OCTOBER 2001
ISSUE #491
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THE NEW!

73® Amateur Radio Today

Fiber-Optic Antenna Tuner

Nifty Test Device

Iran Contra ... er, Controller Project

Plus: Much MORE Spooky Stuff!

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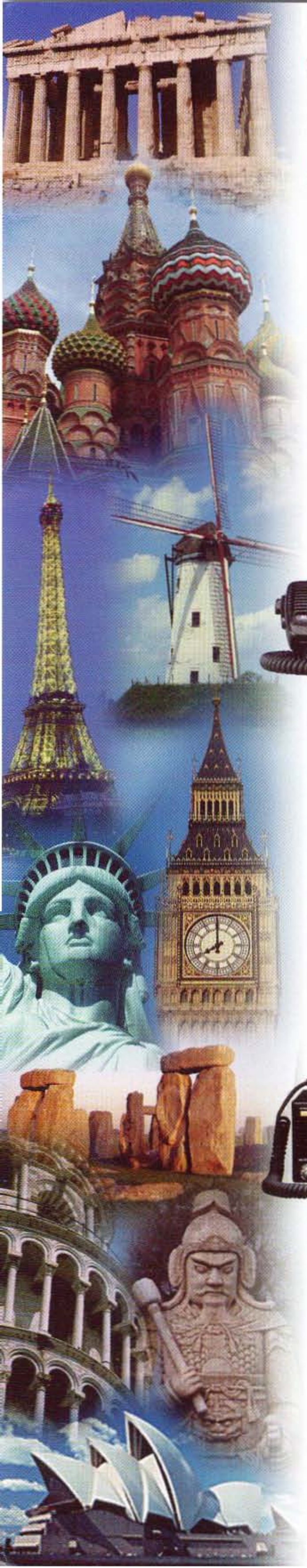
Ham Public Service
(see page 33)



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Rugged and versatile, DX-70 radios are recognized around the world as proven performers!

160m ~ 6m Amateur Band TX in all modes, general coverage RX 150 KHz ~ 30 MHz and 50 ~ 54 MHz, 2 VFOs, 100 memories, removable face for remote mounting, speech compressor, SSB, CW and AM narrow filters, full, semi or automatic break-in, multi-function control, RIT, TXIT, easy split operation, RF gain, CTCSS for 10 and 6m repeaters. 100w output on both HF and 6m.

DX-77T HF Desktop Transceiver

It's the radio Amateurs asked us to build!

A super performer at a tiny price, the DX-77T has solid credentials and great reviews. 160 ~ 10m Amateur Band TX in all modes, general coverage RX 500 KHz ~ 30 MHz, 2 VFOs, internal keyer (6 ~ 50 wpm), 100 memories, 13.8 VDC input, optional computer control capability, CTCSS encoder (front panel programmable), RIT, easy split operation, speech compressor, selectable AGC, large front panel speaker. The value leader in HF desktop radios!

DM-330MV Communications Grade Switching Power Supply

Tiny, powerful, 30A continuous, 32A peak output, weighs less than 5 lbs! Variable output 5 ~ 15 VDC, memory output, rear panel high-current (30A) terminals, triple circuit protection, illuminated V/A meter, ultra-quiet with patent-pending noise-shift circuit. Front panel cigar (10A) and quick-connect (5A) terminals, ripple less than 15mV p-p. Perfect for travel, station or test bench use. There's no switching supply like it! **Also available: DM-340MV IC Regulated Power Supply.**

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Quickly tune wire antenna (from 8 to 80 feet) for any band from 10 through 160 meters (minimum 40 foot wire antenna required for 160 meter use). Perfect for base, mobile or marine use. Plugs directly into Alinco DX-70 and DX-77 transceivers. You don't have to pay more for great performance!

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OCTOBER 2001
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THE NEW! 73® Amateur Radio Today

TABLE OF CONTENTS

Business Office
Editorial - Advertising - Circulation
Feedback - Product Reviews
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THIS MONTH'S COVER: See page 33.
LAST MONTH'S COVER: See page 36.
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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 . . .

More Hams Upgrade, But Little New Blood

A lot of hams are upgrading, but there are few new people coming into the hobby. That's the bottom line as we passed the halfway point in the year 2001.

According to a person who should know, in the last four years the United States Amateur Radio Service has grown at a rate of only 2000 additional hams annually. That's about three tenths of one percent per year and less than the United States Census

Continued on page 6

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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	2⅛ 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	2⅛ 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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- Synthesized 88 to 108...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

Our FM100 is used all over the world by serious hobbyists as well as churches, drive in theaters, and schools. 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

Professional quality rock stable synthesized transmitter. Dip switch settable for any frequency between 88-108 MHz. Strappable for high power output for export applications. Our most popular kit. Start your own radio station today with the FM25!

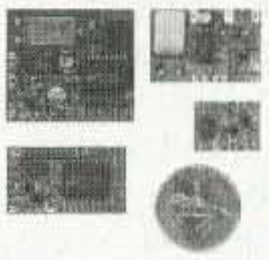
FM25	**Synthesized FM Stereo Transmitter Kit**	**$129.95**

FM STEREO TRANSMITTER

Great entry level FM broadcast kit. Thousands in use. Handy for sending music through house and yard, ideal for school projects too – you'll be amazed at the exceptional audio quality! Runs on 9V battery or 5 to 15 VDC. Add matching case and whip antenna set for great pro look.

FM10A	**Tunable FM Stereo Transmitter Kit**	**$34.95**
CFM	**Matching Case and Antenna Set**	**$14.95**
FMAC	**12V DC Wall Plug Adapter**	**$9.95**

RF WIRELESS LINK MODULES



- SAW Resonators for high stabillty – NO Drift!
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RXD433	**433 MHz Receiver/Decoder Mod., Assembled**	**$26.95**
TXE433	**433 MHz Transmitter/Encoder Mod., Assembled**	**$24.95**
RX433	**433 MHz Data Receiver Mod., Assembled**	**$21.95**
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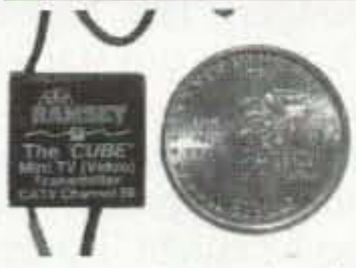
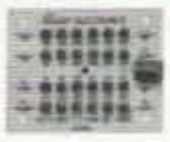
THE CUBES! MINIATURE VIDEO TRANSMITTERS



Wireless crystal clear reception, yet smaller than a quarter! Transmits color or B&W with fantastic quality almost like a hard wire connection to any TV or VCR tuned to cable channel 59. Crystal controlled for no frequency drift with performance that equals law enforcement models that cost hundreds more! Basic 20mW unit goes up to 300' while the high power version can virtually double that range! Fully assembled and tested, and ready to go. Powered by a standard 9V battery. Name that Quarter!

C2000	**Video Cube, Factory Assembled & Tested**	**$89.95**
C2001	**High Power Version, Assembled & Tested**	**$129.95**

INFRA-RED VIDEO CAMERA ILLUMINATOR



Lets video cameras "see in the dark". Invisible light source to us, but lots of light to CCD B&W cameras! Illuminates the area just like light, yet cannot be seen. Draws 180mA at 12 VDC. 110VAC power adapter available.

IR1	**Infra-Red Camera Illuminator Kit**	**$24.95**
AC125	**12VDC Power Supply**	**$9.95**

ELECTRONIC PROTOTYPING SOFTWARE

Priced for the hobbyist!
You can create and test AC and DC circuits minutes after installing this package on your PC. Start from scratch, or from the included library of pre-designed circuits. Drag and drop placement from a complete list of active and passive components. Test using a complete list of virtual instruments, Oscilloscope, voltmeter, ohmmeter, ammeter, and watt meter.

PLAB4	**Electronic Prototype Software, Win95/98**	**$49.95**

ANALOG-DIGITAL PORTABLE LAB STATION

The COMPLETE analog-digital lab station in one. Includes function generator, clock output, power supplies, level switches, pulsers, pots, LEDs and a LARGE breadboarding area all in one! Includes a custom molded case as shown. Used through the world at universities, technical schools, and R&D labs. Available in "Learn as you Build" kit form or factory assembled and tested. A great buy either way!

ML200	**Lab Station, Kit**	**$155.95**
ML200WT	**Lab Station, Factory Assembled & Tested**	**$225.95**

CABLE WIZARD CABLE TRACER

Did you ever have to identify the "other end of that cable"? No more "ohming it out" with the Cable Wizard. Simply connect the wizard transmitter to one end of the cable and use the receiver to sniff out the other end. It's as simple as that! The transmitter sends a pulsating 2 KHz signal down the cable which is heard when the receiver is close to the cable. Works with any cable including coax, telephone pairs, ethernet and more. Equipped with an RJ45 for all telco connections and clip leads for single wire connections.

WCT20	**Wireless Cable Tracer Kit**	**$39.95**
CWCT	**Matching Case Set for Transmitter & Receiver**	**$29.95**
WCT20WT	**Factory Assembled & Tested WCT20**	**$99.95**

SPEEDY PERSONAL SPEED RADAR GUN

This low cost microwave radar uses the same principle found in police units costing thousands more. This has been the number one Science Fair project for years. Direct digital readout in miles/hour, kilometers/hour, or feet/second. An earphone jack allows you to actually hear the Doppler frequency shift of moving objects. Our detailed manual not only guides you through constuction, but covers the how's and why's of speed radar theory. Learn while you build. Uses two 13 oz coffee cans for the antenna (not included, so start drinking!) and runs on 12 VDC.

SG7	**Speedy Personal Speed Radar Kit**	**$99.95**
AC125	**12VDC Power Supply**	**$9.95**

AND...OUR FAMOUS *MINI-KITS*

These are easy to build kits that can be used either stand alone or as building blocks for more complex projects.

TS4	**Tickle-Stick Shocker**	**$9.95**
BN9	**Super Snoop Amplifier Kit**	**$8.95**
BL1	**LED Blinky Kit**	**$3.95**
TD1	**Tone Encoder/Decoder Kit**	**$6.95**
TT7	**Touch Tone Decoder Kit**	**$29.95**
CPO3	**Code Practice Oscillator Kit**	**$9.95**
UT5	**Universal Timer Kit**	**$8.95**

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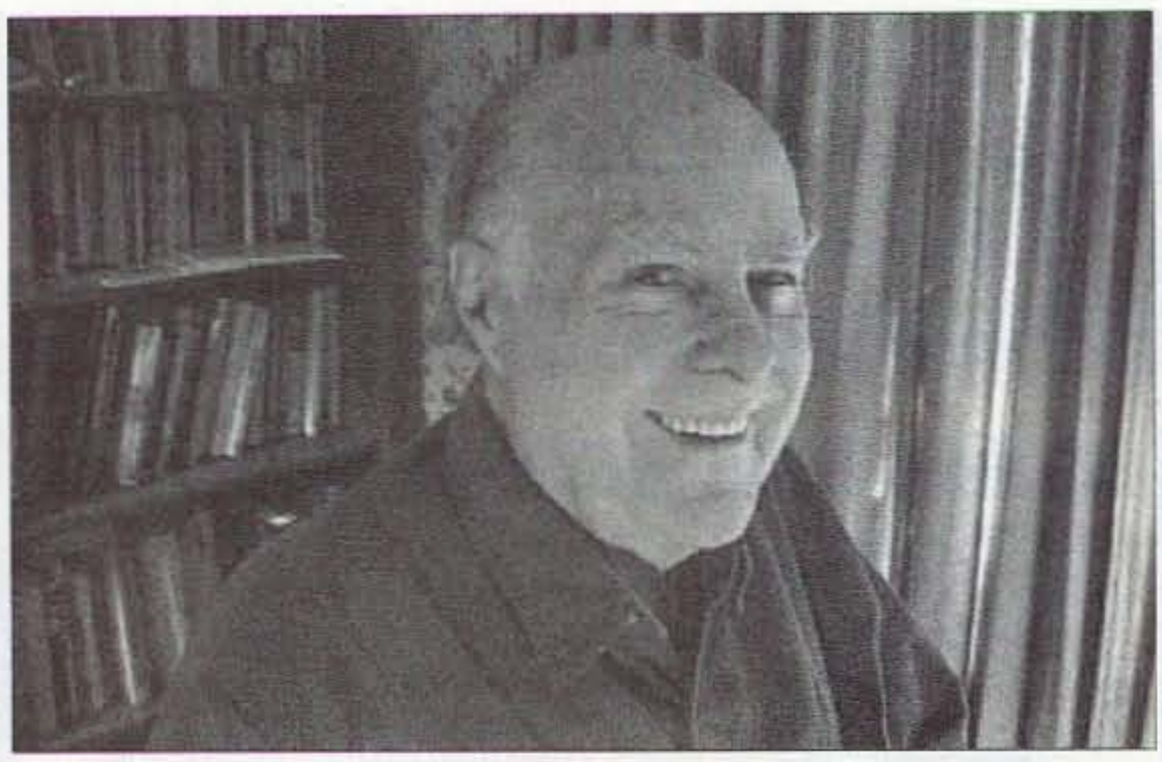

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Stagnant

It's no wonder the ham industry is in such deep trouble. Do you know how much growth we've had in the last four years? What would you guess, 5%? 2%? No, it's zero percent. Dead in the water. And that's only if we don't count the number of old timers who have died since their last ten year license renewal. Considering that almost half of the ARRL members are retired, and that almost zero percent of older people are truly healthy, we've been seeing a net drop in our numbers.

Either you somehow get the League HQ off the Newington golf courses to start promoting amateur radio to youngsters or we're dead meat.

When I got interested in hamming the average ham age was 28. It was a young man's hobby with all kinds of interesting things to build and pioneer. That's what got to me, not sitting there year after year in a roundtable. And not spending decades fighting the pileups for twenty-second DX contacts. Oh, I did those for a while and had fun doing them. I enjoyed the sweepstakes, DX and VHF contests — for a while. But you have to be a Big Gun to do that, with a kilowatt, tower, and great big beam.

A couple of readers sent me clippings of nice ham newspaper articles — the first I've seen in ages. I should be getting dozens a week, not four or five a year. I should be seeing frequent exciting articles in teenage magazines about our hobby.

The League has the money and the responsibility — what they don't have are enough members who give a damn. If you'll read the latest board of director's meeting report you won't even find a hint of any push to get HQ to start promoting the hobby. I can hear the Newington snoring all the way to New Hampshire.

Teaching

If you want to teach your dog the basics ... to walk by your side, to sit down, lay down, come when called, and then on to tricks, how far do you think you'll get if you punish your dog and make him fear you to force him obey? The only way you'll get any results with a stick is by throwing it. Dogs, until punished, are anxious to please. The more love you put into a dog, the more love you'll get back.

Lion tamers today sleep and play with their lions. They don't go at them with a whip and a chair poked in their face. Siegfried and Roy sleep and play with their tigers. No fear or punishment was involved in their training, only love and understanding.

A University of New Hampshire study showed clearly the connection between teen suicide and parents who spanked their children to force them to behave.

Punishment as a way to teach animals or children just doesn't work.

During my 16 years in public schools and college I had only two teachers who did not use fear and punishment to force me to learn. One in high school, and one in college.

Fear? The fear of not passing a test. Fear of not getting a good grade. Fear of my parents if I didn't get good grades.

Mr. Docket, my high school art teacher, had no tests for me to fear. He loved his subject and communicated this to me. He made learning to draw and paint fun and exciting. My mother, who went to the same high school when she was a teenager, also had Mr. Docket as her art teacher. He got her so excited about art that she went on to Pratt Institute of Art and became a commercial artist, painting magazine covers and portraits.

In college it was memorize and test, memorize and test. None of us stayed up all night studying because we wanted to learn more, we did it so we could pass another damned test the next day. The punishment was brutal and the college was proud of it.

The teachers made no effort to make their subjects interesting or fun. I took three years of calculus and hated every minuet of it. When I asked the teachers where I might have a use for what we were being forced to memorize, they had no answer. No wonder, I've been in all sorts of businesses and published high-tech magazines for most of my life and I've never had any occasion to use anything covered during that four years of torture.

The English literature course, which should have been real fun, was an unforgettable grind which turned me off to reading for years.

During the four years of college torture at Rensselaer I had one course where the professor made it fun to learn. He made it so much fun that all of us hated it when the class was over and could hardly wait to get to our homework. We had no exams to fear. We had problems to solve and the excitement of solving them. It was great fun. The subject? Probably the most unlikely to seem fun that you could imagine: accounting!

This is why I predict that education provided on DVD via interactive video is going to eventually wipe out our present school system. Imagine kids begging their parents to get them a program on U.S. history, or geometry! When we provide educational programs that are fun and exciting, we won't be able to stop kids from learning any longer. The history of how America got started is a fantastic story.

Everything that our school system is supposedly teaching can be taught in a fraction of the time if the kids are having fun doing it. Reading, writing and arithmetic can be learned in less than 100 hours instead of twelve years.

When I joined the navy during WWII as an electronic technician, I didn't know beans. The navy school, in just nine months, taught thousands of kids who didn't know a volt from an ampere when they started, how to

Continued on page 38

Big Savings on Radio Scanners

Uniden® SCANNERS

NEW!

Bearcat® 780XLT Trunk Tracker III

Mfg. suggested list price $529.95

Less -$190 Instant Rebate / Special $339.95

500 Channels • 10 banks • CTCSS/DCS • S Meter

Size: 7^5/8" Wide x 6^15/16" Deep x 2^13/16" High

Frequency Coverage: 25.0000-512.0000 MHz., 806.000-823.9875MHz., 849.0125-868.9875 MHz., 894.0125-1300.000 MHz.

The Bearcat 780XLT has 500 channels and the widest frequency coverage of any Bearcat scanner ever. Packed with features such as Trunktracker III to cover EDACS, Motorola and EF Johnson systems, control channel only mode to allow you to automatically trunk certain systems by simply programming the control channel, S.A.M.E. weather alert, full-frequency display & 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 ligher 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, order magnetic mount antenna part number ANTMMBNC for $29.95; The BC780XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO or ESAS systems. For fastest delivery, order on-line at www.usascan.com.

Bearcat® 895XLT Trunk Tracker

Mfg. 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 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 enjoyment, 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's 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. 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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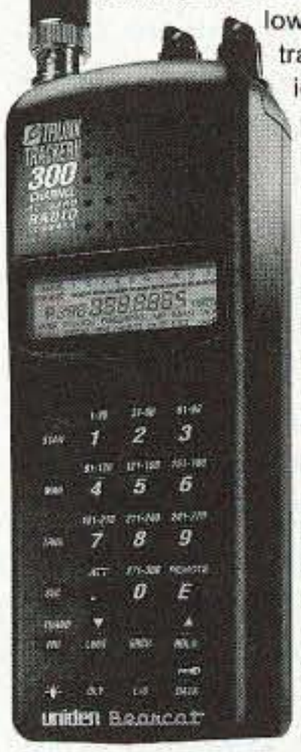

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QRX . . .

continued from page 1

Bureau's total projected percentage increase in the total population of the country.

The person presenting the facts is Fred Maia W5YI, who heads up the W5YI VEC and has been carefully evaluating trends in ham radio for over two decades. And what he has found is good reason for concern.

According to Maia, four years ago, the total Amateur census stood at 674,000. It now stands at 682,000. But, says Maia, an additional 30,000 amateurs are still listed in the FCC's database which includes those whose licenses have expired, but who fall within the government's 2-year renewal grace period. That's the time when you cannot operate a station but can renew without taking an exam.

Maia says that the FCC is now canceling about 1,500 licenses every month that are not renewed within that grace period. He suspects that many are silent keys.

The good news — if you can call it that — is that hams upgraded their licenses in unprecedented numbers. Maia believes that this was motivated by the FCC's restructuring of the United States Amateur Radio service. With the reduction of the top Morse testing speed to 5 words per minute, he believes that most Technician Pluses, Generals, and Advanceds upgraded simply because the 13- and 20-word-per-minute code exams were no longer required. As a result, and to the delight of equipment suppliers, tens of thousands of potential high frequency operators have been added to the all-band rolls. By license class, that's 20,000 new Extra Class and 27,000 added Generals.

But there is another side to the equation. As you might expect, the Novice, Technician Plus, and Advanced Class — all of which have essentially been placed in limbo since restructuring — have seen comparable decreases in numbers. Advanced is down by about 15,000. The Tech Plus is down by 40,000, and there are 8,000 fewer Novices.

The Tech Plus got a double-barrel hit because this license class is no longer being issued. Instead, the database of Technician Plus and Technician class have been lumped together in the FCC's database. Existing Tech Plus license holders are having their tickets renewed as Technician even though they hold a 5-word-per-minute code credit.

This, says Maia, distorts the total of No-Code Technician-Class statistics since many Technician class holders do indeed hold Morse Code credit.

There is some good news. Statistics show that about 1,600 new code-free Technician Class hams are licensed for the first time each month. That's close to 19,000 annually.

Thanks to David Black KB4KCH and the W5YI Report, *via* Newsline, *Bill Pasternak WA6ITF, editor.*

Young Ham of the Year

Patrick Clark KC8BFD, a 17-year-old from Elkview WV who is heavily involved in public service, emergency communications, and youth recruitment of new radio amateurs, has been named the 2001 "Amateur Radio *Newsline* Young Ham of the Year" (YHOTY), according to ham radio operator and Award Administrator Bill Pasternak WA6ITF. The award is jointly sponsored by Pasternak's Los Angeles-based Amateur Radio *Newsline,* Vertex Standard USA, Inc., of Cerritos CA, and CQ Magazine.

Licensed since age 10, Patrick comes from an all-ham family. His sister Erin is KC8PZZ. Mother Tina is N8TSY and his dad is Jeff Clark K8JAC. Following in his family's footsteps, Patrick has been involved in emergency service work from the day his ham radio ticket arrived in the mail. This included the West Virginia Field Day flooding of 1998, when the annual emergency preparedness drill took on a real-life meaning as the skies unexpectedly opened up:

"It was sad to see how many people lost their houses," said Patrick, who with his mother drove to the flood ravaged area to provide communications assistance. The story of one of the disaster victims still hangs in Patrick's mind:

"People showed up at the shelter having nothing. The incident I remember most is when a family came in and said that they had just lost their father, and the child did not have his medication ... and we need his medication because he is a diabetic ... so we contacted Metro 911 and got him his medication. And it sort of made Mom and I feel we had actually accomplished something and helped save a kid's life ..."

If you get the feeling that providing public service communications is almost a way of life for Patrick, you would not be wrong. In addition to his Amateur Radio Emergency Service (ARES) activities, KC8BFD is also a Certified Severe Weather Spotter with Skywarn, a National Weather Service volunteer program. He also holds certification in Basic Life Support and use of a defibrillator. While not a scout, he is a regular operator with the Jamboree on the Air, has spoken twice at the Dayton Hamvention Youth Forum, and promotes Amateur Radio to other youngsters through personal appearances. This includes the annual Sheriff's Youth Camp. And while maintaining a 3.5 grade point average, Patrick still finds the time to act as Net Control Station for the weekly Kanawha Amateur Radio Club's weekly 2-meter net. In his spare time, he is trying to get the Worked All States Award on 10 meters:

"I like the challenge of getting [awards like] the Worked All States Award (WAS). I am mailing out QSL cards tomorrow to try to get 42 states confirmed."

Among those commenting in favor of Patrick's nomination was Morris "Mac" McMillian W8XF, who is ARRL Section Emergency Coordinator for West Virginia. McMillian believes that the future of ham radio is in good hands with a young man like Patrick Clark KC8BFD:

"I have always been able to rely on Patrick's ability to think on his feet in a drill or actual ARES activation, both as EC and now as SEC," says W8XF, adding: "To how many youngsters can you turn over a brand new Yaesu FT-847 on Field Day and say, 'Go for it!'? I did just that with Patrick. Not only was he proficient with it, but he taught me new features on my radio!"

The 2001 *Newsline*™ Young Ham of the Year Award was presented on Saturday, August 18th, 2001, at the Huntsville Hamfest in Huntsville AL. The award ceremony was co-hosted by Bill Pasternak WA6ITF of Amateur Radio *Newsline,* and YHOTY Award Committee Chairman Larry Zettwoch KR4IF.

The presentation of the award as a regular feature of this prestigious Amateur Radio convention has been made possible through the generosity and kindness of the Huntsville Hamfest Planning Committee and its Chairman, Walter "Scotty" Neustadter W4WW.

The Amateur Radio *Newsline* Young Ham of the Year award program, (formerly the *Westlink Report* Young Ham of the Year), now entering its 17th consecutive year, is presented annually to a licensed Radio Amateur (ham) who is 18 years of age or younger and has provided outstanding service to the nation, his community, or the betterment of the state-of-the-art in communications through the Amateur Radio hobby/service.

Past recipients of the Young Ham award include Shawn Alan Wakefield WK5P, of Bartlesville OK (1986); David Rosenman KA9PMK, of Muncie IN (1987); Jonathan Binstock NK3D, of Potomac MD (1988); Erin McGinnis KAØWTE, of Topeka KS (1989); Mary Alestra KB2IGG, of Staten Island NY (1990); Richard S. "Sammy" Garrett AAØCR, of St. Louis MO (1991), and Angela (Angie) Fischer KBØHXY, also of St. Louis (1992); Kevin Boudreaux N5XMH of New Orleans LA (1993); Allison Daneen Zettwoch KD4CKP of Louisville KY (1994); Adam Weyhaupt N9MEZ of Alton IL (1995); Toby Metz KB7UIM of Boise ID (1996); Brian Mileshosky N5ZGT of Albuquerque NM (1997); Richard Paczkowski, Jr. KF4BIA, of Edgewater FL (1998); Michelle Swann KE4EZI of Warner Robins GA (1999); and Christopher Arthur KT4XA, of Russellville AL (2000).

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

ARRL Says Hams Should Get 5 MHz Band

The ARRL says its time for ham radio to have a new band at 5 MHz, and it's asking the FCC to designate one.

A petition filed by the ARRL could result in a new high-frequency band for U.S. amateurs. The ARRL has asked the FCC to allocate 5.250 to 5.400 MHz to the Amateur Service on a domestic — U.S.-only — secondary basis.

The League told the FCC that the new band would aid emergency communication activities by filling a "propagation gap" between 80 and 40 meters. "There are times on certain paths when a frequency in the 80-meter band is too low, and a frequency in the 40-meter band is too high for reliable ionospheric propagation," the ARRL said in its petition. The ARRL said the propagation gap can hamper communication between the U.S. and the Caribbean during a hurricane or severe weather emergency.

The ARRL Board of Directors approved the proposal at its July 20-21 meeting. The FCC has not yet invited public comments on the petition. Even if the petition finds favor with the FCC, it's likely to be several years before the new band actually becomes available.

The ARRL said a new 150-kHz allocation at 5 MHz also could relieve substantial overcrowding that periodically occurs on 80 and 40. If the new band is approved, hams would have to avoid interfering with — and accept interference from — current occupants of the spectrum, as they already do on 30 meters. The band 5.250 to 5.450 MHz now is allocated to fixed and mobile services on a co-primary basis in all three ITU regions.

The ARRL's petition cites the success of the League's WA2XSY experimental operation in the 60-meter band, carried out since 1999, which confirmed the communication reliability of 60 meters.

"An amateur allocation in this band would improve the Amateur Service's already exemplary record of providing emergency communications during natural disasters when even modern communications systems typically fail," the ARRL concluded.

A copy of the ARRL petition is available on the ARRL Web site, [http://www.arrl.org/announce/regulatory/5MHz].

As suggested by the ARRL, amateurs General class and higher would be permitted to operate phone, data, image and RTTY on the new band running maximum authorized power. No mode-specific subbands were proposed.

Thanks to Rick Lindquist N1RL and the ARRL, via Newsline, *Bill Pasternak WA6ITF, editor.*

The NCVEC Wants to Hear from You

The new Chairman of the National Council of Volunteer Examiner Coordinators — the NCVEC — says that there are several issues he wants to bring to the attention of every ham in the United States and its possessions. John Creel WB3GXW, who was elected to the post on June 27th, says that while the VEC program is in great shape, there are some minor problems — but nothing insurmountable.

Creel says that the most important thing the NCVEC needs is closer ties to the ham radio community. He says the Question Pool Committee in particular needs ongoing input from every United States ham who is concerned about the future of the hobby. He adds that the NCVEC also has to find ways of improving testing opportunities in Alaska, where he says sessions are too few and too far in between.

Creel believes that the ham radio community probably has no idea of the unbelievable amount of time the Volunteer Examiner teams and the 14 VECs devote to the program. He notes that

Continued on page 38

LETTERS

From the Ham Shack

Louis L. D'Antuono WA2CBZ. I've had such good response from the readers of *73* when I've been in need of materials or information, I thought I'd try it again with another item I am interested in. I need information on the Russian Volya or Volna military shortwave receiver. Please send information to me at 8802 Ridge Blvd., Brooklyn NY 11209. Thanks!

Tim Hamilton. I just got some third-degree chemical burns from a plumbing accident under the house (acid). My memory triggered the remembrance of the silver colloid generator parts I got from you but never built. I kicked into the assembly mode. I applied it internally and externally. In one week everything scabbed over nicely.

That stuff's magic — for cuts, burns, warts, jock itch, athlete's foot, ear infections, and rashes. The pure silver and a kit for making the stuff is available from Radio Bookshop (page 63). — Wayne.

Barry Sanderson KB9VAK, Indianapolis. Digital images have been successfully transferred from Australia to the United States on 20 meters using normal SSB radios. A computer sound card was used to provide the audio to the transmitter. Another computer sound card was used to record the audio from the receiver. Computer programs were used to generate the audio that was transmitted, and to recover the original image file from the audio that was received. Differential phase modulation and two levels of Reed-Solomon coding were used to transfer these image files.

A presentation describing this method was made at the Dayton Hamvention on May 19th, 2001. The slides from this presentation, as well as some that were not shown, are available at [http://svs.net/wyman/examples/hdsstv/index.html].

The source code used to transfer these images is distributed under the terms of the GNU Public License, which is included in the distribution via the URL [http://svs.net/wyman/examples/hdsstv/pm7b100.tgz]. This source code has only been used under the Linux operating system. Anyone wishing to port it to other operating systems is encouraged to do so. Questions may be E-mailed to [wyman@svs.net].

A number of SSTV images, using various modes, were transferred just after the digital transmissions were concluded. A comparison of the SSTV images and the digitally transferred images is available at [http://www.mindspring.com/~sstv/hdsstv/sstv-com0.html].

Sietse PA1XA. I think that Roger G3LDI hits the nail on the head in his analysis on the CW issue. Amateur radio isn't about numbers, but it's about quality. Lowering our standards might be the beginning of the end and will prove to be almost impossible to reverse. We should focus on interested and motivated people who are willing to do just that bit more. CW should be used as an attraction, not as an argument why people are not willing to be a ham op. I personally think that this argument isn't right — you first have to take a technical exam before CW comes in sight. Many people are not motivated enough to start studying for this technical exam, without even thinking about CW.

We shouldn't want to compete with the Internet and other digital hobbies, our strength is the magic in plain old radio, antennas, and propagation problems. The strength of our representation and arguments is much more important than the number of amateurs which those representatives represent.

CW is magic, and magic is what we need to attract new, motivated radio amateurs.

Au contraire — it's all about numbers. To keep our bands from being sliced and diced, quality isn't going to count. We're dealing with politics, and very rich corporations who want to buy spectrum. Our spectrum. — Wayne.

Richard C. Skolo KD7NKW, Salt Lake City UT. Here goes on try number two to write a coherent letter to convey a meaningful message.

You are a wise man. Very wise indeed. Therefore I need not spend a lot of time covering material that you have dealt with editorially in *73* magazine plurally.

Things like discovering an interest in two-way radio communications via CB in 1978. Or how natural it seemed to graduate quickly to a good SSB rig. Then on to an "export" President Grant and an 80 watt RF amp. I could talk all over the free, and sometimes not so free, world. One of the first stations I worked with this mobile station was in the Marshall Islands.

I was ready for more. *Eleven Meter Times and Journal* was good. So were *CQ, Ham Radio*, and of course *73*. *QST* never did flip my switch — I thought the contests and certificates were dorky.

Honestly, it was your often lengthy "Never Say Die" that I was looking forward to and buying. You were an insider who saw the problems very clearly. More importantly you offered solutions. You were there writing about the need for new hams. At the time I was 34 years old, newly married, one baby, and a desire for social contact while at work (driving).

The outreach from the ham community was not only nonexistent, but what I got was outright negative. Three of my customers were hams. They scoped my CB and free band ways as though it might be contagious. NO ONE wanted to show me their station and what it could do. I was a black sheep because I had dared to discover radio without opening the "ham" door first.

I still wanted more. In 1984 I bought *Tune In the World With Ham Radio* and started to read my way through that. My family had grown to two kids, one on the way, and the same old wife. I had plenty to do and my attitude had declined to "screw the hams!" After all, I had 11 meters and an estimated 20 million CB and free band stations out there to talk to. Who needs 'em? On a good day there were more CB and free band operators actually on the air than there were licensed hams. If ham radio could have "converted" just one out of ten 11-meter ops, ham radio could have doubled its numbers. Oops, now I'm sounding more like you.

By 1992 I had another son. My regularly assigned corporate vehicle that contained my station was retired and I was assigned a temporary van. My station was dismantled and put on the shelf of my garage and has never been used again.

Interest in radio faded. new things filled the void — even my sporadic purchase of *73* ended — sorry about that.

Then, this past April my church organized a ham class to generate new ops for our local 2m net. While much of America was wondering why we Utahans made such a big deal out of having a tornado tear through town in August of '99, we did learn that landline and cellular service was not the number to bet on in a real emergency. The church wanted new ops, and I did know a thing or two, so I signed up for the classes.

Continued on page 58

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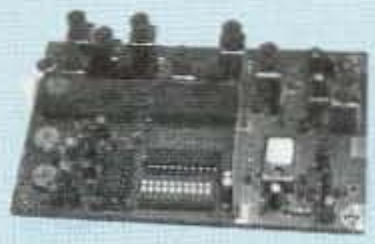

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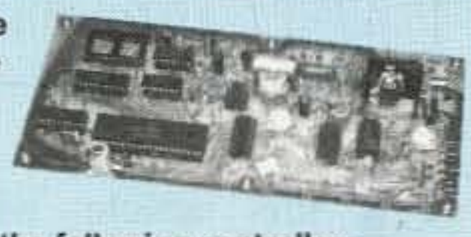

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COR-5. µP controller with autopatch, reverse ap, phone remote control, lots of DTMF control functions, all on one board, as used in REP-200 Repeater. ..... **$379 w/t**

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

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Russ Cable WA6TLK
707 2nd St.
Steilacoom WA 98388
[rustoncable@mindspring.com]

Antenna Tuning at the Speed of Light

Build your own 8-channel fiber optic control system.

I have never particularly liked antenna tuners. For several years, I worked on various types of HF antenna tuning units (ATUs) installed in aircraft. These were completely automatic units usually mounted near the antenna. From this experience, I learned that an ATU could do a very good job of antenna matching, and without adding more knobs to diddle with in the shack. These units, however, cost big bucks and ran off of 400 Hz AC or 28 volts DC or both. Newer generations of HF rigs often have built-in ATUs, but most will work only with particular radios. Then along came the LDG Electronics AT-11 antenna tuning unit, and my life was changed.

This article will describe a couple of additions/modifications I put in place using some readily available kits, 1mm plastic fiber optic cable, and my venerable AT-11. If you already have one of these units or are planning on getting one, you will want to add the flexibility my mods give your new toy. Refer to **Fig. 1**.

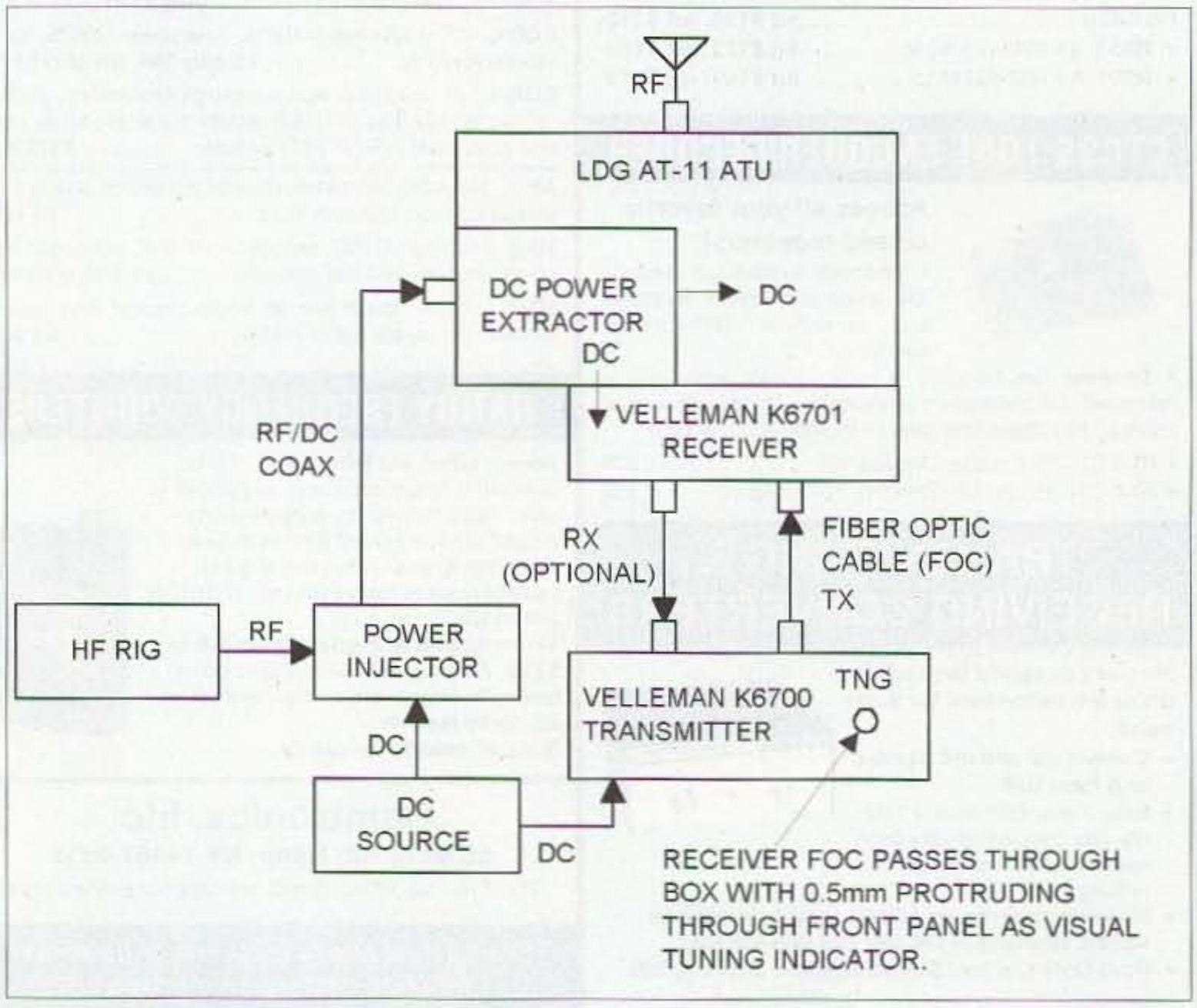

Fig. 1. *Fiber optic control system. Receiver FOC passes through box with 0.5mm sticking out of the front panel as a visual tuning indicator.*

My system

The AT-11 is a microprocessor-controlled ATU that came as a kit and worked great the first time it was hooked up to my aging Kenwood TS-530S. However ... as a ham I was bound not to leave well enough alone. To start with, I did not want the ATU in the shack because tuners are intended to tune the antenna, not the coax between the radio and the antenna. My rig is located in the house, with the ATU mounted on the wall of a detached garage about 60 feet from the radio. The antenna is a five-band trap-type dipole attached to the garage roof; with this tuner, I am able to operate from 160 through 10 meters.

The AT-11 will operate in the automatic mode in this configuration, but to be able to use all of its manual functions, about 10 control wires would have to run from the shack to the ATU. This was too many wires; I have plenty installed already for other systems. I had previously modified my AT-11, adding a system that enabled me to send 12 volts DC down the coax with the RF to power the unit. However, the only control I had was to be able to turn the ATU on or off. There had to be a better way.

The solution

First, I elected to use 1mm plastic fiber optic cable instead of control wires so I would not have any RF pickup problems to deal with, and I wanted to use fiber to learn how to use it. With fiber I had to use serial data transfer of some kind. I then saw a Velleman-Kit catalog describing a couple of 2-wire, 8- and 10-channel pulsewidth modulation–type remote control systems.

There are now two kits that can be used for this project. The first kit is the K6700 transmitter with the K6701 receiver. This is an older kit and is being discontinued, but a check of dealers shows there are still many of the kits still in stock. The other kit is the new K8023; it uses a microprocessor to encode and decode the commands and consists of the P8023S transmitter and the P8023R receiver.

With a little modification, either of these kits is able to communicate using plastic fiber optic cable for the signal path. The plastic cable used is *very* easy to work with. You need only common tools to work with it and there are a variety of emitters, detectors, and splices available to use with it. Whichever kit you choose to use, first build the kits according to the instructions and then ensure they work as advertised before you do the modifications I outline. The required modifications are described below.

As I said, the AT-11 is a great little device which I modified just enough to get my system to do what I wanted. All of the modifications are additions to the existing circuits and do not require any major surgery to the unit that could do more damage than good. The first modification, and possibly the only one you may want to do, is to add a power injector/extractor system in the RF circuit, allowing you to power the ATU remotely by way of the RF coax.

DC power

The DC power injector is simple and easy to build. [See **Fig. 2(a)**.] This should be built in a small metal box or inside the rig you're using. Mine is built in a small metal box with BNC connectors for the RF, and the DC is fed into the box with an RCA type connector. I get the power from the TS-530S filament supply; that way, the tuner can be active only when the "Heater" switch is on.

The power extractor in the ATU

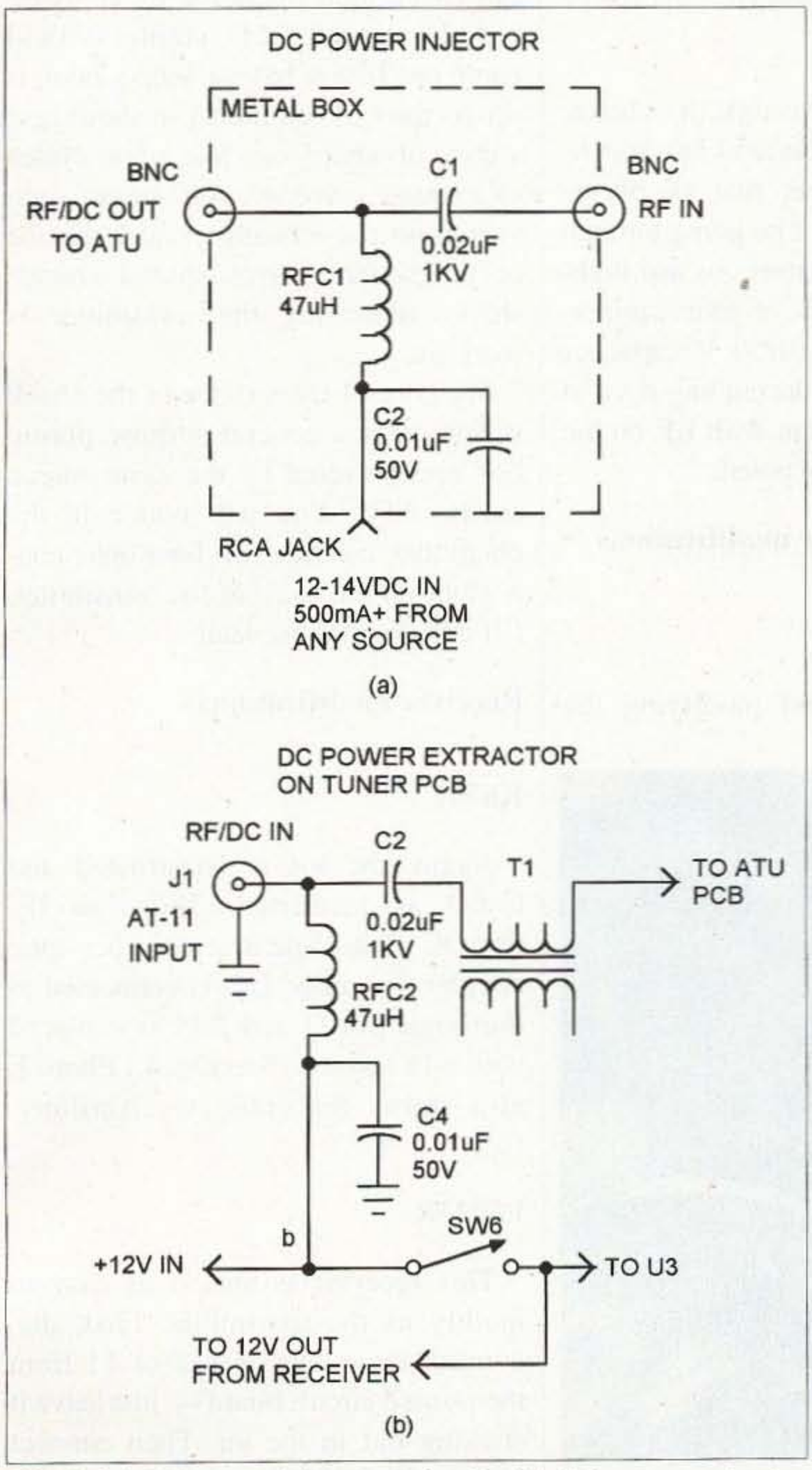

Fig. 2. (a) DC power injector at the rig. (b) DC power extractor on tuner PCB.

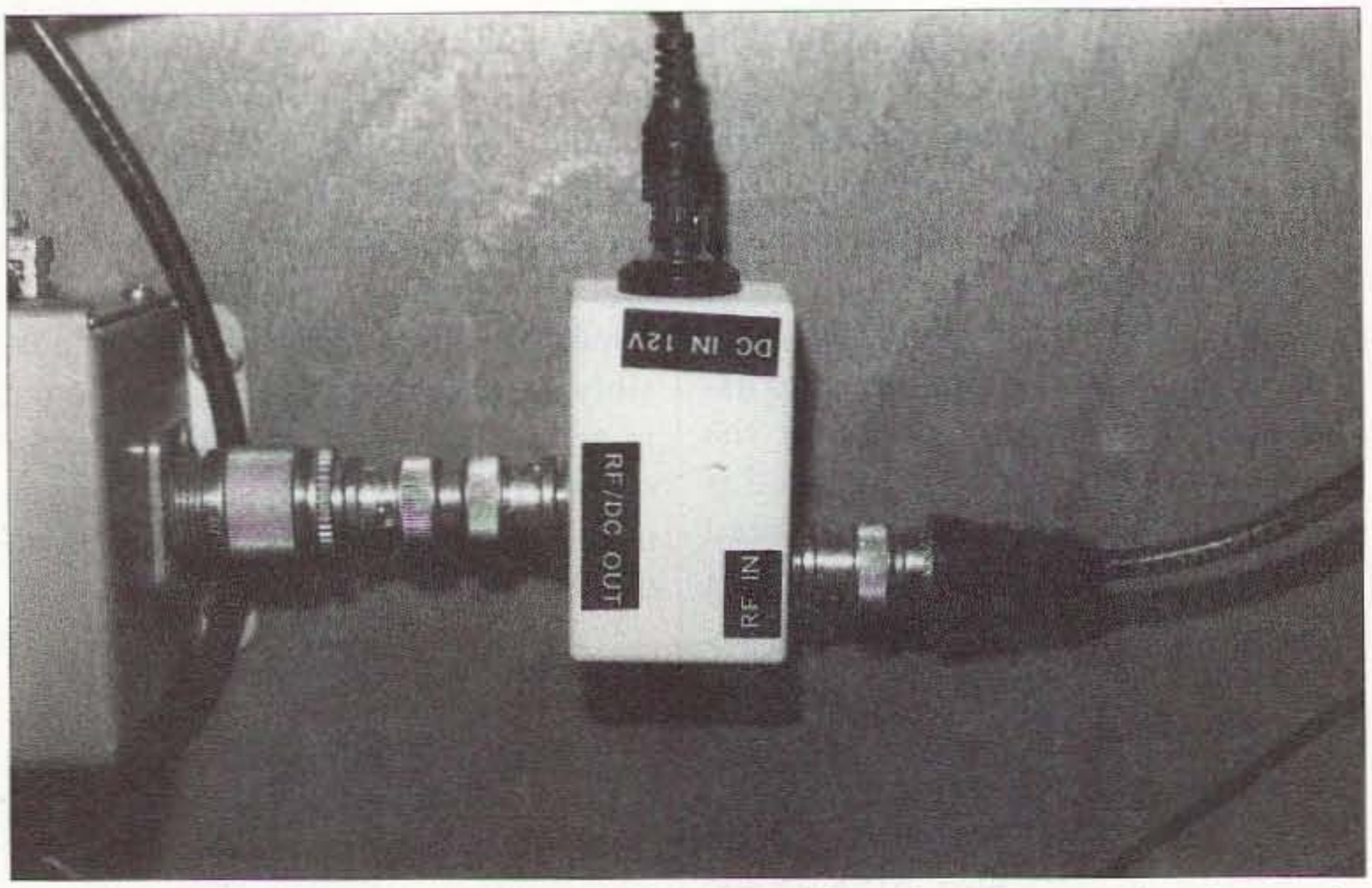

Photo A. *The finished power injector. DC is derived from the HF transceiver but can be from any source. (Photos by author)*

consists of two disc ceramic capacitors and a small RF choke. [See **Fig 2(b)**.] The 0.02/1 kV capacitor is connected between the RF input connector and the circuit board. The capacitor's lead going to the printed circuit board is used as the one turn winding that goes through the center of the core which makes up T1. T1 is the SWR sensing transformer, which is a part of the AT-11 kit. The RF choke on the connector side is a small 47 µH unit which I had in the junk box.

The values of the capacitor and inductor do not seem to be critical. Just keep in mind that the total current of the ATU must go through the choke, so keep the DC resistance as low as possible. Also, remember that all of the transmitter power will be going through these blocking capacitors, so use high-quality disc ceramics or trans- mitter-grade micas. The 0.01/50 V capacitor adds a bit more RF decoupling right at the choke. No problem with RF on the DC line has ever been noted.

Control transmitter modifications

K6700

Next, building and modifying the transmitters. I'll start with the K6700. The kit is built as instructed. Then, from the DO pin connect a 220 ohm resistor and U6, an IF-E97 super bright red emitter, which is an integrated red LED fiber optic coupler assembly. Remove R9. (See **Fig. 3**.)

P8023S

Build the entire kit. Then, connect U8, another IF-E97 red LED emitter, across T2; from the collector to the emitter of the transistor. [See **Fig. 5(a)**.] This is all that has to be done to convert the transmitter to an optical emitter.

To test the optical transmitters, you can check their operation by applying power; the red LED emitter should come on. If you have a scope, hook it across the LED emitter; you should get a trace of what looks like a few cycles of a square wave. As you operate each switch on the transmitter, at least one of the square waves should change shape, indicating the transmitter is working.

My control transmitter in the shack is housed in a general purpose plastic box and powered by the same source as the ATU. You will notice in the photo that there are two fiber optic connectors on the back of the transmitter. I'll talk about those later.

Receiver modifications

K6701

Again, the kit is constructed and tested as instructed. Then, an IF-D95OC photologic detector fiber optic coupler assembly, U5, is connected to the input pin D and R11 is replaced with a 1k resistor. (See **Fig. 4**.) **Photo E** also shows the entire receiver/interface.

P8023R

This receiver is almost as easy to modify as the transmitter. First, disconnect the collector lead of T1 from the printed circuit board — just leave it sticking out in the air. Then connect U7, the IF-D95OC optical detector, as shown in **Fig. 5(b)**. That's it — the

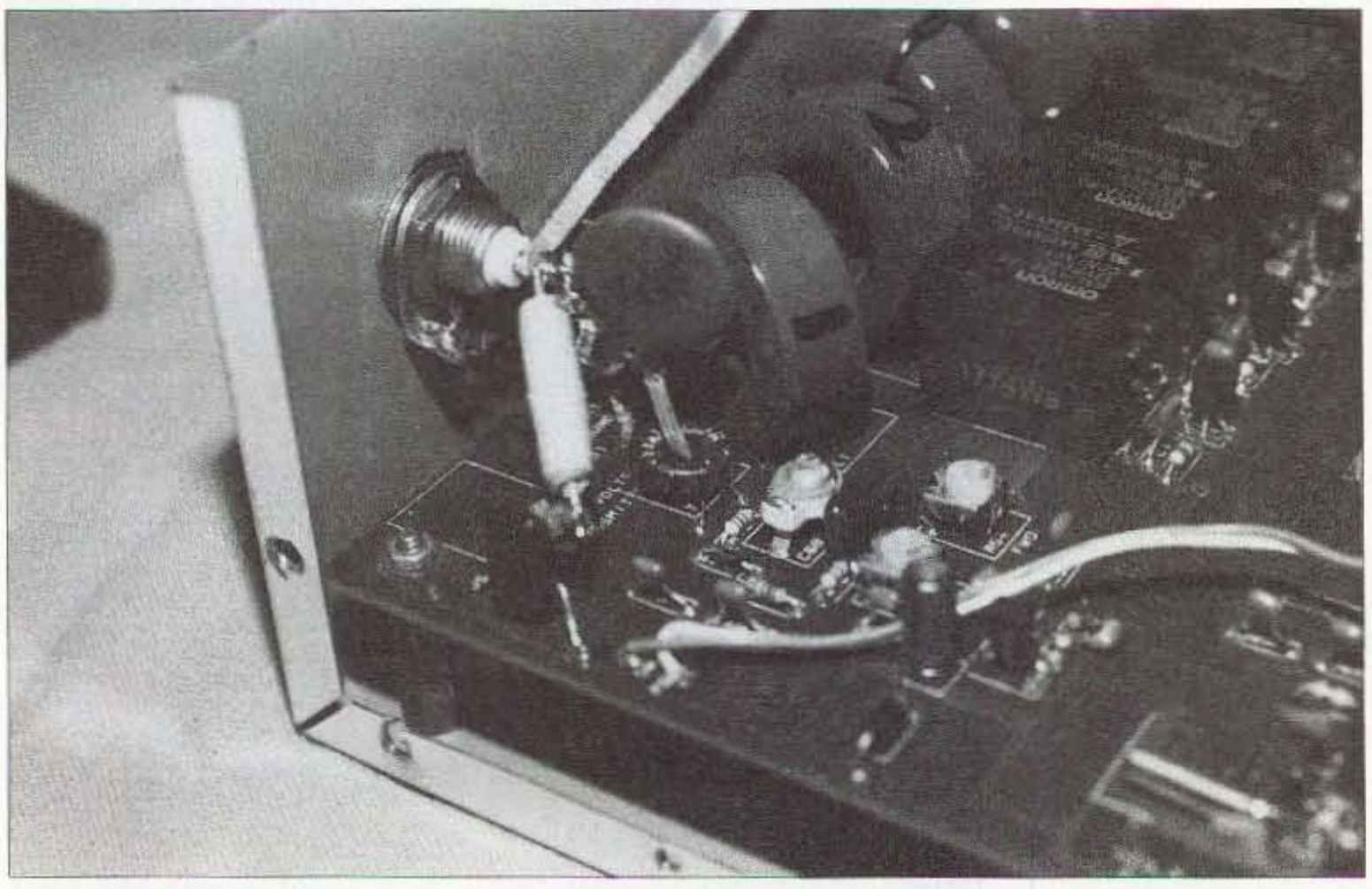

Photo B. *The power extractor mounted inside the tuner enclosure, showing one lead of C3 passing through T1, a part of the ATU.*

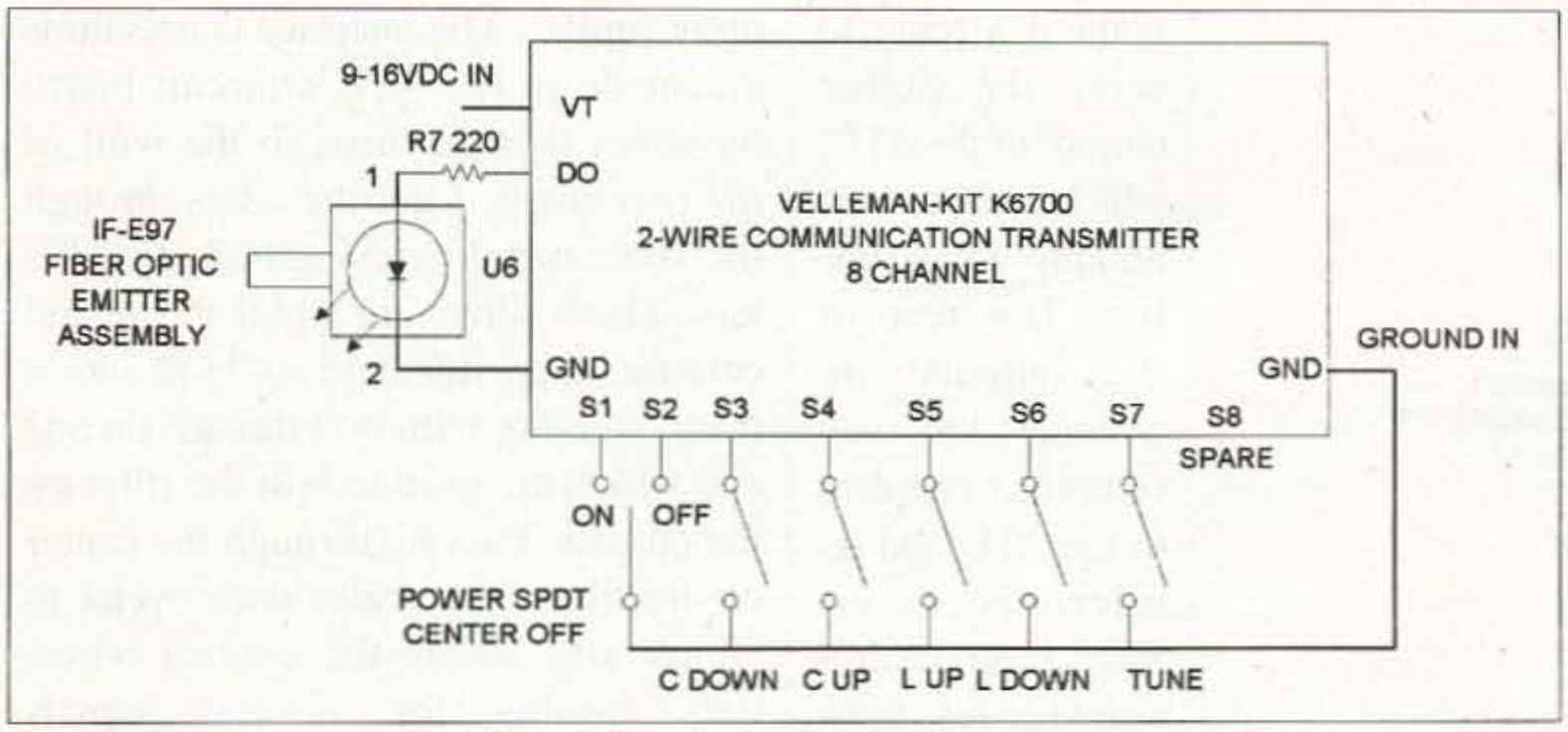

Fig. 3. Control transmitter locatod at rig in the shack.

receiver is now ready to be connected to a transmitter by the fiber optic cable and a system test run.

As a quick test, power up the receiver/transmitter system and select commands; the various channel indicator LEDs on the receiver should light as you select them on the transmitter. If you want to confirm that the data is being carried by the fiber optic cable and not the two original wires, connect the receiver or transmitter to its own battery supply and test the system again. That was the easy part; the interface to the ATU gets a little more complicated but it works great.

Interface/System Integration/ Checkout

The K6701 receiver has eight outputs; the K8023 receiver has 10 outputs. When a valid code is received, the appropriate output of the receiver goes low. I used seven of these outputs to control all of the ATU's manual functions: C up/down, L up/down, power on/off, and manual tune command. I used no particular order when choosing which output did what — I just started with output 1 and used it as the power on function, and on through to output 7.

My way of controlling the power

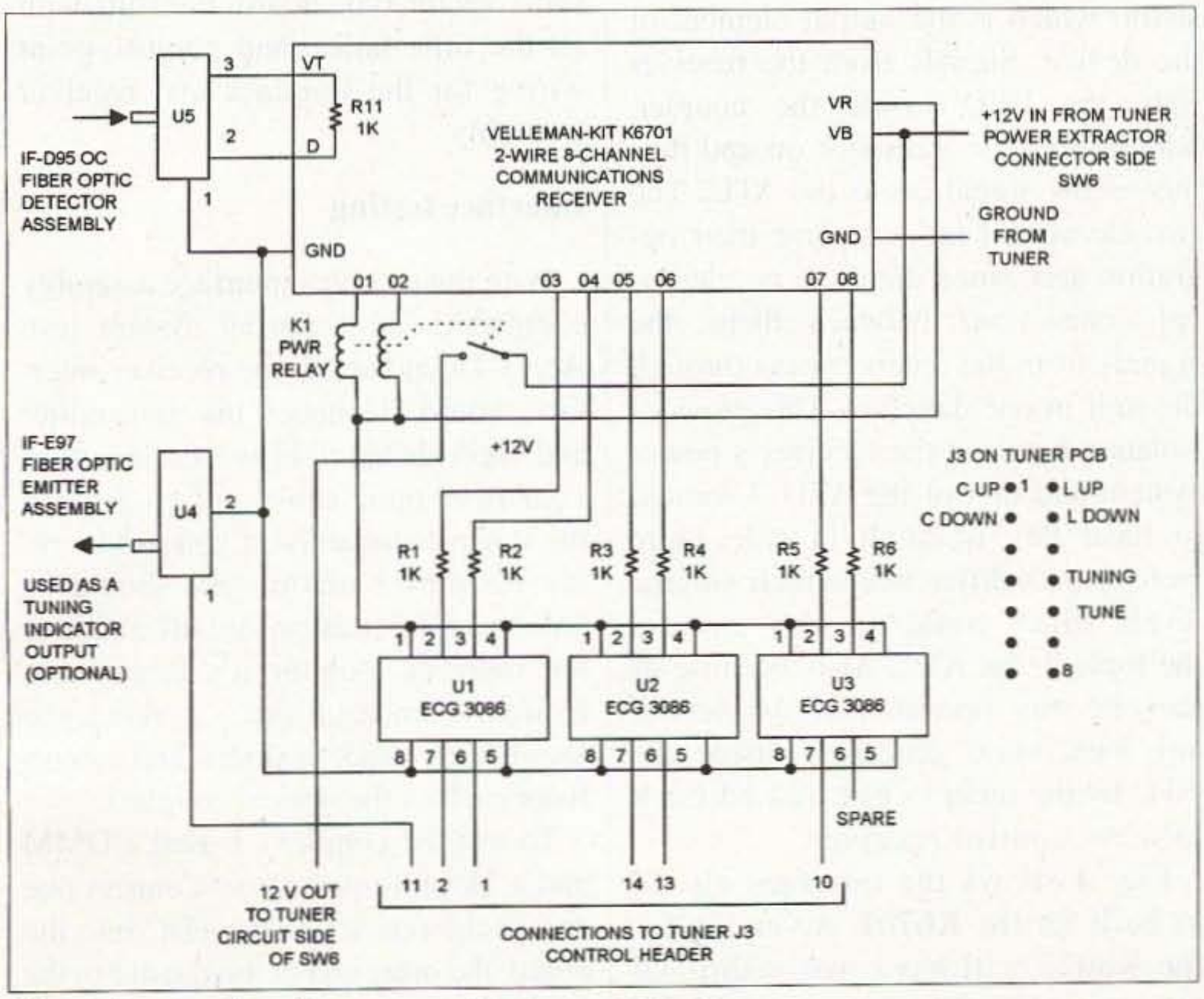

Fig. 4. Receiver/interface mounted on tuner cabinet.

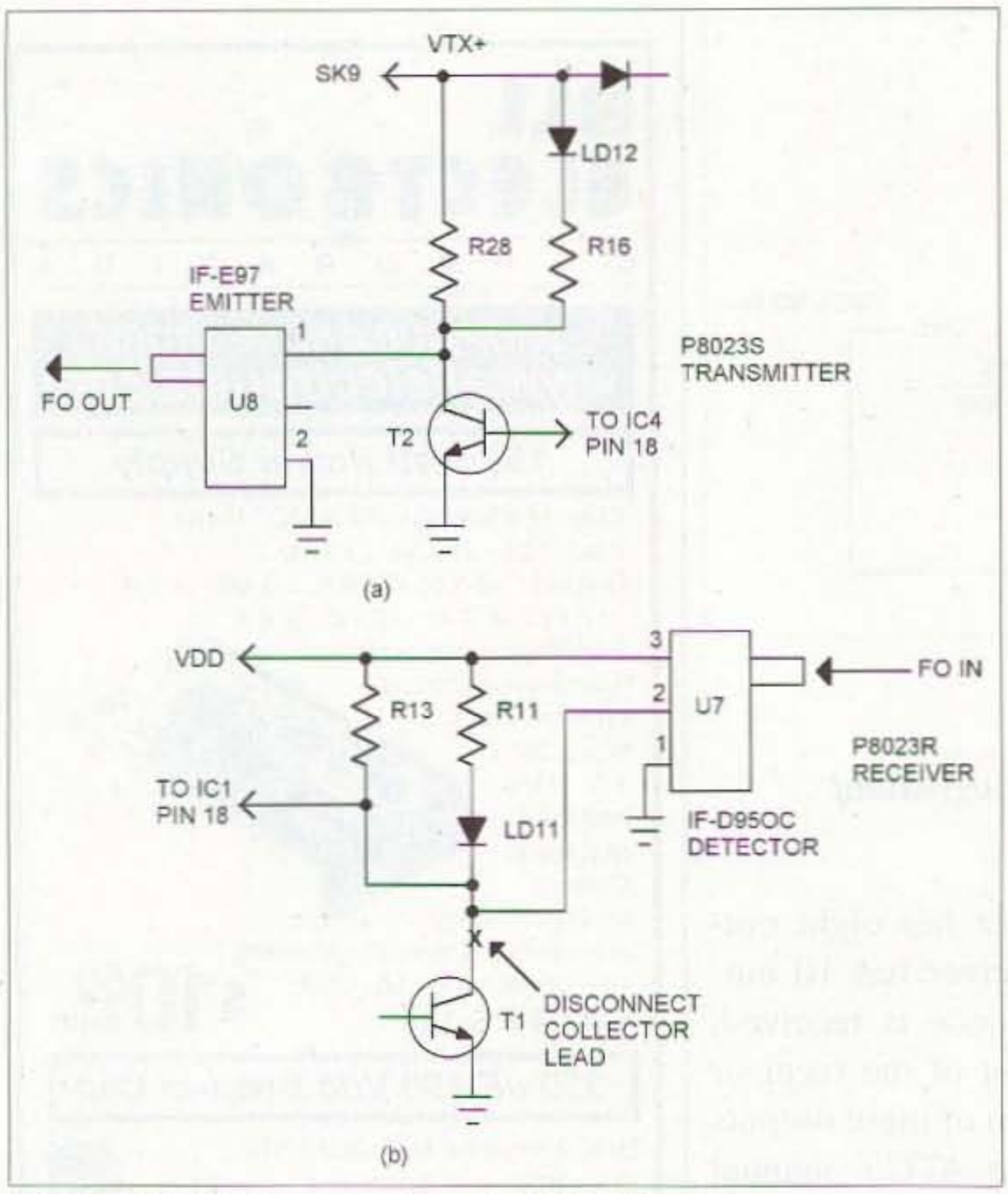

***Fig. 5** (a) P8023S transmitter. (b) P8023R receiver.*

on/off needs some explanation. I used a two-coil latching relay; output 1 of the receiver sets the relay on, applying power to the ATU, and output 2 resets the relay, which turns the ATU off. I did it this way because I had never used this type of relay before and I wanted a relay to carry the higher current of the ATU, which is about half an amp when tuning. The rest of the outputs are connected by way of optical couplers to the ATU and its microprocessor. Each time a valid output comes from the receiver, a coupler applies a low to the ATU just like one of its push-buttons.

I used optical couplers to isolate the two systems from each other. Optocouplers are a single component consisting of a light source and photodetector. These elements are isolated from each other inside the assembly, which is enclosed in an opaque plastic package — usually a six-pin dual-inline package. Inside the ECG-3086 the light source is an LED; the detector is a light-sensitive NPN transistor, which is the output element of the device. Signals from the receiver light the LED inside the coupler, which turns the transistor on and thus passes the signal on to the ATU. The two elements cannot reverse their operation and, since there are no electrical connections between them, the signals from the receiver pass through the unit in one direction. This provides isolation between the receiver's power system and that of the ATU. I wanted to have this isolation in case there were a small difference in their voltage levels which could possibly confuse the logic in the ATU. Also, because of the one-way operation of the device, any logic noise generated inside the ATU by the tuner is not passed back into the control receiver.

Fig. 4 shows the interface circuit as built for the K6701. A version for the K8023 will have two additional outputs and will require additional optocouplers. The interface connections are made to the ATU's circuit board by wires that go through the wall of the two boxes. I got the wires through the sheet metal by using bolt-style filters. These filters are small ferrite and ceramic capacitor devices built into a metal housing with bolt threads on one end which are used to bolt the filter on the chassis. Passing through the center of the filter is a solder wire eyelet to which you solder the control wires, thus passing the desired signals through the box wall. Try operating the system without these filters first. If the system seems to work but responds erratically to commands, installing these filters or similar ones is what I would try first. However, I don't think you'll have any problems. Once inside the ATU box the wires connect to J3, the 14-pin header solder points provided by the tuner designers. In other words, the interface is connected in parallel with the ATU manual control switches.

The receiver kit and interface circuits are mounted in a metal box which is physically attached to the ATU. I did it this way so I would have only one unit to mount on the wall. The ATU and the control receiver could be in separate boxes connected by cabling — it's up to you. I used some vector-type board, the stuff with all the little holes, and point-to-point wiring for the interface and receiver assembly.

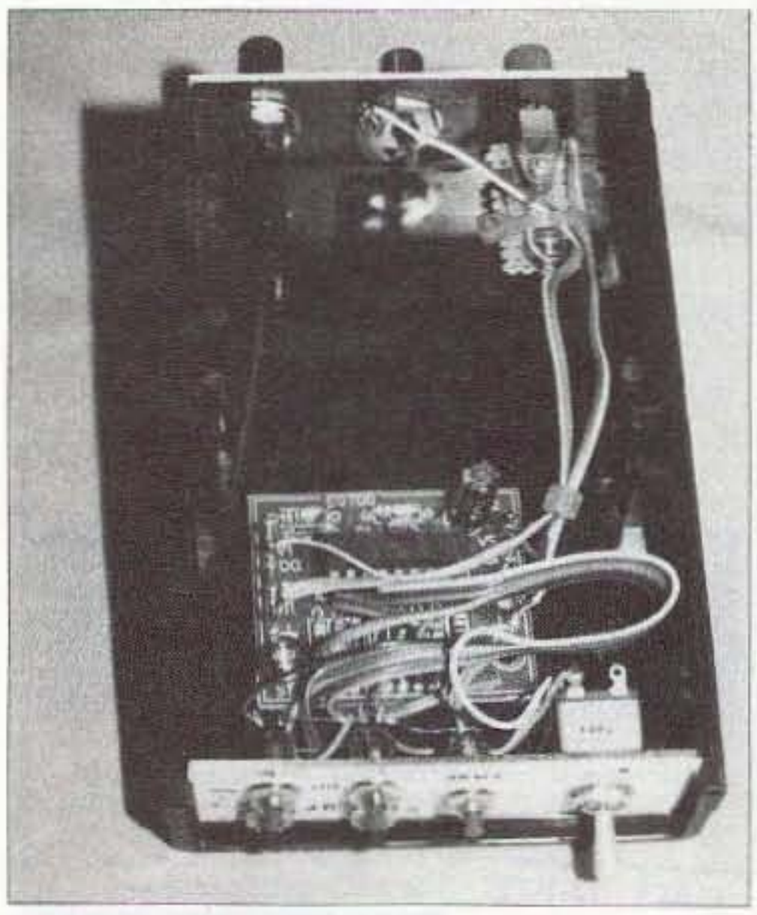

***Photo C.** Inside the receiver. The two fiber optic cables (FOC) and power enter from the rear. If used, the tuning indicator FOC enters on the left rear in this view, passes through the enclosure, and protrudes about half a millimeter out of the front panel.*

Interface testing

With the receiver-interface assembly completed, do a partial system test. Apply DC power to the receiver-interface board. Connect the transmitter and receiver together with a length of your fiber optic cable and go through the tuner commands. If you used a relay for power on/off, you should be able to switch this on and off and hear the relay or monitor it's functioning with a multimeter. If that is working, you should then check the individual outputs from each of the optical couplers.

To test the couplers, I used a DMM and a 1k pull-up resistor. Connect one end of the resistor to the +DC into the board, the other end of the resistor to the + probe of your DMM; the negative

Photo D. *Front view of the transmitter, with the TUNE indicator on the right marked TNG.*

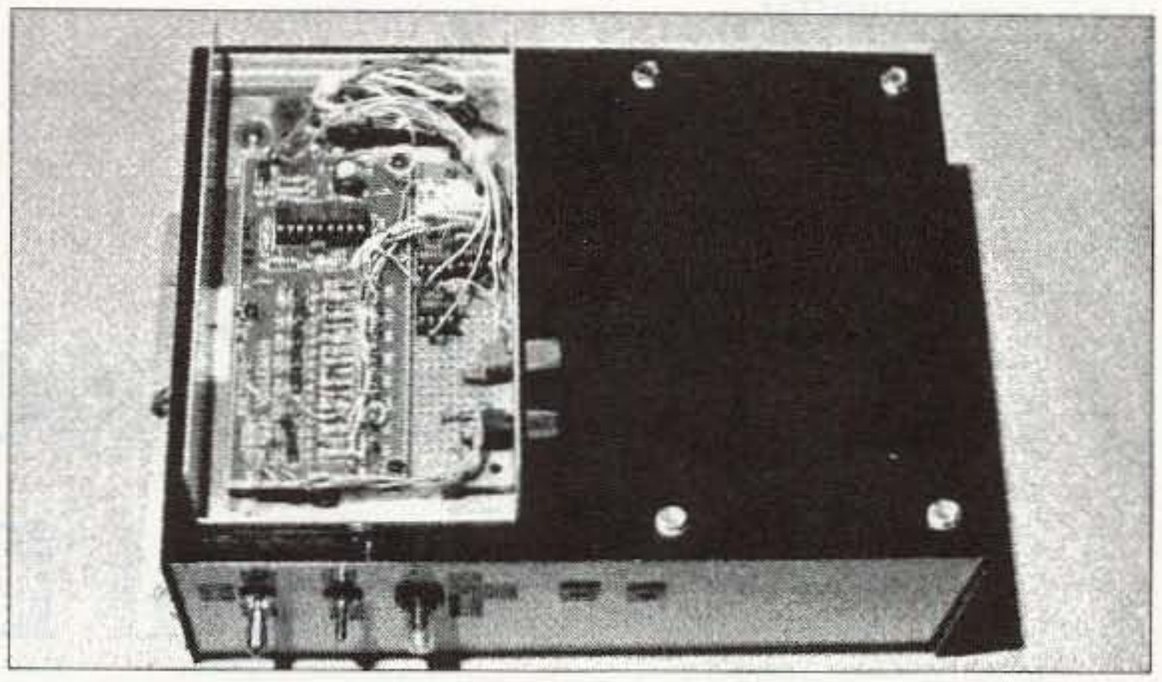

Photo E. *The receiver/interface mounted on the tuner enclosure. The interface portion is built on a piece of vectorboard that also has the receiver circuit board mounted on it.*

probe of course goes to ground (GND). Temporarily connect the resistor/probe combination to one of the coupler outputs; you should read a positive voltage. Switch the appropriate switch for that output on the transmitter; the DMM, set to DC volts, should go low, almost to ground. Do this with each output. If these all test good, you're ready to connect the receiver/interface system to your tuner. With all power removed from the tuner and receiver, a small soldering iron and a steady hand make the new connections within the AT-11.

With this complete, you should connect your entire control system together on your bench. You don't need your rig yet unless that is where you are getting your DC power to run everything. On the ATU set the POWER ON/OFF switch to the OFF position, set the AUTO/SEMI switch to the SEMI position. Apply power to your power injector/extractor system and the control transmitter. You should have power at the ATU circuit board on the +12 V IN side of SW6 and into the control receiver. Turn the tuner system on using the ON function of the transmitter. If you used a power relay as I did, you should hear it energize. If you used the tuning indicator LED U4, it will flash on for about half a second when you apply power. In the tuner you should now have power on the 5-volt regulator side of SW6; this means the tuner is energized.

As I mentioned earlier, there are two fiber optic cable connectors on the rear of the transmitter. The second one is a luxury item. I already had two runs of plastic cable going from the shack to the antenna tuning unit in the garage so I used the second one to give me visual feedback on the tuner's operation. The ATU has a tuning in progress output at pin 11 of J3. This is high whenever it's tuning and when it is powered up. I used this output by connecting another IF-E97 super bright red LED emitter, U4, to this output. [See **Fig. 4**.] The second fiber then connects to this coupler and continues physically into the control box of the transmitter in the shack with just a very small tip of the fiber sticking out of the front panel through a small hole. This is a nice indicator to have, but if you don't want the extra cost of the second cable system, it can be eliminated.

Part	Description
C1, C3	0.02 µF, 1 kV disc ceramic
C2, C4	0.01 µF, 50 V disc ceramic
FOC	Fiber optic cable, Digi-Key A1700-X-ND, Industrial Optics simplex cable IF-C-E1000, duplex IF-C-D1000, tel. 602-804-1227
K1, K2	Aromat DS2Y-SL2-DC12V, Digi-Key 255-1083-ND
K6700	Velleman Kit 8-channel transmitter
K6701	Velleman Kit 8-channel receiver
R1–R6, R11	1k ohm, 1/4 watt carbon
R7	220 ohm, 1/4 watt carbon
RFC1, RFC2	47 µH choke
U1–U3	ECG 3086 optical isolators
U4, U6	IF-E97, Industrial Fiber Optics bright red LED emitter
U5	IF-D95OC, Industrial Fiber Optics detector
Filters, bolt-style (optional)	Allied Electronics, Inc., 1-800-433-5700, [www.allied.avnet.com], P/N 512-6876 or 512-6874

Table 1. *Parts list.*

System testing, 1, 2, 3...

Now would be the time to connect the whole system together and test it

Continued on page 58

Hugh Wells W6WTU
1411 18th St.
Manhattan Beach CA 90266-4025

CTCSS Encoder-Decoder Test Device

Nice article + Useful piece of equipment = Construction fun!

It has been said many times that hams can never have enough test equipment because it provides the "eyes" that allow a ham to "see" into electronic circuits. As a result, test equipment is something every ham needs to have on his workbench. In many cases the equipment will sit idle for long periods of time, but when it is needed, it had better be there and be functional.

Being an active builder of ham-related projects, I find test equipment extremely important. Because of the expense of commercial test equipment, I try to build the items that I need, and I needed the one described here to assist in a recent project (see **Photo A**). The CTCSS test device is one of those items that falls into the rarely used category, but is certainly an essential device for some applications. Besides, it was fun to build and use in various experiments.

I'm responsible for the technical aspects of four ham repeaters in the Los Angeles basin and, as a result, upon occasion I need to work on one or more of them. When I do, I had better have the needed test gear available.

Before continuing, perhaps a definition of the terms to be used should be addressed, as there could be some confusion with the terms CTCSS, Encode, and Decode. The names of these terms may be different as described by the various manufacturers of equipment, but in each case, the functions are as described below.

CTCSS is short for "Continuous Tone-Coded Squelch System." When used, a continuous subaudible tone is transmitted along with voice audio to open (key) the squelch circuit of a receiver, allowing the voice to pass through to the speaker. In the absence of the tone, the receiver would ignore the incoming signal.

In addition, CTCSS tones may be used between stations operating simplex. With a tone present, the receiving station can select which transmitted signal is to be received. You could call

Photo A. *This is the completed CTCSS Encoder-Decoder Test Device.*

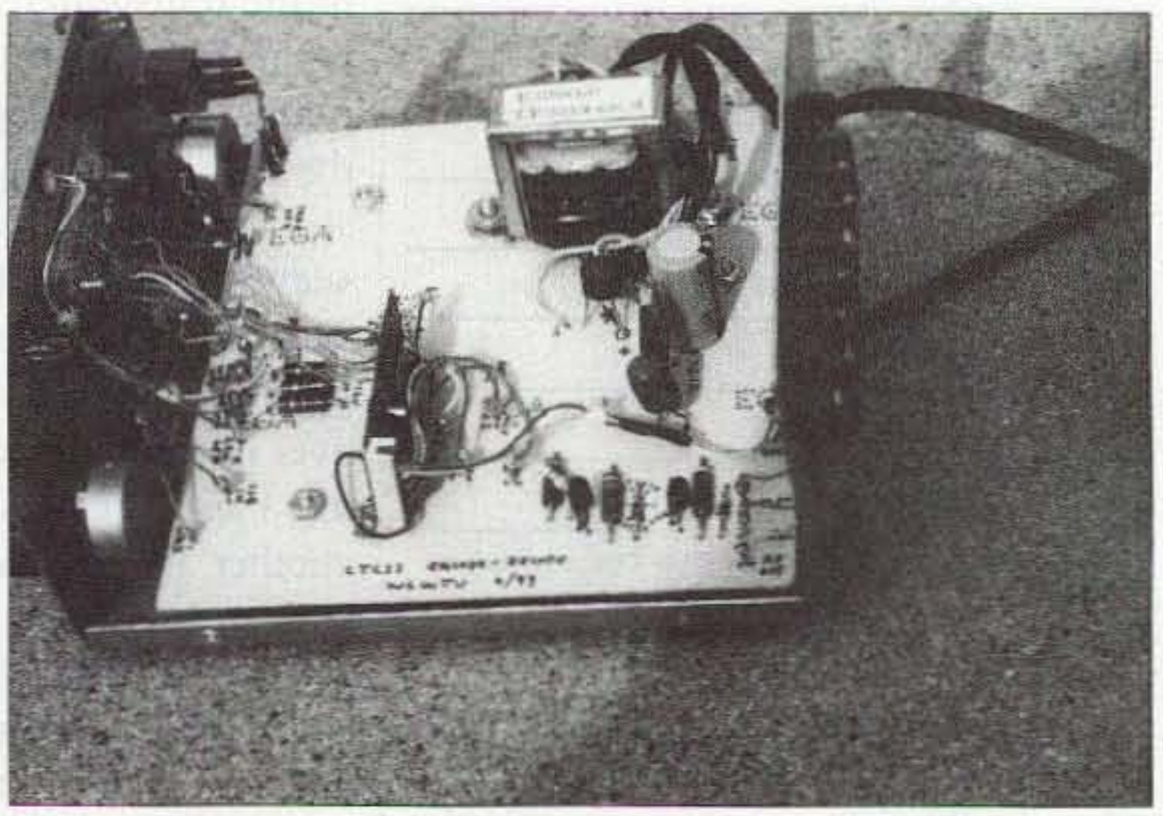

Photo B. *Internal view of the CTCSS Encoder-Decoder Test Device showing the general parts placement.*

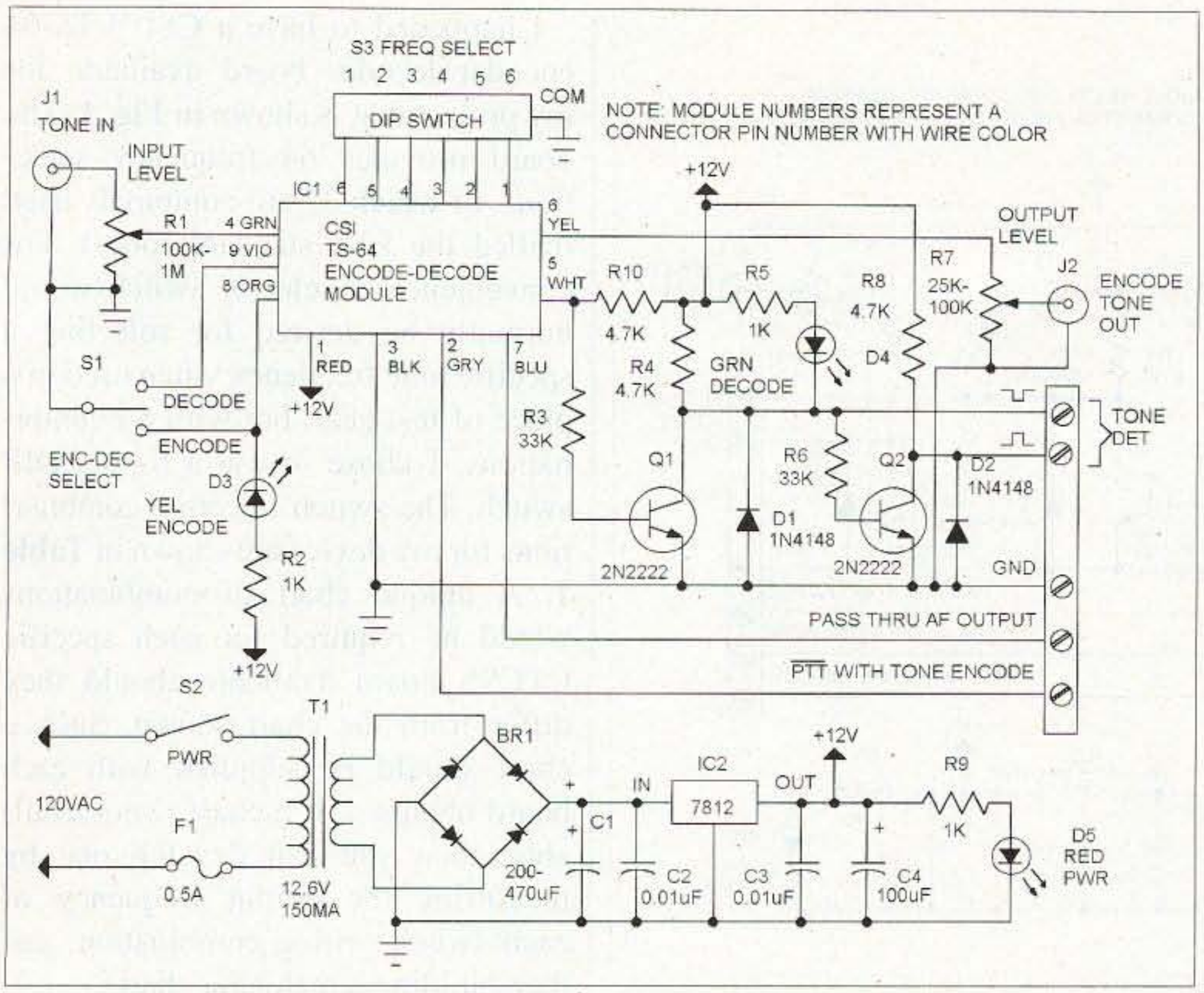

Fig. 1. CSI Encoder-Decoder model TS-64 used in the CTCSS test device. Note: Module numbers represent a connector pin number with wire color.

it selective receiving, in that it allows the receiver to remain quiet until a desired signal (including tone) appears.

The terms Encode and Decode may conjure up the notion of something secret and perhaps to be kept away from the majority of people — actually, that isn't true. In this case, to encode a tone means simply to generate a subaudible tone that will be transmitted along with the audio (voice) modulation. Being both low in frequency as well as in amplitude, the tone is typically not heard by the station listening to the audio. Without the presence of the tone-encoded system, a remote transmitter would be subject to being keyed by extraneous and uncontrolled signals. The presence of the tone helps in maintaining control of the remote transmitter.

The term "decode" relates to the receiving end of the tone path. If a receiver is set to detect the presence of a tone, then the receiver will remain silent until a designated tone, along with the signal carrier, appears at the receiver.

Not too long back I was working on a system and needed to add a CTCSS tone to my signal generator so that I could assess the level of sensitivity required by the CTCSS decoder unit attached to the repeater's receiver. Using a handheld radio worked OK for accessing the repeater, but it didn't solve a tone sensitivity level issue. The question at hand was whether the CTCSS decoder was being overdriven, since it was responding to adjacent CTCSS tone frequencies causing the repeater to operate inappropriately.

Well, "necessity is the mother of invention," as the saying goes, so I doubt that the CTCSS Encoder-Decoder Test Device is unique in the test equipment world. However, I needed one urgently and happened to have a spare CTCSS board available that allowed the spawning of the device described.

Since building the CTCSS device, I've found it to be very useful; some of its applications include:

- generating a CTCSS tone for accessing a repeater using a transmitter being worked on;
- providing a CTCSS tone for a signal generator's test signal;
- generating a carrier signal having a CTCSS tone to check the keying sensitivity of a receiver; and
- generating accurate audio frequencies in the 33–254 Hz range.

I'm sure there are other encoder applications that will come to mind as

Tone number	EIA code	freq Hz	switch code 1 2 3 4 5 6
1		33.0	- - - 4 5 -
2		35.4	- - - 4 5 6
3		36.6	- - 3 - - -
4		37.9	- - 3 - - 6
5		39.6	- - 3 - 5 -
6		44.4	- - 3 - 5 6
7		47.5	- 2 3 - - -
8		49.2	- 2 3 - - 6
9		51.2	- 2 3 - 5 -
10		53.0	- 2 3 - 5 6
11		54.9	- 2 3 4 - -
12		56.8	- 2 3 4 - 6
13		58.8	- 2 3 4 5 -
14		63.0	- 2 3 4 5 6
15	A1	67.0	- - - - - -
16		69.4	- 2 - 4 5 6
17	B1	71.9	1 - - - - -
18	C1	74.4	- - - - - 6
19	A2	77.0	1 2 - - - -
20	C2	79.7	- - - - 5 -
21	B2	82.5	1 - - - - 6
22	C3	85.4	- - - - 5 6
23	A3	88.5	1 2 - - - 6
24	C4	91.5	- - - - 4 - -
25	B3	94.8	1 - - - 5 -
26		97.4	- - - 4 - 6
27	A4	100.0	1 2 - - 5 -
28	B4	103.5	1 - - - 5 6
29	A5	107.2	1 2 - - 5 6
30	B5	110.9	1 - - 4 - -
31	A6	114.8	1 2 - 4 - -
32	B6	118.8	1 - - 4 - 6
33	A7	123.0	1 2 - 4 - 6
34	A7	127.3	1 - - 4 5 -
35	A8	131.8	1 2 - 4 5 -
36	B8	136.5	1 - - 4 5 6
37	A9	141.3	1 2 - 4 5 6
38	B9	146.2	1 - 3 - - -
39	A10	151.4	1 2 3 - - -
40	B10	156.7	1 - 3 - - 6
41		159.8	- 2 - 4 5 -
42	A11	162.2	1 2 3 - - 6
43		165.5	- 2 - 4 - 6
44	B11	167.9	1 - 3 - 5 -
45		171.3	- 2 - 4 - -
46	A12	173.8	1 2 3 - 5 -
47		177.3	- 2 - - 5 6
48	B12	179.9	1 - 3 - 5 6
49		183.5	- 2 - - 5 -
50	A13	186.2	1 2 3 - 5 6
51		189.9	- 2 - - - 6
52	B13	192.8	1 - 2 3 - -
53		196.6	- 2 - - - -
54		199.5	- - 3 4 5 6
55	A14	203.5	1 2 3 4 - -
56		206.5	- - 3 4 5 -
57	B14	210.7	1 - 3 4 - 6
58	A15	218.1	1 2 3 4 - 6
59	B15	225.7	1 - 3 4 5 -
60		229.1	- - 3 4 - 6
61	A16	233.6	1 2 3 4 5 -
62	B16	241.8	1 - 3 4 5 6
63	A17	250.3	1 2 3 4 5 6
64		254.1	- - 3 4 - -

Table 1. Switch positions for selecting the 64 CTCSS tones for the TS-64 encoder-decoder board. The C1116 encoder-decoder board will select only tone numbers 15 to 64 (67–254.1 Hz).

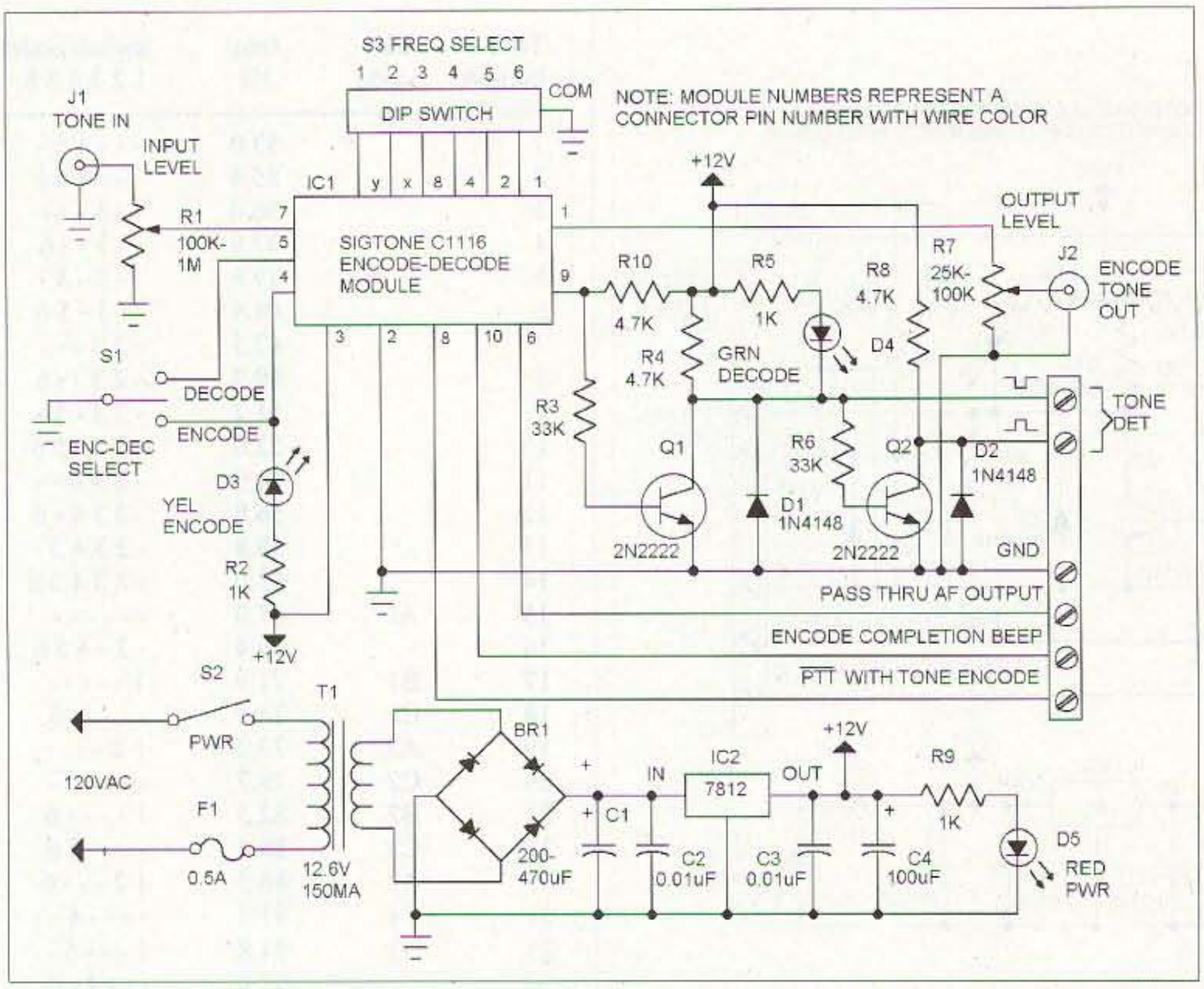

Fig. 2. Sigtone Encoder-Decoder model C1116 used in the CTCSS test device. Note: Module numbers represent connector wire color coding.

the device is needed now that it is available.

On the receive, or decoder side of the device, I've found it to be useful for the following:

Function	Spec
Freq range	33.0–254.1 (64 tones) 67–250.3 Hz(37 EIA STD tones)
Freq accuracy	Better than 0.05 Hz
Operating Voltage	6–20 VDC @ 6 mA
Encode	
Max output level	3.0 Vrms
Output impedance	2k ohms
Purity	1.5% THD
Turn-on time	Less than 2 ms
Decode	
Max input sensitivity	10 mV rms
Input impedance	50k ohms
Decode bandwidth	2% total
Detection response time	Less than 200 ms
Speech rejection	Greater than 2 dB (300–3,000 Hz)

Table 2. CTCSS Encoder-Decoder Test Device specifications used for general reference.

- for checking the output of a CTCSS encoder board on a system;
- to assess the level of a generated tone; and
- to identify/verify the tone frequency being generated by another device.

The decoder is also useful in identifying a subaudible tone frequency being transmitted on a received carrier — though a little cumbersome for searching due to the DIP switch frequency selection scheme.

The CTCSS device

Building up the CTCSS device is fairly simple because all of the electronics, with the exception of the power supply, are mounted on a preassembled CTCSS encoder-decoder board (see **Photo B**). Some encoders and decoders are made on separate boards, and using one of each in the project would work well. Combined encoder-decoder boards are available from several sources and are adaptable for the application described. A review of the data sheet for the specific board would be required to ascertain the proper wiring connections required for that board.

I happened to have a CSI™ TS-64 encoder-decoder board available for my project that is shown in **Fig. 1**. The board provides 64 frequency selections, of which 37 are commonly used (called the EIA standard tones). For convenience, a selector switch would normally be desired for selecting a specific tone frequency when used in a piece of test gear, but with 64 combinations, I chose to use a 6-pole DIP switch. The switch selection combinations for my device are shown in **Table 1**. A unique chart of combinations would be required for each specific CTCSS board available should they differ from the chart shown. Such a chart should be supplied with each board obtained. If a chart is not available, then you can develop one by measuring the output frequency of each switch setting combination, and then building a matching chart.

An alternate encode-decode board suitable for use in the CTCSS Test Device is the Sigtone™ model C1116. It will provide fifty CTCSS tone frequencies. **Fig. 2** shows the schematic of the C1116 configured to operate in the test device as described for the CSI TS-64. The external circuit differences are minor, allowing both boards to function well in the project. The frequency and switch chart for the C1116 is shown in **Table 1**, with the limitations noted. I believe the Sigtone company is now out of business, but their boards are still around and appear at swap meets periodically. I got mine through a swap meet purchase.

In use

Table 2 shows the general specifications for the CTCSS Encode-Decode Test Device. The values shown may vary to some degree, based upon the specific characteristics of the board being used. Major items on the front panel are as follows:

- I elected to use BNC coax connectors for tone in and out signals (see **Photo C**) — phono connectors would work as well. However, I've found the use of a 1:1 scope probe having a BNC connector to be the most advantageous method for connecting the CTCSS device to a radio. A short

Photo C. *This is the front panel showing parts placement. A 6-pin DIP switch is used for selecting one of 64 CTCSS frequencies.*

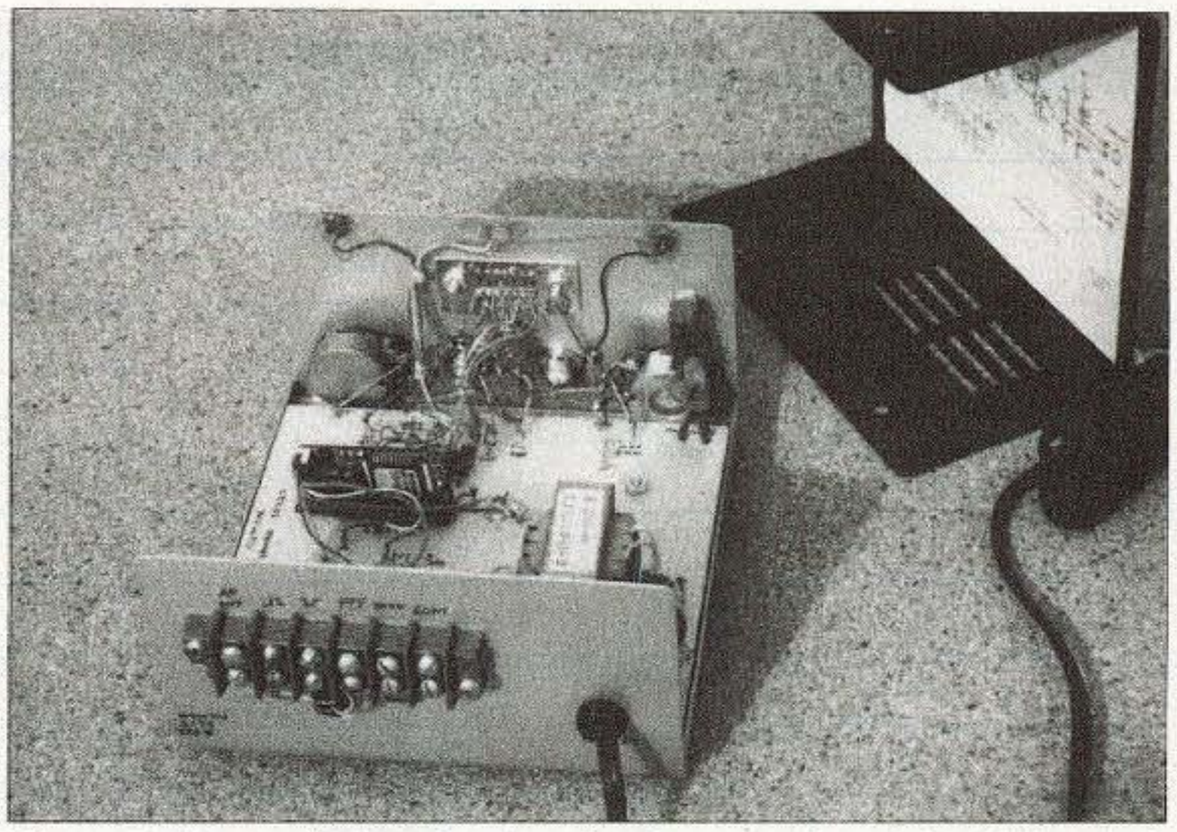

Photo D. *Internal view showing the front panel and the DIP switch circuit board. The terminal block is shown on the rear panel.*

length of coax is used to connect the CTCSS Test Device to the signal generator.

• Three LEDs are mounted on the front panel to show device status, with a red LED used for indicating power "ON".

• A green LED on the front panel will illuminate when receiving a selected tone to indicate that a tone is being detected.

• A yellow LED will be illuminated when a tone is being generated.

• Potentiometers on the front panel are used to vary the amplitude of the generated tone and the level of the received tone.

A terminal block is mounted on the rear panel to provide access to the logic and audible outputs available from the TS-64 (see **Photo D**).

Construction

Fig. 1 shows the schematic for my device, with the power supply and output logic drivers being the main portions to be constructed (**Fig. 2** shows the use of the C1116). The remaining circuitry is used for making connections to the encoder-decoder board. **Photo B** shows the general parts placement that I found convenient. Again, parts placement is noncritical in this application. The CTCSS board may be mounted in any position, but I chose to mount mine vertically so that I could see both sides of the board.

Transistors Q1 and Q2 appear to be redundant in their function as related to the direct output from the board. The logic output from the board "goes high" when a tone is detected and transistor Q1 inverts the logic function, providing a logic "low." Transistor Q2 inverts the logic again to repeat the "high" from the board. The objective of using Q2 to repeat the board's output logic is to do two things: (1) to isolate and protect the board from the outside world; and (2) to increase the current sink capability of the output device. Diodes D1 and D2 were added as reverse voltage protectors for the transistors, should the CTCSS device ever be used to drive a relay coil.

Lesser-used board functions are brought out to a terminal block mounted on the rear of the chassis, making them accessible should they be needed (see **Photo D**). The objective was to provide access to the audio and logic outputs provided by the CTCSS board. For my normal applications of the CTCSS test device, those connections are unused.

Parts used in the construction of the test device are really noncritical and available through most parts outlets. A parts listing is shown in **Table 3**, and in the case of need, parts substitution is encouraged. The most critical item is the CTCSS encoder-decoder board(s), which is (are) available from several sources, but I recommend using the CSI TS-64 both for function and availability. When choosing a board, make sure that it accommodates external DIP switches for frequency control, and is able to respond to a received tone and to generate a tone.

Construction of the CTCSS Test Device is primarily mechanical, except for the construction of the power supply, logic output, and wiring to the front and rear panels. Because of the low frequency involved, wire routing and bundling is not an issue. However, AC power routed to the front panel

Part	Description	Source*
R1	100k–1 meg pot	
R2, 5, 9	1k 1/4 W	
R3, 6	33k 1/4 W	
R4, 10, 13	25k–100k pot	
R7	4.7k 1/4 W	
C1	200–470 µF 25 V elec cap	EG G9093/G9097
C2, 3	0.01–0.02 µF disc ceramic cap	
C4	100–220 µF 15–25 V elec cap	
D1, 2	1N4148 or equiv diode	EG G9245
D3	Yellow LED	EG G1007/G5305
D4	Green LED	EG G1006/G6164
D5	Red LED	EG G1113
J1, 2	BNC panel mount coax connector or equiv.	
SOC	14-pin DIP socket	EG G4381
S1, 2	SPDT toggle switch	EG G1944/G1485
S3	6-pole DIP switch	
Q1, 2	2N2222/2N4401 or equiv. NPN gen. purpose transistor	EG G4210/G8566
IC1	CSI TS-64 CTCSS encoder-decoder board	Communication Specialists, 426 W. Taft Ave., Orange CA 92865-4296; 1-(800)-854-0547
IC1 Alternate	Sigtone C1116 CTCSS encoder-decoder	
IC2	7812/LM340T-12 12-V reg.	EG (P/N N/A)
F1	0.5 A fuse any style	
T1	120/12.6 V @ 200–500 mA pwr xfmr	EG G8535 (250 mA) EG G4266 (350 mA) EG G6071 (750 mA)
Term	5–6 screw terminal block	
Chassis		Radio Shack #270-253A
Knob		Radio Shack #274-416A
Misc	PCB material, hardware, wire, etc.	
*EG = Electronic Goldmine		

Table 3. *Suggested parts listing for the CTCSS Encoder-Decoder Test Device. Parts may be substituted as desired. EG = The Electronic Goldmine, P.O. Box 5408, Scottsdale AZ 85261; tel. 1-800-445-0697 or (480) 451-7454; [http://www.goldmine-elec.com].*

switch should be kept away from the tone wiring to reduce the introduction of hum. Power line hum falls within the operating frequency range of a CTCSS device.

Although the CSI TS-64 board operates on a supply voltage from 6–20 VDC, I chose a 12 V regulated supply to provide a stable and hum-free source.

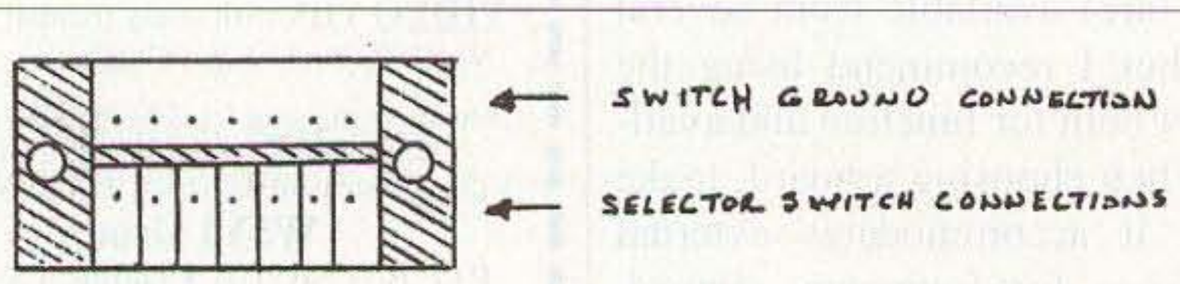

Fig. 3. *Suggested board layout for mounting a 14-pin DIP switch socket. Only 12 of the 14 pins are used.*

DIP switches select a frequency by grounding the select lines per the chart shown in **Table 1**.

The mounting of the DIP switch to the front panel is accomplished by laying out a small piece of circuit board for a 14-pin DIP socket (see **Fig. 3** and **Photo D**). The board is made longer than the socket so that two screws may be used to mount the board onto the inside of the metal front panel. With a 14-pin DIP socket installed on the board, washers are used as spacers to place the top of the socket flush with, or recessed slightly behind, the front surface of the panel. A 6- or 7-pole switch may be used for frequency selection. A 6-pole DIP switch, when inserted, is shifted to one end of the 7-pin socket. When a 7-pole switch is used, the 7th switch position is ignored. A 5-pole switch may be used with boards accessing only the 37 EIA frequencies. Wiring to the switches should be from left to right, as viewed from the front of the panel, to match the numbering found on most DIP switches. The objective of using a DIP socket is to allow changing of the DIP switch should it become damaged.

LEDs are mounted by gluing them with contact cement into holes drilled in the panel that are just slightly larger than the LED body diameter. Thin wires with extra length are soldered to the LED leads to reduce tension on the glue holding the LED to the panel.

Conclusion

The primary objective of this discussion regarding the CTCSS Encoder-Decoder Test Device is to encourage the construction of test equipment to fit a ham's need even in cases where the equipment may not have frequent use. In most instances, the construction of a project is aimed primarily at "building and learning" from experimentation and construction. Ending up with a useful piece of test gear is the reward for the effort expended.

Since building up the CTCSS project, I've had a lot of fun just "playing" with it and placing it into as many applications as possible. It's been a "fun" project, and one that was easily constructed. Give it a try! 73

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Your Long-Lost Transistor Notebook

Part 4 of 4.

This is the final part of our tour. We started off the series by generating characteristic curves for common transistors found in a ham's "junk box." With the curves in hand we began a tour of designing a common Class-A amplifier circuit requiring that we work out component values based upon our choices of the variables involved.

To complete our tour, we need to select component values, determine the input and output impedance, and the roll-off frequency exhibited by the circuit.

Calculating resistor values

The next step in the process is to determine the base biasing resistor values for R1 and R2. These are user-selected to meet a desired input impedance for the stage, which is basically the load that will be placed on the circuit driving the stage that we're designing. Resistor R2 is the major contributor to the input impedance and its value may be selected either by "picking" a value or by working the math to select it. After a little experience with circuit design, the selected value will essentially be the same for most general applications.

Since we're doing the design from scratch, let's use the mathematical approach, then adjust the calculated value to use common resistor values.

We know the desired base current for QOP and that current must be sourced through resistor R1 as shown in **Fig. 1**. In addition, the current flowing through resistor R2 will also be sourced through R1. We also know that the supply voltage, Vcc, is placed across resistors R1 and R2, but as yet we don't know the voltage across resistor R2. As a circuit designer, you have some flexibility in the selection of the voltage across R2.

An approach for determining the voltage across R2 is to start with the voltage across R4, which is the emitter resistor. Again, you as the designer have a choice in the voltage to be selected. Whatever voltage value that is chosen to be across resistor R4, it must be subtracted from the Vcc value applied to the circuit. Your question might be, "What difference will that make in the circuit performance?" To answer that question, look at the load line shown in **Fig. 2**, where we chose 12 V for Vcc. The value of 12 V is also the bottom end of the load line, and any voltage that we choose to have across resistor R4 must be subtracted from 12 V. The resulting lower voltage will shift the load line to the left where the change may or may not have any noticeable effect on circuit performance.

A safe method for selecting a voltage across resistor R4 is to choose the voltage to be 10% of Vcc, and in our example that will be 1.2 V. The actual voltage to be selected may vary from the 10% value as needed to meet the desired circuit performance.

However, we've selected 1.2 V to be across resistor R4. Since junction transistors have a voltage drop of approximately 0.7 V between base and emitter, we add 1.2 V and the 0.7 V to obtain 1.9 V, which is the voltage across resistor R2. If you wish, you may choose to use 2.0 V instead if it makes the next set of calculations easier.

Using the circuit shown in **Fig. 1**, we've selected resistor R3 to be 4.7k and have determined the base QOP current value to be 6 µA.

The next calculation is to determine the values for resistors R1 and R2. We have some room to fudge our numbers at this step, but let's see what happens if we make some assumptions. A value for R2 may be selected in many ways, but the proper way would be to select it to be approximately twice the value of the desired input impedance. There is no real detriment to selecting an R2 value that is too high, except that transistor bias stability may be affected. If R2 is too low, the resulting low input

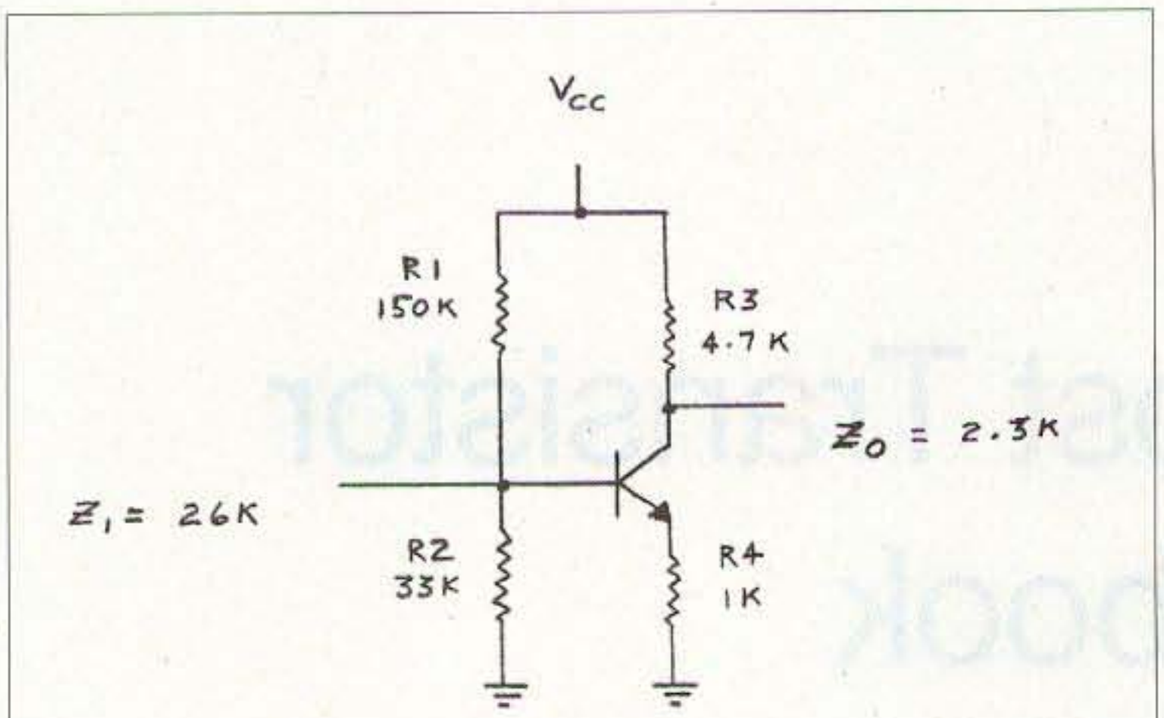

Fig. 1. Completed circuit design based upon the data obtained from the 2N3904 transistor Vce-Ic characteristic curves.

impedance requires more drive power from the preceding stage.

Although the actual ratio of the R2 current-to-base current is not critical, the resulting base bias stability is critical. By rule of thumb, current flowing through resistor R2 should be at least ten times higher than the base current at QOP to maintain stability.

If we follow the rule of thumb and have a QOP base current of 6 µA, then the minimum current through R2 must be 60 µA. We determined previously that the voltage across R2 should be either 1.9 or perhaps 2 volts. Using 2.0 volts divided by 60 µA, we get 33,333 ohms for the value of R2. Knowing that value, you can now fudge it to a standard value either up or down. Our logical choices then fall within the range of 27k to 47k. But to keep things within our calculated region, lets use a 33k value for R2. With 2 V across R2, the current flowing through R2 will be 60.6 µA. Add to that the 6 µA base current and we get 66.6 µA of current flowing through resistor R1. With 12 V Vcc and 2 V across R2, R1 will have 10 V across it and a current flowing through it of 66.6 µA. Dividing 10 by 66.6 µA yields a resistance value of 150,150 ohms. The closest common value is 150k for resistor R1.

OK, where are we in the design of our amplifier stage? We now know the values for resistors R1, R2, and R3, but we haven't determined the value of R4. So how do we determine the value of resistor R4?

Looking at the load line of 4.7k as shown in **Fig. 2**, we locate the 6 µA base current curve. Where the curve intersects with the load line we can determine the collector current to be 1.4 mA. Adding the base-current of 6 µA to 1.4 mA results in a negligible difference, so we'll use 1.4 mA as the current flowing through resistor R4. Earlier, we selected the voltage across R4 to be 1.2V, and with 1.4 mA of current flowing through it, the resistance value would then be 857 ohms. We can then choose a standard resistor value between 560 and 1,000 ohms. Let's choose 1k as a value for R4.

If we've done our math correctly, we should now be able to build up the circuit using the 2N3904 characterized by the curves and have it perform per our calculations. Assuming that we've built up the circuit, what would be a first test to perform on it that would provide an indication of our success or failure? I'd suggest measuring the voltage from collector to ground and from emitter to ground. Since we've done all of the resistor value selections using 1.2 V from emitter to ground, it should be reasonably close (perhaps in the 1.2–1.5 V range) even though we've fudged the figures some. OK, then how should we determine the voltage from collector to ground? Take a look at the load line curves shown in **Fig. 2**. At the 6 µA curve intersection with the 4.7k load line, the voltage is approximately 5.5 V. An actual circuit measurement of the voltage from collector to ground should yield a value reasonably close to 5.5 V.

Now let me make an observation for you that has always been a key for me when designing a stage similar to the one we've used as an example. The collector voltage should be centered approximately at the midway point between Vcc and ground. If Vcc is 12 V, then the collector voltage should be reasonably close to 6 V. If you subtract the emitter voltage of 1.2 V from 12 V you get almost 11 V, and when 11 V is divided by 2 you get 5.5 V, which is a match for what we calculated. The important thing to know is that we've done our selections correctly and that the results are within the ballpark of our calculations.

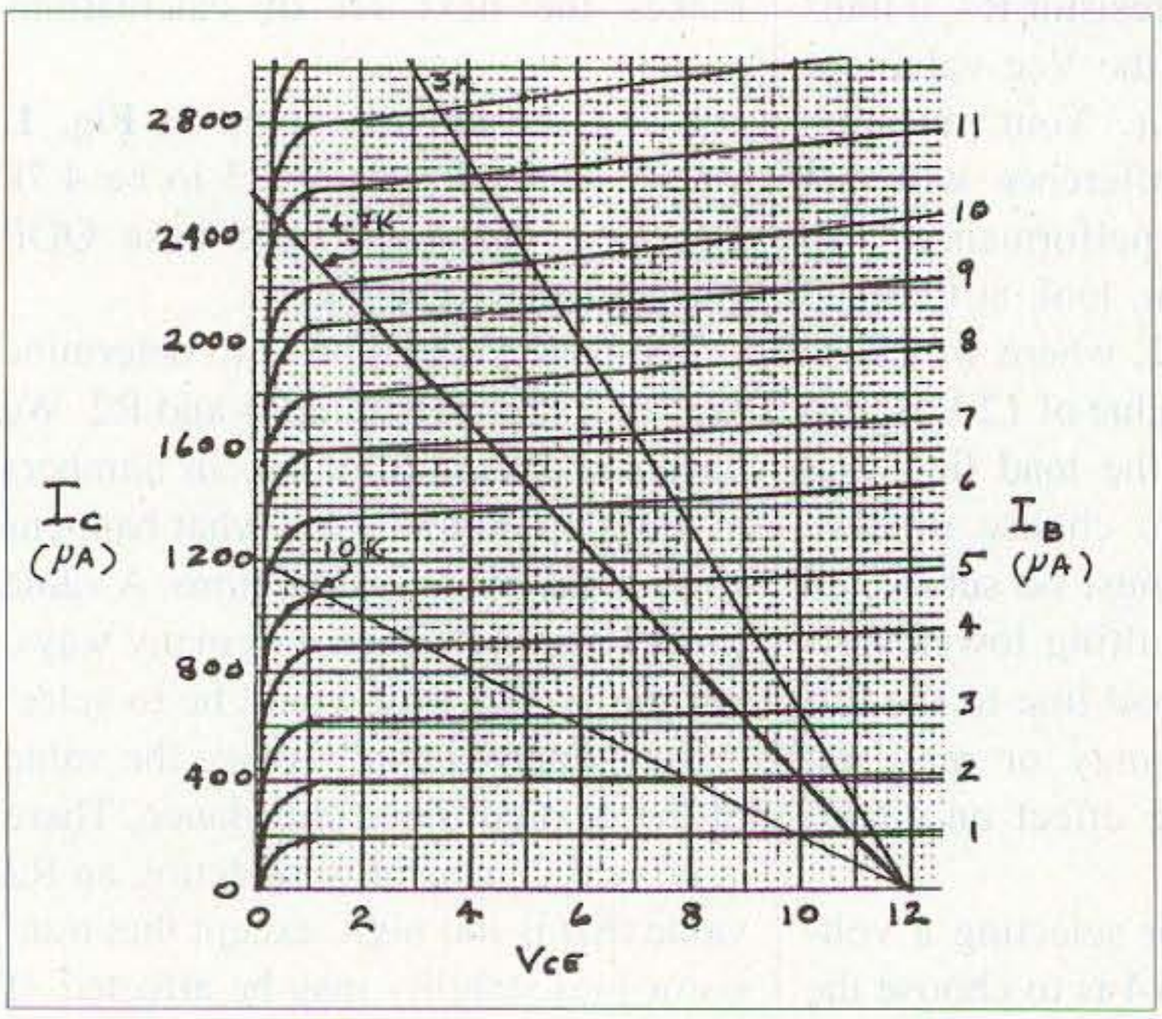

Fig. 2. 2N3904 characteristic curves with three load lines shown.

Input/output impedance

Now that we have the resistor values selected as shown in **Fig. 1**, we can estimate the input and output impedance of our amplifier design.

The output impedance is the simplest to calculate because in setting up the load Line we chose a 4.7 k resistor for R3. We then selected the QOP on the load line to be at the midpoint between zero and Vcc, causing half of Vcc to be dropped across resistor R3 and the other half to be across the transistor. Impedance-wise, the transistor and resistor are equal in value and are

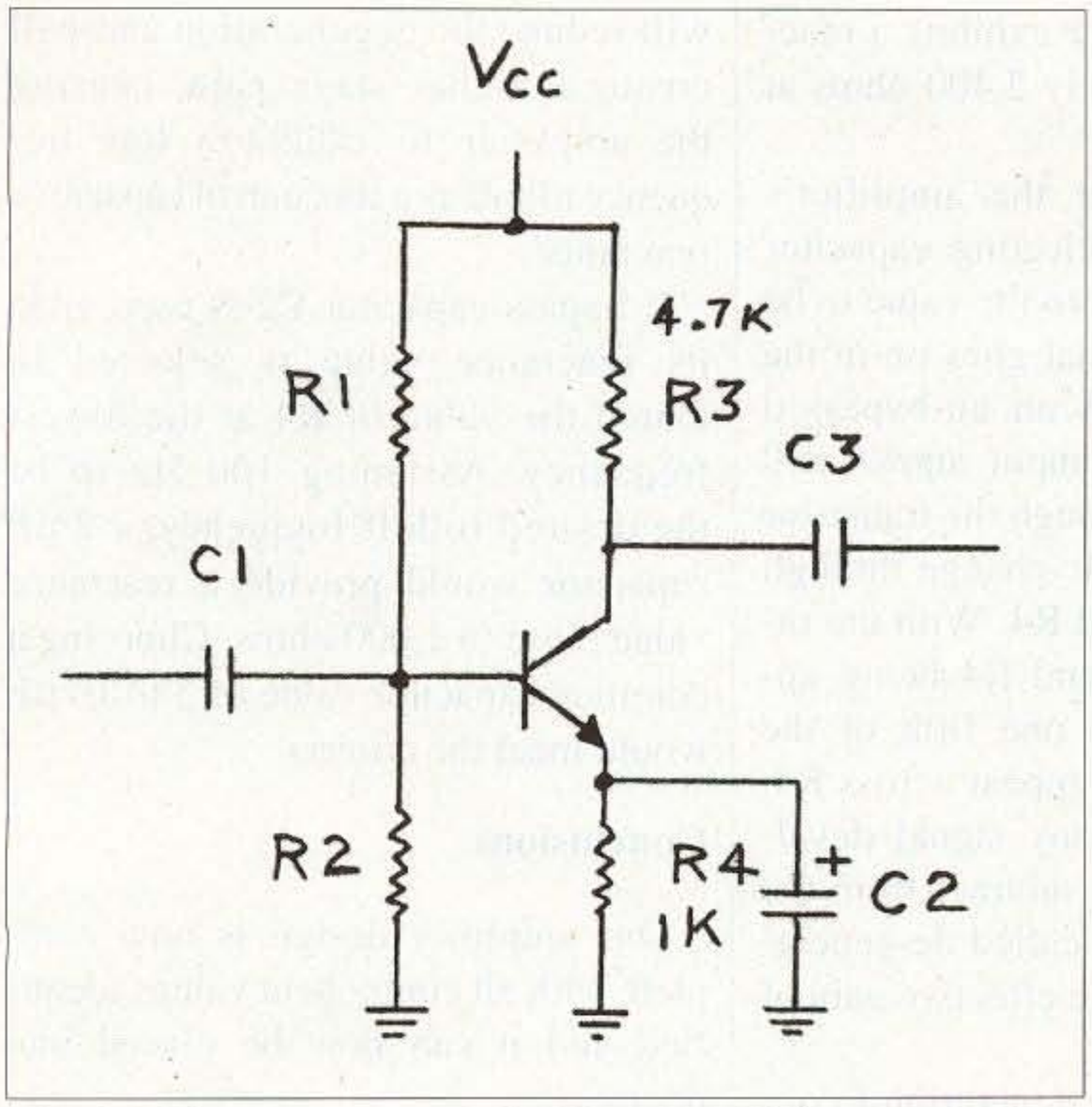

Fig. 3. Adding capacitors to the Class-A amplifier.

connected in parallel. Therefore, two 4.7 k resistors in parallel will yield an output impedance of 2,350 ohms.

Determining the input impedance is a little more difficult, but it can be estimated to be a value between 50%-75% of the R2 resistor value. The wide range of variability is caused by factors in addition to the resistor values involved. Resistor values R1 and R2 used in the circuit establish the maximum input impedance value which can be shifted to a lower value by the reflected resistance/reactance into the base from the emitter.

Let's approach a calculation of the input impedance by considering the factors involving resistors R1, R2, and the reflected impedance from the emitter circuit. If we use the un-bypassed emitter resistor, then the reflected impedance into the base circuit is the transistor gain times the value of R4. In an earlier calculation we determined the stage gain to be 227. We then get 227,000 ohms by multiplying 227 times 1,000 ohms. Placing R1 (150k), R2 (33k) and the base impedance of 227k in parallel, we get a resulting impedance value of 26,169 ohms. A further reduction in the input impedance would occur if a capacitor was placed across resistor R4 — the reactance of the capacitor is a function of frequency as the controlling factor.

Using the amplifier

When using the amplifier as an audio amplifier, it is necessary to consider the lowest frequency of intended operation. Because capacitors exhibit a reactance value as an inverse function of frequency, the reactance value will be the highest at the lowest frequency.

Referring to **Fig. 3**, we have three capacitors to consider to complete the design of our amplifier. Under most circumstances the capacitor values are selected "because they are available" from our "junk box" — and that's OK. However, following the premise of determining how values are selected, we can examine the circuit requirements imposed on the value selection.

In terms of value selection, capacitors C1 and C3 are perhaps the most critical from the standpoint that they involve the signal path where an impedance value must be considered for stage coupling. Capacitor C1 is the input coupling capacitor and can affect the input impedance value of our amplifier. Our circuit design exhibits an input impedance of 26k ohms, and the reactance of C1 should be less than 26k at the lowest frequency of expected operation. When the reactance value of C1 is equal to the 26k ohms, typically half of the input signal will be dropped across C1 and the other half will be

between the base and emitter of the transistor. Dividing the signal equally creates a 3 dB (half power) rolloff in the transferred signal. If we assume the low end of our audio spectrum to be 300 Hz, then we would prefer to have as much signal transferred as possible down to at least 300 Hz. A frequency rolloff below 300 Hz might then be acceptable. As the circuit designer, you have choices to make in the final performance of the design.

If we choose 100 Hz as our 3 dB point, then the capacitive reactance of C1 should be 26k or less at 100Hz. A 0.1 µF capacitor exhibits a reactance of about 24k at 100 Hz; therefore, any capacitor value greater than 0.1 µF will meet our objective. A common capacitor value selected for C1 falls into the 1 to 5 µF range.

Selecting the value of coupling capacitor C3 follows the same thought process except that the reactance value should be equal or less than the 2.3k ohm output impedance value. Again, a 1 to 5 µF capacitor meets the criteria since a 1 µF capacitor exhibits a reactance of approximately 2,400 ohms at 100 Hz.

We must consider the amplifier's gain rolloff when selecting capacitor C2. Before deciding on the value to be selected, let's see what goes on in the emitter circuit. With an un-bypassed emitter resistor, an input signal will cause the current through the transistor to vary, creating an Ic change through both resistors R3 and R4. With the ratio of resistors R3 and R4 being approximately 5 to 1, one fifth of the resulting signal will appear across R4. Of concern is that any signal developed across R4 will subtract from the input signal. This is called de-generation and it reduces the effective gain of the amplifier stage.

The presence of degeneration in our amplifier improves the response linearity of signal amplitude swings at the transistor base. Again, it is your choice to select the amount of degeneration, if desired, that will be used. Placing a bypass capacitor across resistor R4 will reduce the degeneration and will create a higher stage gain, causing the amplifier to exhibit a low frequency rolloff as a function of capacitive reactance.

If bypass capacitor C2 is used, then its reactance value is selected to match the value of R4 at the lowest frequency. Assuming 100 Hz to be the desired rolloff frequency, a 2 µF capacitor would provide a reactance value close to 1,000 ohms. Choosing a common capacitor value of 5 to 10 µF would meet the criteria.

Conclusions

Our amplifier design is now complete with all component values identified and it can now be placed into operation.

I hope that you've had as much fun with the tour as I've had in presenting it. Much of the mystery behind how circuit values are determined should

Continued on page 59

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Iran

DTMF Remote Controlling

In somewhat fractured syntax, here's how to let your fingers do the talking.

Editor's note: While the information in this article is pretty much "old hat," we publish it as a gesture of thanks and encouragement to those potential authors around the world for whom reaching us — and thus you — is not as easy as just sticking something in the mailbox or sending an E-mail. Indeed, Shahrokh, like a number of overseas contributors, had to negotiate considerable stumbling blocks in order to legally submit something like this. Their goal? Simply to share information, and, as Shahrokh put it in a letter, "to know more and more by others' help." We thank them all, and hope you do, too. — J.B.

Do you want to be able to control any electrical set just by a call? You have seen the different types of telephone sets, and of course can see how they work and how they dial.

As you know, there are two ways for dialing; we name them "pulse" and "tone." This article will explain these two systems and show how to design and build an inexpensive system which can help you to sit in your armchair at your home or work office and control/command any electrical sets located at any point in the world just by making a telephone call.

Pulse and tone dialing

There are still thousands of old dial-type telephone sets. If you connect the dial telephone's line to an oscilloscope terminal you can see square waves on the screen which show the same number of high/low levels equal to the number you dialed. See **Fig. 1**. This type of telephone is called a "pulse" dialer. On the average, it takes one second for each number dialed. If you dial 6 figures, it takes about 6 seconds. As a result, old telephone centers were slow to dial.

In most countries these days, digital telephone centers are used, and just one of the advantages of these centers is fast dialing by using DTMF, or "tone" dialing.

What is DTMF?

Fig. 2 shows a matrix with four rows and four columns. As you can see, any pressed key can be detected by tracking the two frequencies of the output wave. For example, if output consists of two tones with the frequencies 770 Hz and 1477 Hz, then key number 6 is the one that was pressed.

In tone dialing, the telephone center can detect your dialed numbers with more speed and accuracy than with pulse dialing.

Phase Locked Loops, or PLLs, are the best choice for tracking a signal to measure its frequency. There are several types of PLL devices for general or special purposes, and everyone can choose what type is more efficient for his or her application. In this project you could use the NE567 IC PLL (see **Fig. 3**). It has a TTL output and this characteristic makes it so efficient for designing a simple digital system to decode the numbers. Of course, there

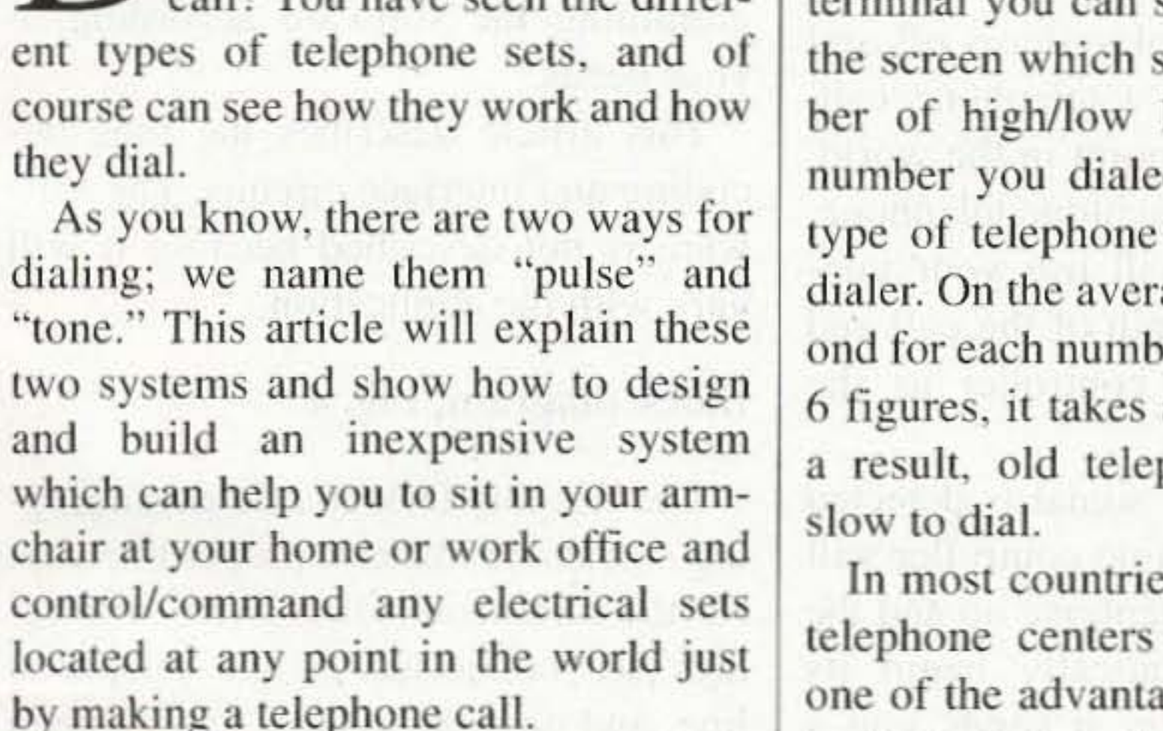

Fig. 1. Pulse dialing.

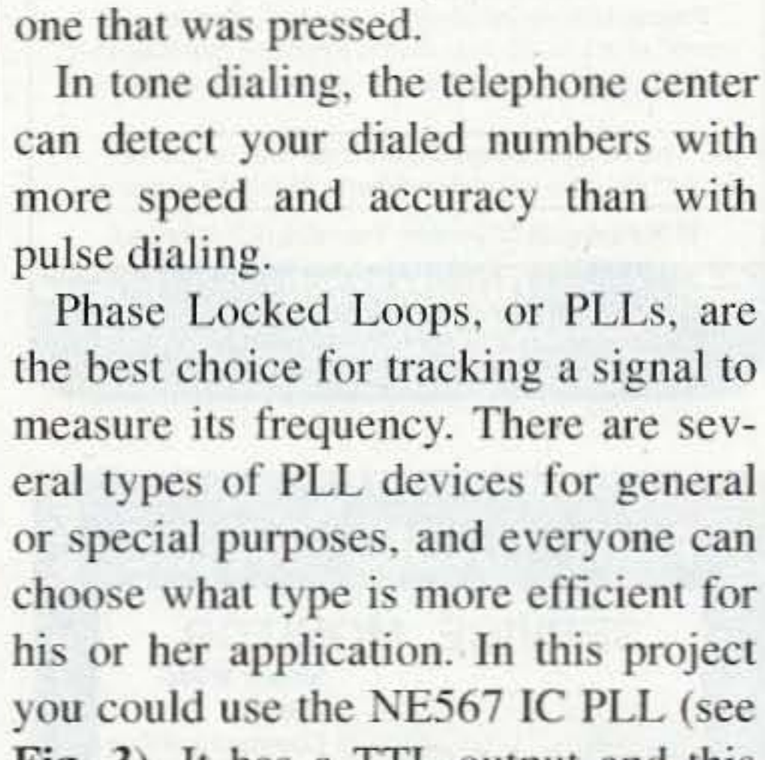

Fig. 2. Tone dial pad.

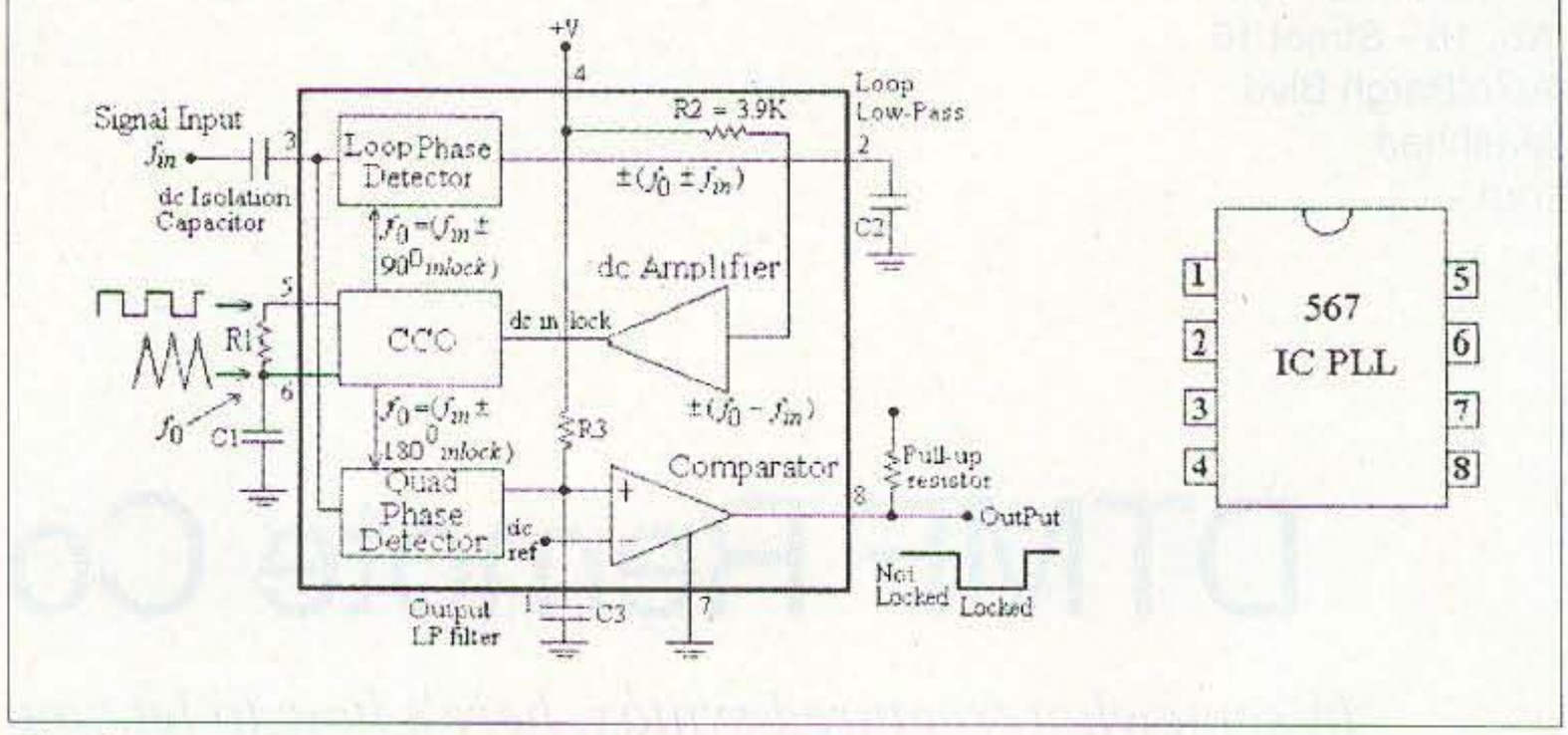

Fig. 3. A sample PLL circuit using IC PLL 567.

are several special ICs which are produced for this application that directly decode the numbers and give four bits support of the 16-key dial pad. In fact, these ICs consist of eight PLLs and a simple decoder to convert the outputs of PLLs to 4-bit words as output. We will use one of these ICs to simplify the project.

The goal

In this project, the goal is to remotely turn electrical systems off and on through making a telephone call. You may be at any point in the world. All you need is a touchtone telephone. (See **Fig. 5**.) We will use your telephone set as the origin of the call and the DTMF remote controller as the destination.

When the ringing signal is detected at B, the DTMF remote controller will virtually pick the telephone up and the system will automatically begin its routine. For instance, it sends you a beep or a recorded voice to notify you about the connections and to offer help with its operation.

Through software, any key or any composition of keys could be specialized to do an exact instruction. You can also do this with the dependent Help/Notify recorded voice.

You can command the system by pressing on the TONE keypad. It is possible to add more capabilities for this system, and you might enjoy programming the software according to your needs.

This article describes the tone decoding and interface circuits. The software is not described because it will vary with the application.

Block diagram, Fig. 4

The Ringing Detector detects a ringing signal and makes a proper interrupt for the microcontroller. Next, both relays are connected to the telephone line, and now the system sends a beep

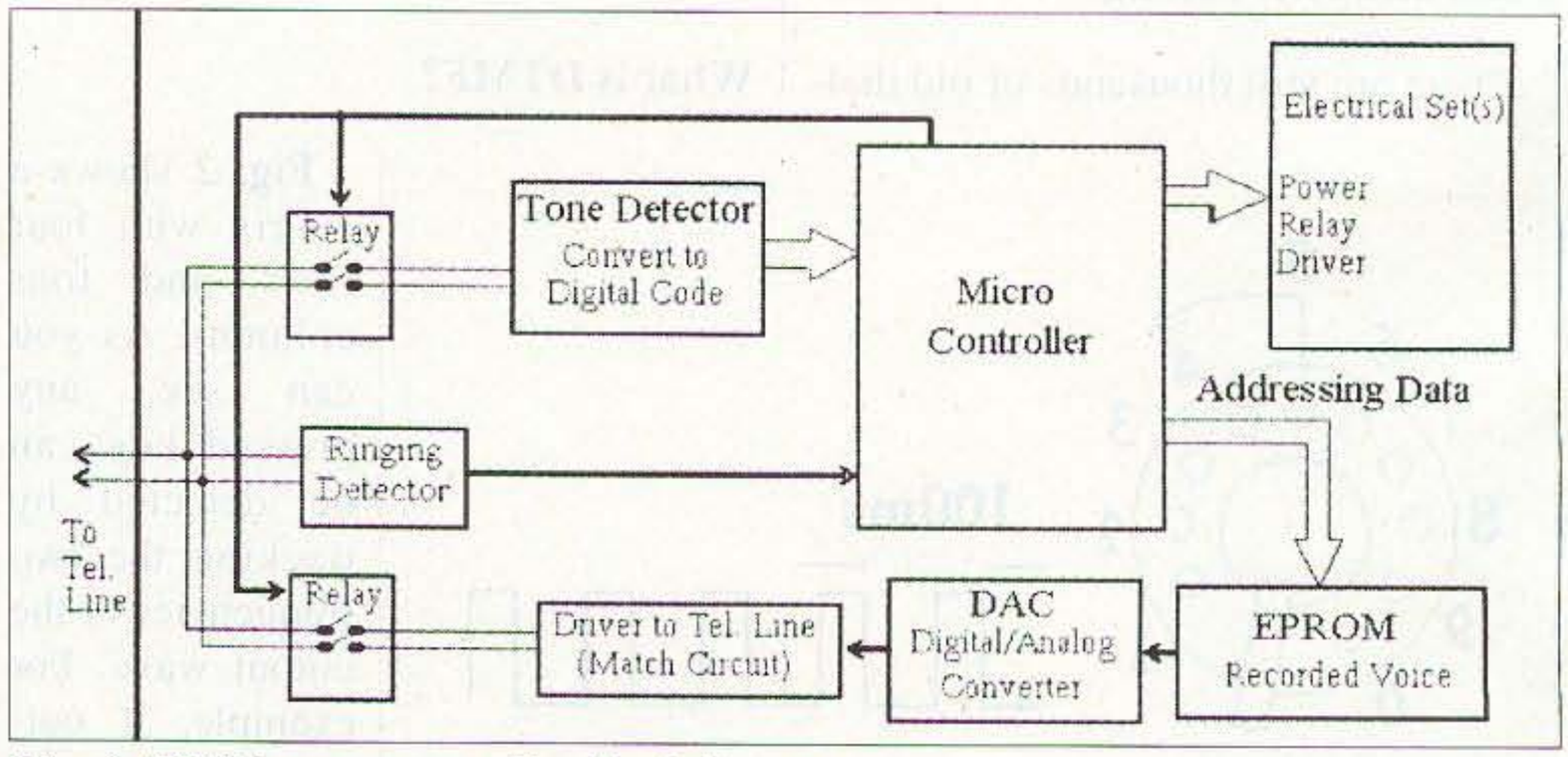

Fig. 4. DTMF remote controller block diagram.

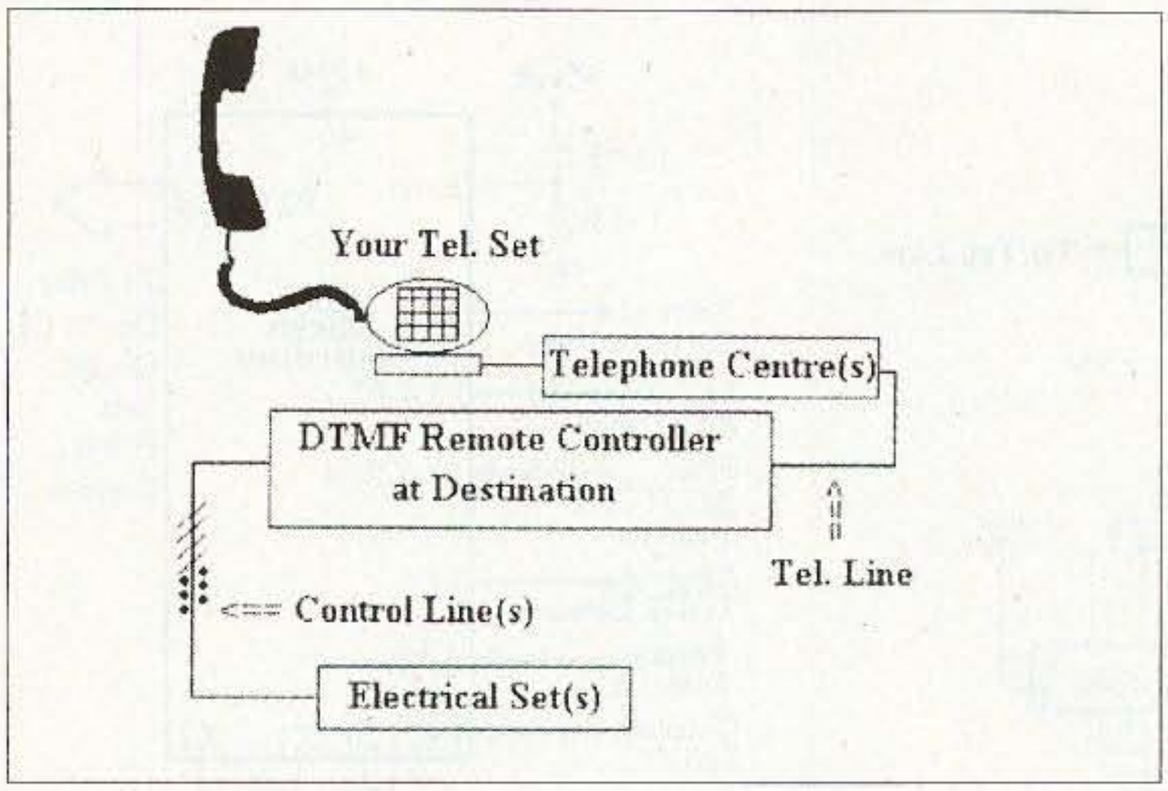

Fig. 5. What's the goal?

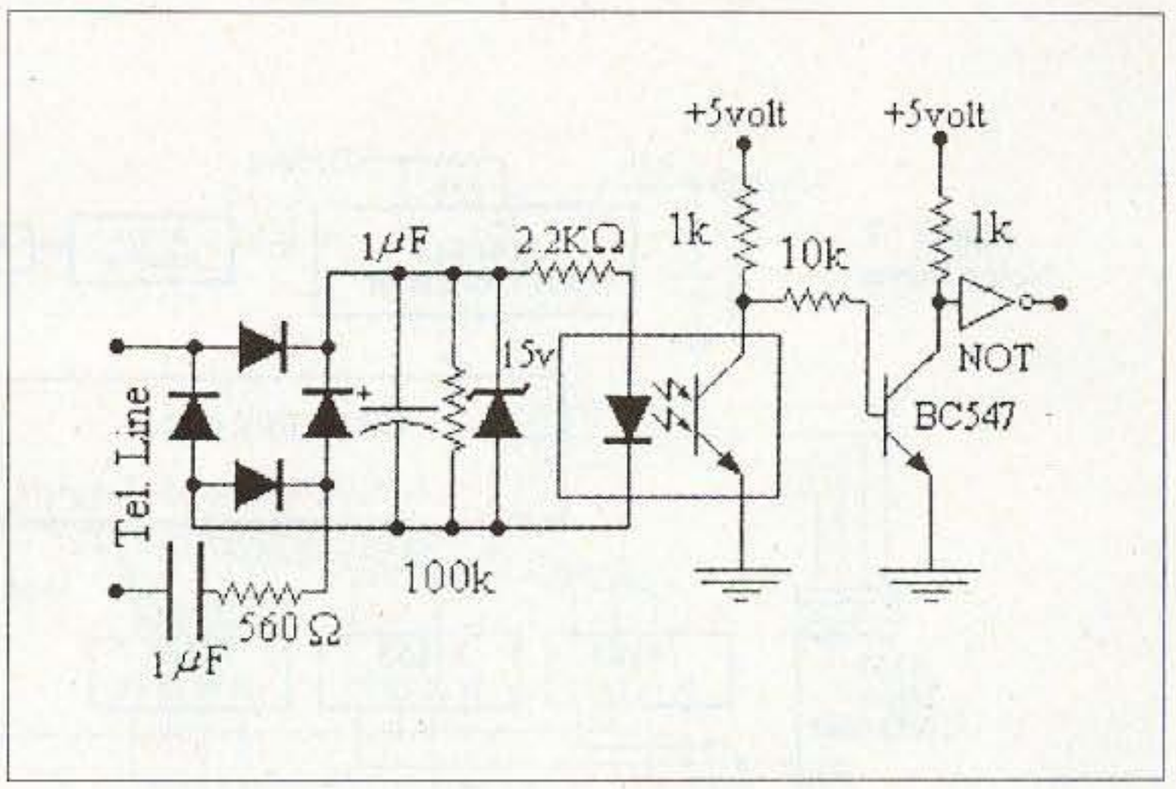

Fig. 6. Ringing detector.

or a voice to show its readiness. The tone detector is ready to convert your commands to digital words and, according to your commands, the microcontroller is ready to do specified routines — for example, turn On/Off some electrical sets which get their power through power relays.

Ringing detector

A ringing signal is a sinusoidal wave with about 100V(p-p) amplitude. This circuit detects received ringing and applies an interrupt signal to the microcontroller/processor (see **Fig. 6**). By using a transistor as a switch, the output will be TTL-compatible.

A rectified ringing signal is applied to an optocoupler device to cause transistor T1 to turn off. As the result, output voltage goes high (level).

TONE detector

Output of the ringing detector is used as interrupt activator of the microcontroller. The software will tell the two relays (see **Fig. 4**) to run (connect). The TONE detector could be an array of 8 separate PLLs, each one is locked in the same frequency of dependent key on keypad. **Fig. 3** shows a sample PLL circuit which uses IC PLL 567.

Of course, in this method it is necessary to decode these 8 outputs to a 4-bit word, and also detect the output changes to recognize the pressed key changes and create a special signal for the controller.

These all take more time and cost, but fortunately there are several different integrated circuits (ICs) which combine these circuits on a single chip.

Continued on page 28

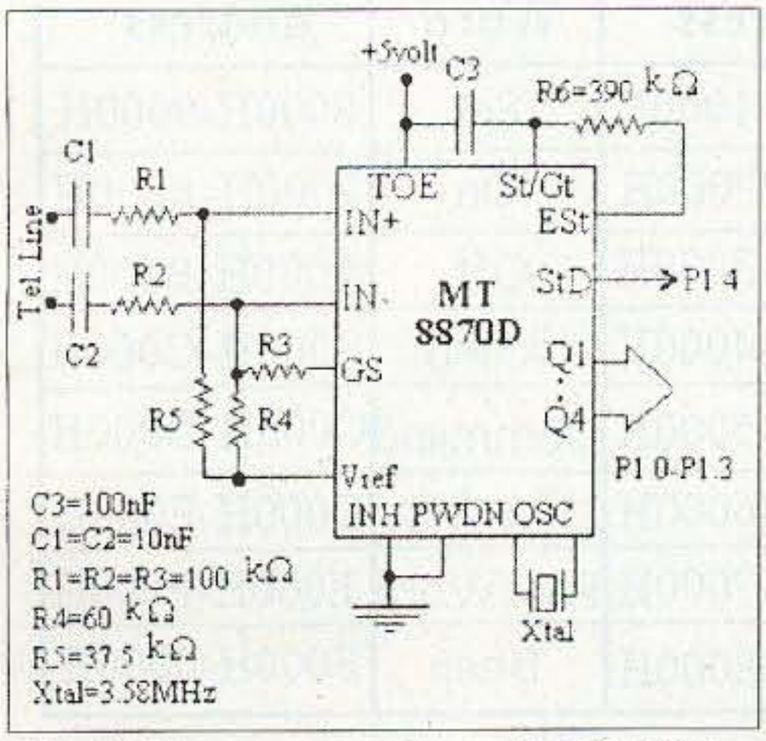

Fig. 7. Pinout connections of MT8870D.

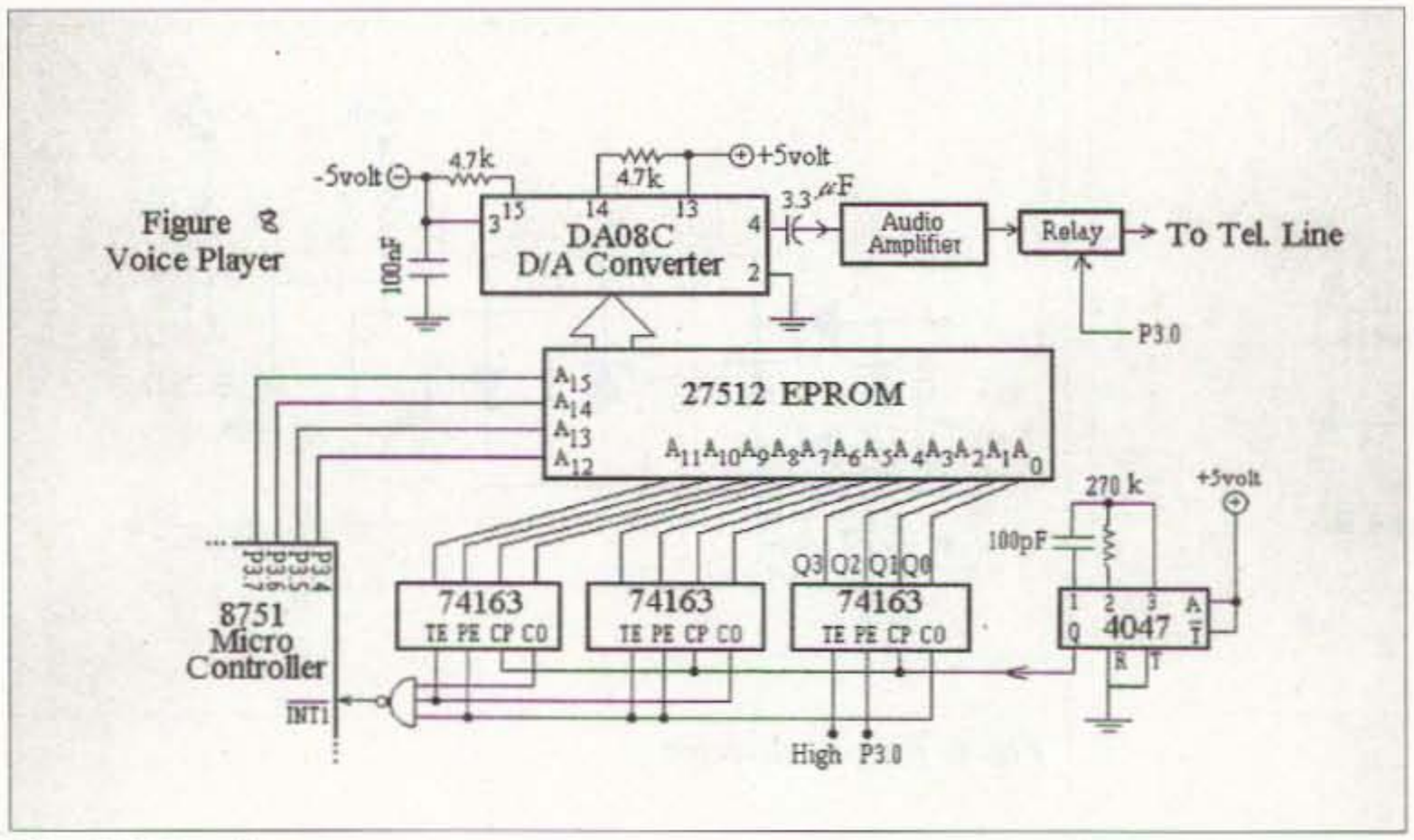

Fig. 8. Voice player.

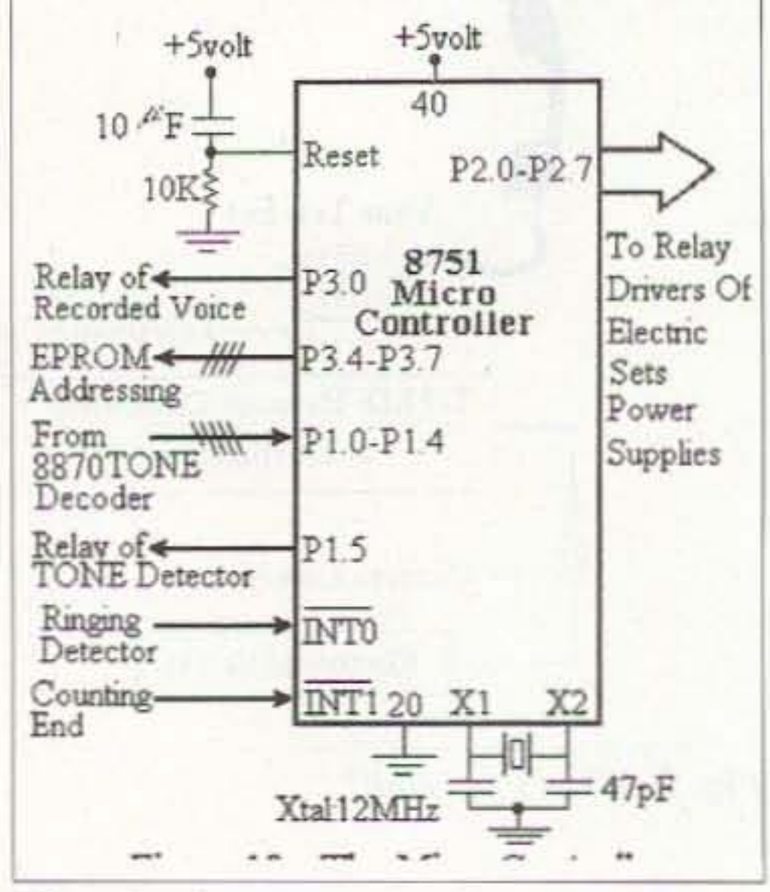

Fig. 10. The microcontroller.

DTMF Remote Controlling

continued from page 27

For example, in this project, the MT8870D (DTMF receiver, manufactured by MITEL Co.) is used because it was the one accessible in Iran. (Available in the U.S. from B.G. Micro, [www.bgmicro.com].)

MT 8870D/8870D-1 integrated DTMF receiver

The DTMF8870D/8870D-1 is a complete DTMF receiver integrating both the band split filter and the digital decoder function. The filter section uses switched capacitor techniques for high and low group filters. The decoder uses digital counting techniques to detect and decode all 16 DTMF tone pairs into a 4-bit code. External component count is minimized by on-chip provision of a differential input amplifier, clock oscillator, and latched three-state bus interface.

Fig. 7 shows a sample pinout connection of MT8870D/MT8870D-1. P1.0 through P1.4 are I/O ports of the 8751 microcontroller.

EPROM (recorded voice)

Here is some information on using a 27512 EPROM to store spoken words. The 27512 is a 64 Kbyte EPROM. See **Table 1**; there are 16 main saved words for sentences of the autoreporter. For example:

System: Ready.
System: Command?
User: 5 [enter] (choose Set number 5)
System: Set Number 5, Command?
User: 1 [enter] (default command for turn on)
System: Number 5, On, Beep.

It is possible to use additional words with additional EPROMs or even using a PC with infinite capability to save words or sentences with EPROM.

64 Kbytes is adequate to save 16 words with a sampling rate of 8 kHz. For simplification of addressing and because of the limitations of microcontroller ports, the duration of all words are equal, 0.5 second each. This duration simplifies the addressing. The microcontroller provides four upper bits (A12–A15) and detects 16 words; the rest lower bits are provided by three cascade counters (see **Fig. 8**). The clock frequency of these three is the same 8 kHz of sampling rate produced by a 4047 astable vibrator.

INT1 shows each word's end. During this period, the output data of

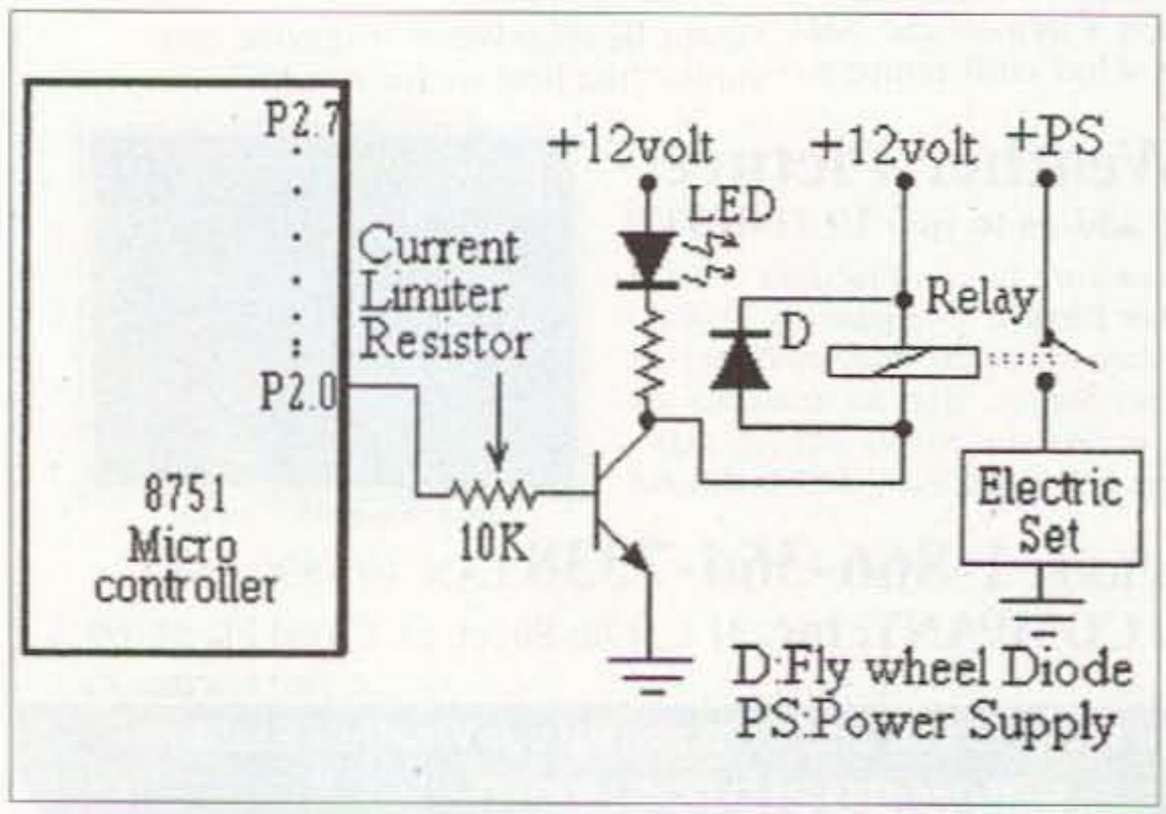

Fig. 9. Relay drivers.

Word	Address	Word	Address
One	0000H-1000H	Set	8000H-9000H
Two	1000H-2000H	On	9000H-A000H
Three	2000H-3000H	Off	A000H-B000H
Four	3000H-4000H	Ready	B000H-C000H
Five	4000H-5000H	Command	C000H-D000H
Six	5000H-6000H	Number	D000H-E000H
Seven	6000H-7000H	PassWord	E000H-F000H
Eight	7000H-8000H	Beep	F000H-0000H

Table 1. Data and addresses of 27512 EPROM.

EPROM will be converted to analog by a DAC, amplified by an amplifier block, and sent to the telephone line.

Relay drivers

As you know, the maximum output current of microcontroller's ports are limited, so for providing the exciter current for relays, I strongly recommend using a transistor as shown in **Fig. 9**.

The microcontroller

The used microcontroller is 8751 with on-chip memory to save the software. **Fig. 10** shows its terminal connections. You must program the microcontroller to perform your desired functions.

References

1. Robert G. Irvin, *Operational Amplifier Characteristics and Applications* (New Jersey: Prentice-Hall Inc., 1987), p. 357.
2. *CMOS Pocket Guide* (GTP Ltd., 1991), p. 69.
3. *TTL Pocket Guide* (GTP Ltd., 1991), p. 1–164.

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Shahrokh Sanati was born in Tehran Iran in 1976. He received an engineering degree (B.Eng.) in electronics from the Ferdowsi University of Mashhad in 1999. He is interested in all things relating to electronics and computers, and is interested in feedback from others to help him learn more. He is not a member of any amateur radio society because no real societies exist in his country at the present time. 73

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The QRP Asylum That Almost Closed

The mad building spree continues.

After more than a year of building QRP rigs, I have them piled everywhere. My shack has a shelf-full, and I have them in my upstairs office and several on my bedside table. I even ran a coax up along the main plumbing vent stack from the basement to the attic so I would have an antenna feed on the second floor.

About a month ago, I noticed that none of the rigs upstairs worked very well. With simple receivers, you can never be sure if the band is down, or there is a source of interference that is masking the signals. First my 80m receiver started getting very faint. Then the 20-meter rig went deaf, and then my Small Wonder Labs SW+ 40m transceiver stopped hearing anything. Maybe I misplaced my good high-impedance earphone? Those rigs don't drive inexpensive 8-ohm stereo headphones very well, do they?

How was it that radios which checked out perfectly down in the shop just faded away upstairs? The coax switch was set properly, and the connections looked good from a distance. Why am I bothering with these homebuilt rigs anymore? Why not just save up for an Icom 706 or one of those new FT-817s or even a TS-50?

The mystery was solved right after I put up my first decent HF antenna in 15 years.

Photo A. *The coax balun on my G5RV dipole.*

The MFJ G5RV ($39.95)

I used to move a lot for work, and did not like the idea of putting up a tower and then selling the house and taking down the tower a year later. As a result I was running dipoles and verticals. The dipoles were never high enough (20 feet or so) and the verticals never had enough buried radials. The result was that I got lousy signal reports and enjoyed plenty of frustration. When testing a recent 80-meter transmitter project, I got a generous 339 report from a ham a mile away.

I had been pacing out my backyard for several years and eyeballing a 50-foot oak tree right behind the house. What if I put up a dipole here? How would I ever get a line up there? I was sure that the wire would break as the tree limbs bent in the wind, so I never took any action.

One day I got fed up and went up to

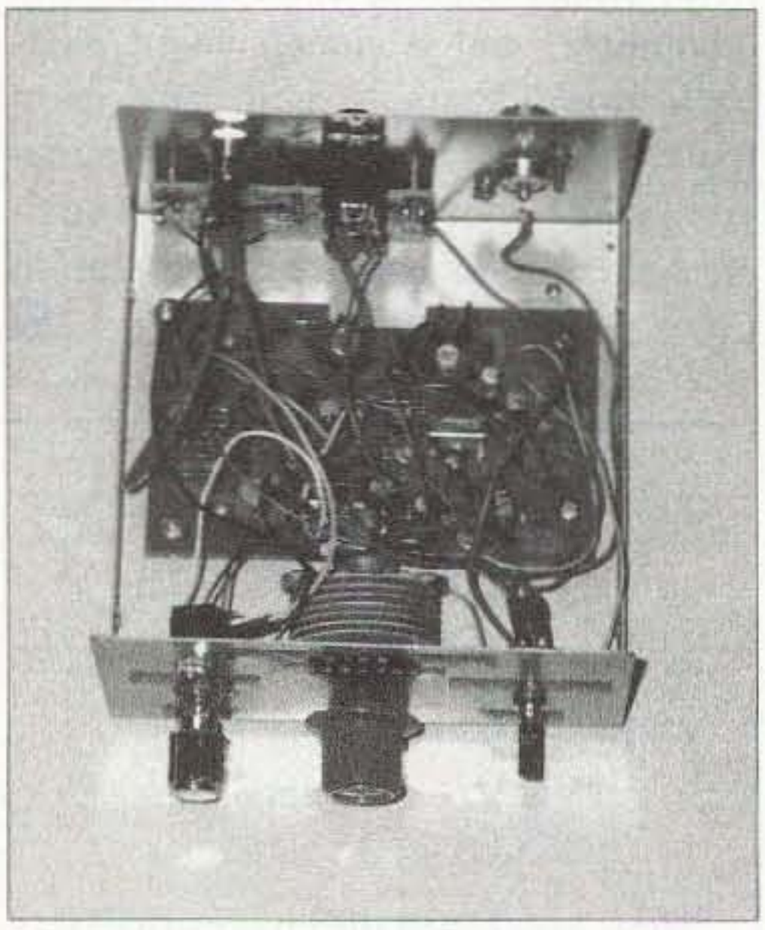

Photo B. *W1FB 40m 1.5 watt transceiver kit, top view.*

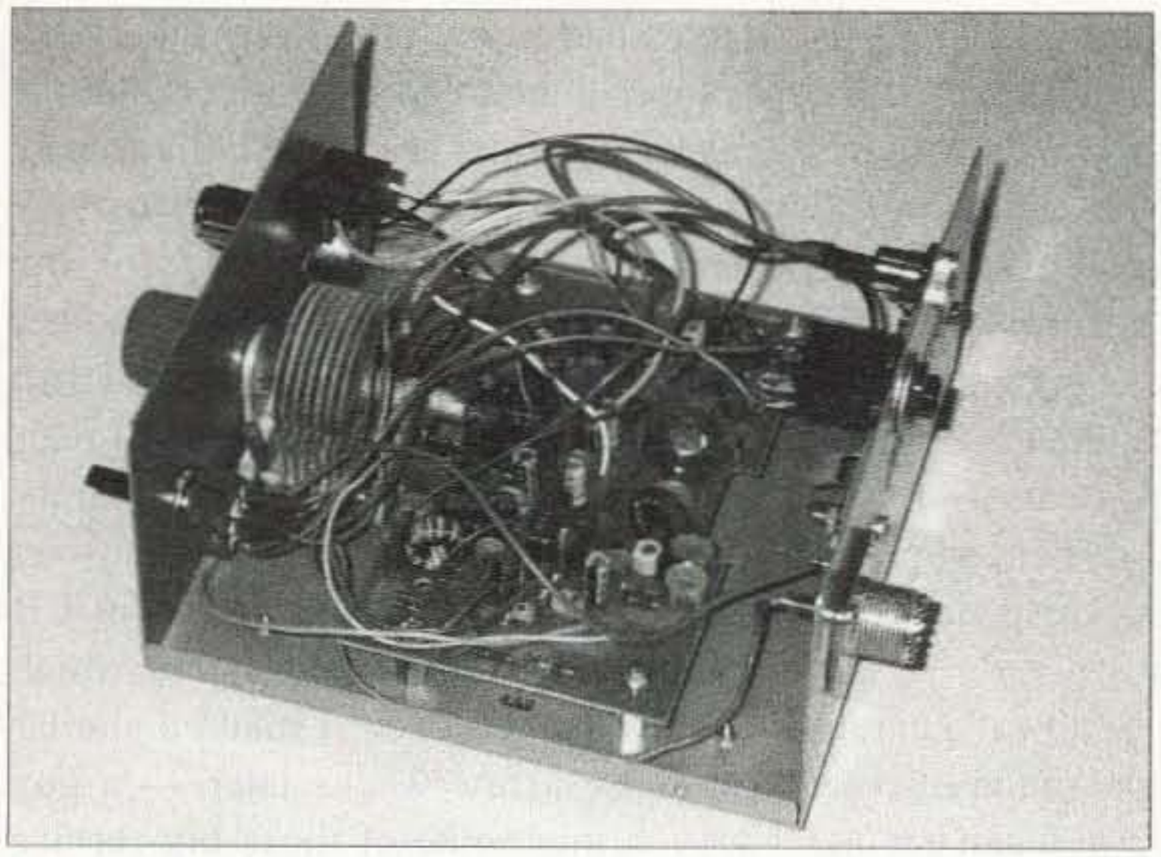

Photo C. *W1FB 40m 1.5 watt transceiver kit, side view.*

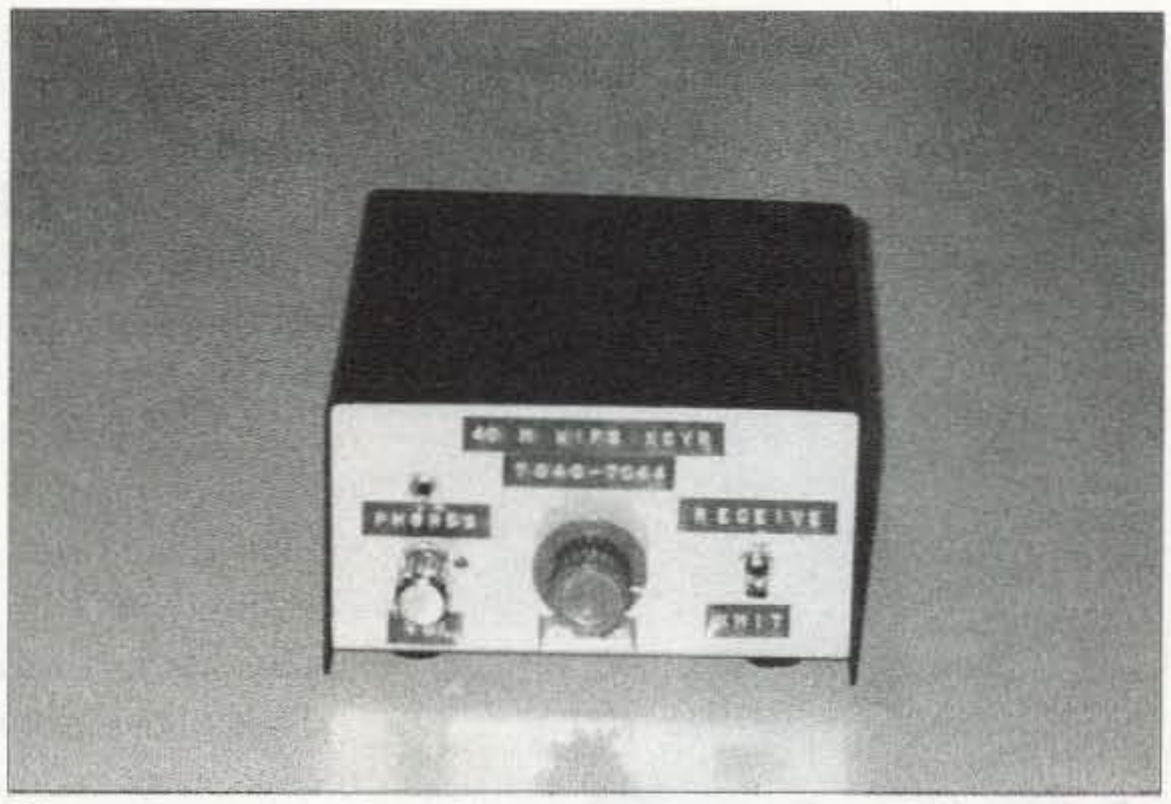

Photo D. *W1FB 40m 1.5 watt transceiver kit, all finished and ready to run.*

Radio City. I was pondering yet another compromise HF antenna, a Hamstick Dipole. Then I checked the selection of wire dipoles. They were sold out of the various shortened dipole kits. But they did have a G5RV left. It was 102 feet long and used ladder line. I wondered if it would fit in the yard. What would I do with ladder line? As with all impulse buys, I'd take it home and I'd make it work.

In the garage was a child's fishing rod I'd salvaged from a dumpster. My fishing tackle box contributed a one-ounce sinker that had done walleye duty on Lake Mille Lacs. I went to the rooftop, and looked over at the tree, which was now eye-level. The first cast went over the top. I said no, I wanted to go over a certain stout limb most of the way up. Another cast and the line got tangled. Forget it — over the top again. I got out a hank of green 1/4-inch nylon antenna rope, and hoisted the center point of the G5RV. The bottom of the 35 feet of attached ladder line was dangling 10 feet in the air. This meant the center point was up over 45 feet!

Down in the shack, I tuned up my main HF rig on 80 meters. Smoke came pouring from the tuner. Was that coax balun supposed to be 7 turns or 10? Back outside to add a few more turns. My 80-meter SSB section net was starting — I asked for a report. Instead of the usual "try again, you are just above the noise," I was 58/59, even 10 over 9!!! In the course of running the coax for this antenna, I found that the jumper for my upstairs coax feed didn't go anyplace and ended in an empty connector.

The W1FB 1.5 Watt 40-Meter CW Transceiver

I think I've said this before — if you have a bit of money and a credit card and want a great low-cost QRP transceiver kit, order up a Small Wonder Labs SW+. This is almost too easy, though. There is a thrill to the chase in seeing how far you can get rummaging in the junk box to scratch-build something more basic.

FAR Circuits makes the PC board for the W1FB transceiver from the *W1FB Design Notebook.* The one tricky part is the audio transformer — the board is set up for the Mouser part, though you can use a substitute. FAR includes a circuit board layout addendum dated 3/90. There are a few typos to watch for:

On the FAR sheet C10 has the wrong polarity. The schematic and book layout are correct. In the book on p. 169, the lower-left 0.1 µF cap should say C33 not C23. In the caption on p. 167 it says, "T1 has 28 Ts no. 26 enamel." That should say T3.

The main RF transformer in the receiver, T1, is a little complicated to install. I colored one of the secondary windings with a black marker before winding it so I would not get it mixed up. I could not get the sidetone part of the circuit to run, and needed to start troubleshooting.

I ended up using a 2N3866 transistor for the PA. I started out with a transistor that looked like a 2SC799 in the distinctive tabbed TO-5 case from an old CB, but I could not find it in my substitution book and it would not work.

My rig tends to operate in a range a few kilohertz above the crystal frequency, so if you want to operate above and below 7040 kHz, you should use maybe a 7037 kHz crystal. I am currently using the $5 7040 kHz crystal that the nice folks at Norcal sell. Thanks, Doug and Norcal.

You can get a 100 pF tuning cap suitable for a knob at RF Parts or Dan's. I found mine at a hamfest. 40-meter CW is no picnic these days with a simple homemade rig. This one seems to have a sweet spot of about 1/4 of the tuning radius on the control. I waited until the band was mostly dead one morning and answered W5HW's CQ, and was able to chat for a bit until the band faded completely.

The Ramsey DMM240 LCR Meter ($99.00)

One of the myths of QRP construction is that you need a bench full of costly test equipment. You can get a long way with just a volt ohmmeter and another HF rig to listen to your signals and generate test signals for receivers. Actually, an outdoor antenna and your fellow hams are a good source of test signals as well.

The Ramsey DMM240 LCR meter is unique in the world of low-cost

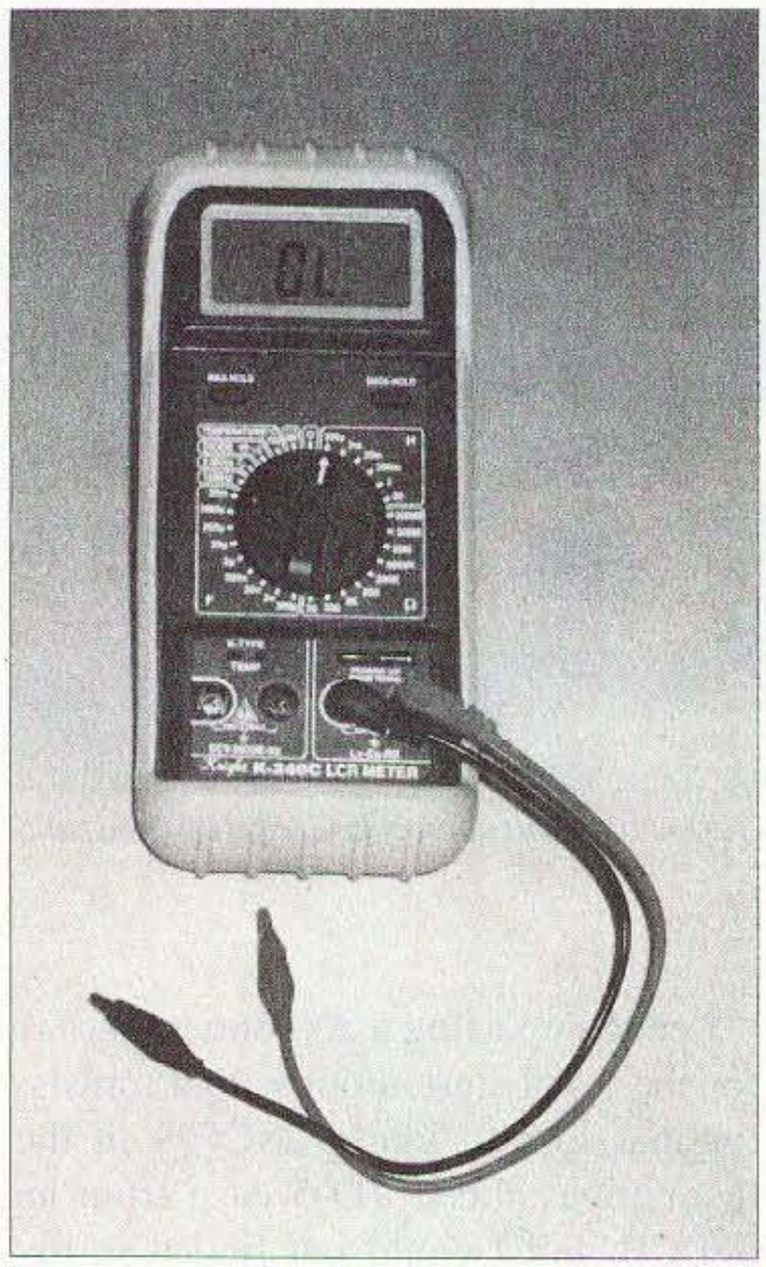

***Photo E.** Ramsey DMM240 LCR meter.*

handheld digital meters in that it has low-value capacitance and inductance scales. These are great for testing and adjusting mystery RF chokes and coils, and for identifying hamfest tuning and trimmer capacitors. It also has a 15 MHz frequency counter that can be used for testing local oscillators, VFOs, and transmitters. If I am feeling unlucky, I test each capacitor, resistor, and coil as I install it, ruling out bad components.

The Wavetek 3000 Series RF Signal Generators ($350 used)

Don Rice NØBVE was kind enough to loan me one of these while I was wrestling with a repeater project. I was immediately addicted, and had to own one. These have thumbwheel switches for setting the exact frequency out to several decimal places. It has a step attenuator, so you can generate an exact number of microvolts of signal to test a receiver. It has two different settings for audio tones, so you can find your signal in a clutter. When you are checking band edges, close does not count, so this one is it.

These cost around $350 in "guaranteed to work" condition on the Internet auction sites. For $175 you can get one "as-is," or "untested." After quite a few radio and test equipment purchases on an auction site, I can assure you that "untested" or "as-is," means "probably broken." You should never assume a piece of equipment is working if it is sold untested or as-is, and you should limit how much you pay for such items to include a significant repair cost.

I bought a 3000 as-is for $175.00, and it was broken. I found that one of the modules inside that did the FM was pulling the -18 volt power supply to ground. I bought another unit as-is for $175.00, and was fortunate to find that one, while also broken, had a good FM module, and the modules were interchangeable between models. I would have saved a lot of time and energy buying one guaranteed to work.

TV service shop inventories

Up at the Superior WI hamfest I was digging around for parts for the W1FB transceiver project above. One of the tables had a row of cartons full of envelopes containing the entire transistor inventory from a defunct TV repair shop. I could not remember what numbers I needed. I bought one of the boxes, and then went back for another and another. Fifty dollars later I had the whole set. When I got home I realized I had most of the 2S line of transistors from 2SA to 2SK, inclusive. There were dozens and dozens of CB output (QRP output) transistors, which cost $4 to $10 each. I made a similar purchase a few weeks later — a guy was selling some of those big service kits of tubes — I could not remember which ones I needed, so got the whole box. W1FB suggests bringing a gunny sack to hamfests and buying ahead. I recommend a pickup truck.

Old televisions

One night on our Minneapolis Area Tuesday Tech Talk net, Jim Fisk KCØHEW offered up some old television sets for my QRP stockpile. I took the truck to his house and we headed for the basement. He had five or six 18" TVs and some other items. One of the TVs was tube, and I was happy for the tubes, high voltage caps, and transformers. The solid state TVs were heavy and only had a few small circuit boards each. One 9" portable TV had a lot of great components, as did an ancient VCR. Looking at my garage after this trip, I think there is truth to David Newkirk WJ1Z's comment: "Asking around on the air may net you more offers of freebies than you can handle."

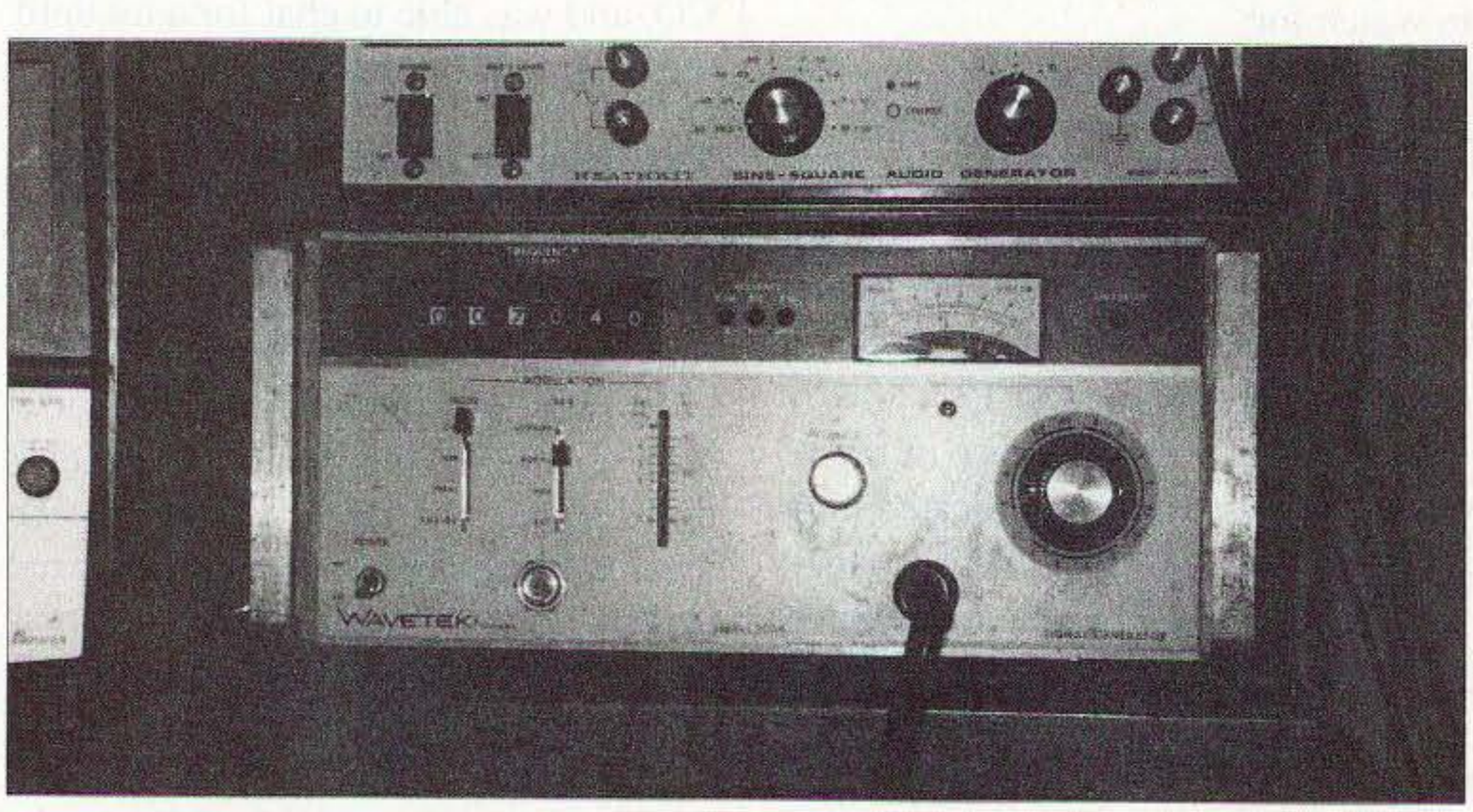

***Photo F.** The Wavetek 3000 RF Signal Generator.*

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Dan's Small Parts and Kits, Box 3634, Missoula, MT 59806-3634; (406) 258-2782; [http://www.fix.net/~jparker/dans.html].

DeMaw, Doug, *W1FB's Design Notebook*, ARRL, First Edition, Second Printing, 1994. ISBN 0-87259-320-7.

FAR Circuits, 18N640 Field Court, Dundee IL 60118. (847) 836-9148 voice/fax. Boards and matching article reprints. [http://169.207.3.68/~farcir/index.htm]

Continued on page 59

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Cleanin' and Climbin'

Hams get involved again.

Whenever there is an activity of more than just a few people, hams are usually requested to provide communications for the event. The event this time was named "Clean And Climb," which was primarily a rock climber's activity with hams providing communications support.

The participating hams had a lot of fun being part of the affair since most of us had never previously been involved in rock climbing activities. For this event, the Xerox Amateur Radio Club (XAR) was asked to provide communications support. Hams participating in the event were (**Photo A**): Barbara WA6EUB, author Hugh W6WTU, Terry KC6VCL, Norm K6YPD, Doug WA6LXB, and Dave W6MIK.

The site selected for the activity was an area called Stoney Point Park located near the northern edge of Chatsworth, California. The County of Los Angeles has marked this area as a "park" so that it appears on the map. Although there are residential communities nearby, the Stoney Point area is made up of huge piles of sandstone rock that appear a lot like huge boulders stacked into various piles that extend upwards perhaps 500–600 feet (see **Photo B**). The area is part of the natural surrounding mountainous environment where the rainfall over time has washed out all of the top soil, exposing the rock structure. The particular pile of rocks selected for the climbing site is isolated from the other piles so that it has become a real challenge for rock climbers. Some of the rock faces are absolutely smooth vertical surfaces standing several hundred feet high. Some rocks form mantles

Photo A. *Hams participating in the Clean and Climb activity [L to R]: Terry KC6VCL, Doug WA6LXB, Dave W6MIK, Barbara WA6EUB, Hugh W6WTU, Norm K6YPD. The communications center gazebo is visible in the background.*

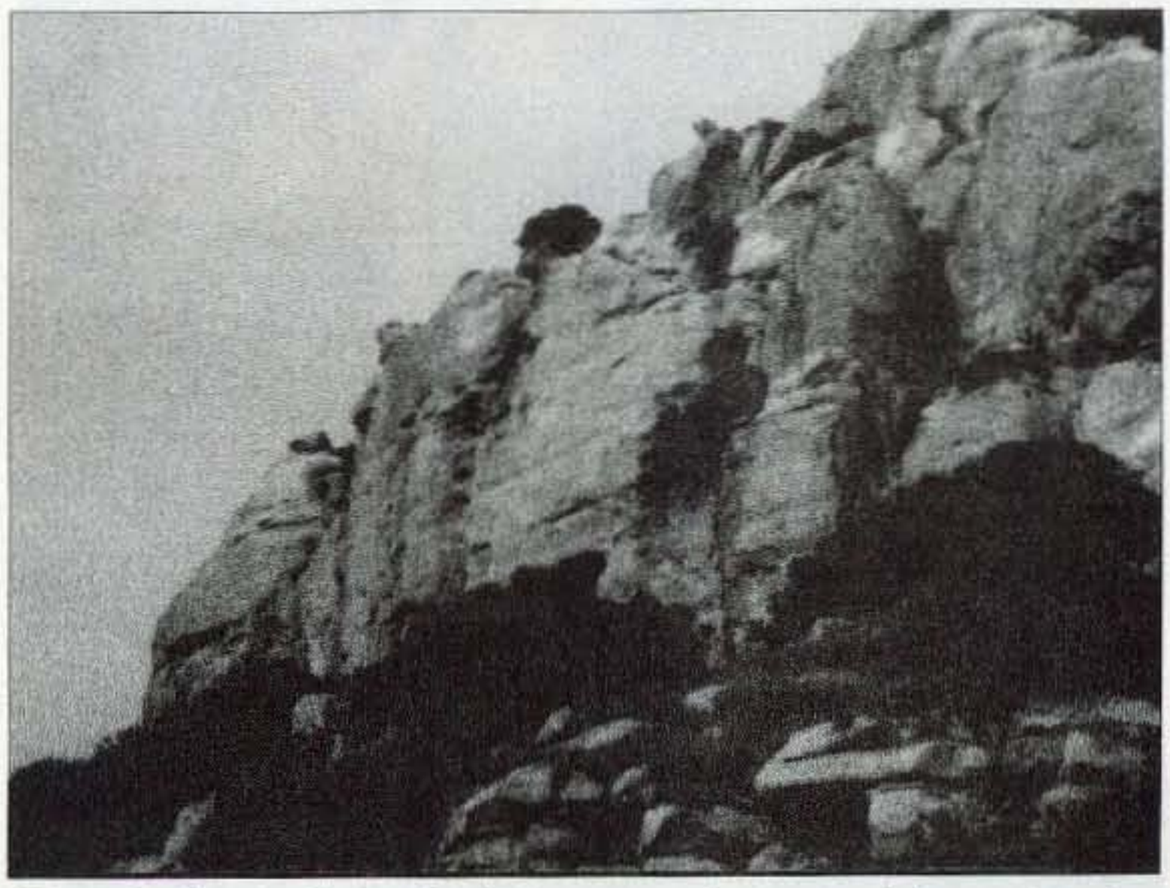

Photo B. *Stoney Point Park. Large sandstone rock formation that is used extensively by rock climbers. The height is estimated to be 500–600 feet.*

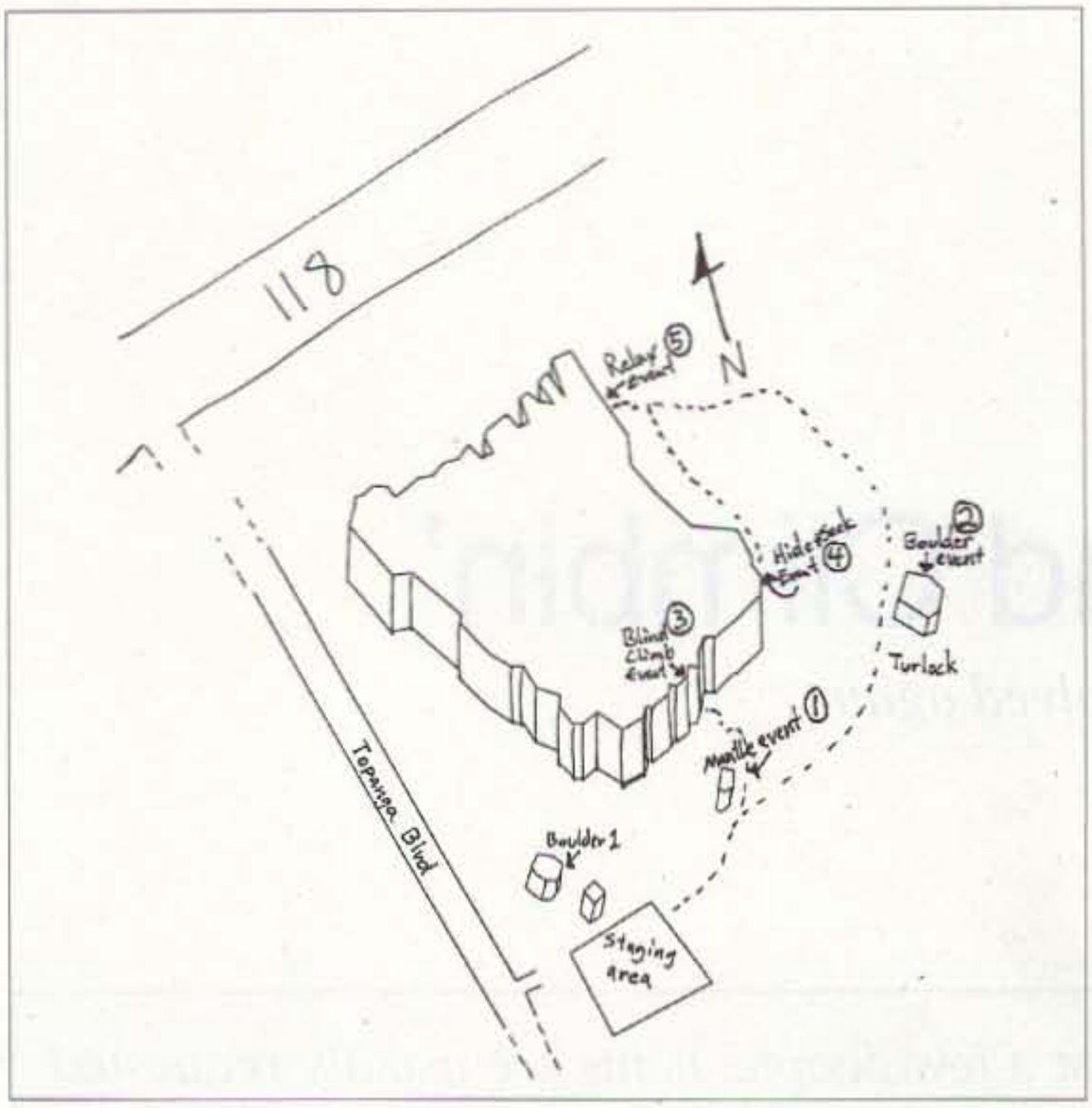

Fig. 1. General layout of Stoney Point Park. The location of the staging area and contest sites are shown.

requiring the climber to crawl up the face below the mantle and then climb over the mantle's edge to get above it for the next challenge.

The drawing shown in **Fig. 1** depicts the general layout of the rock pile, in addition to showing the location of the various climbing contests. Paths around the rock pile provide nearly 360 degrees of access around the rock that has a circumference of perhaps two to three miles.

Activities for the day started at approximately 6 a.m., with nearly 75 people showing up to participate in the cleanup portion of the event. The hams arrived at 10 a.m. and set up a sun shade, called a gazebo, which was a plastic sheet draped over a steel tube tent frame (see **Photo A**). Four corners of the frame and plastic were staked to the ground, providing a perfect sunshade without inhibiting air flow. A card table was set up under the cover, providing space for radio gear. It also served as the hams' luncheon table.

Lunch was served at 12 noon and consisted of three 6-foot-long Subway-style sandwiches cut into 3-inch sections. Each was about 6x4 inches in diameter. A single 3-inch slice was about all one can get around and still feel as if they could navigate. An excellent-tasting potato salad was provided, along with potato chips, salt-free trail mix nuts with raisins, soft drinks, and water. It only took one trip through the chow line to get filled up, so there was ample food available at the end of the day. At that time it became "open season" on the remaining food, as it all had to "go" in the end.

Following lunch, the activity judges were brought over to the communications center gazebo where a ham operator was paired off with a judge. There were six hams and six activities

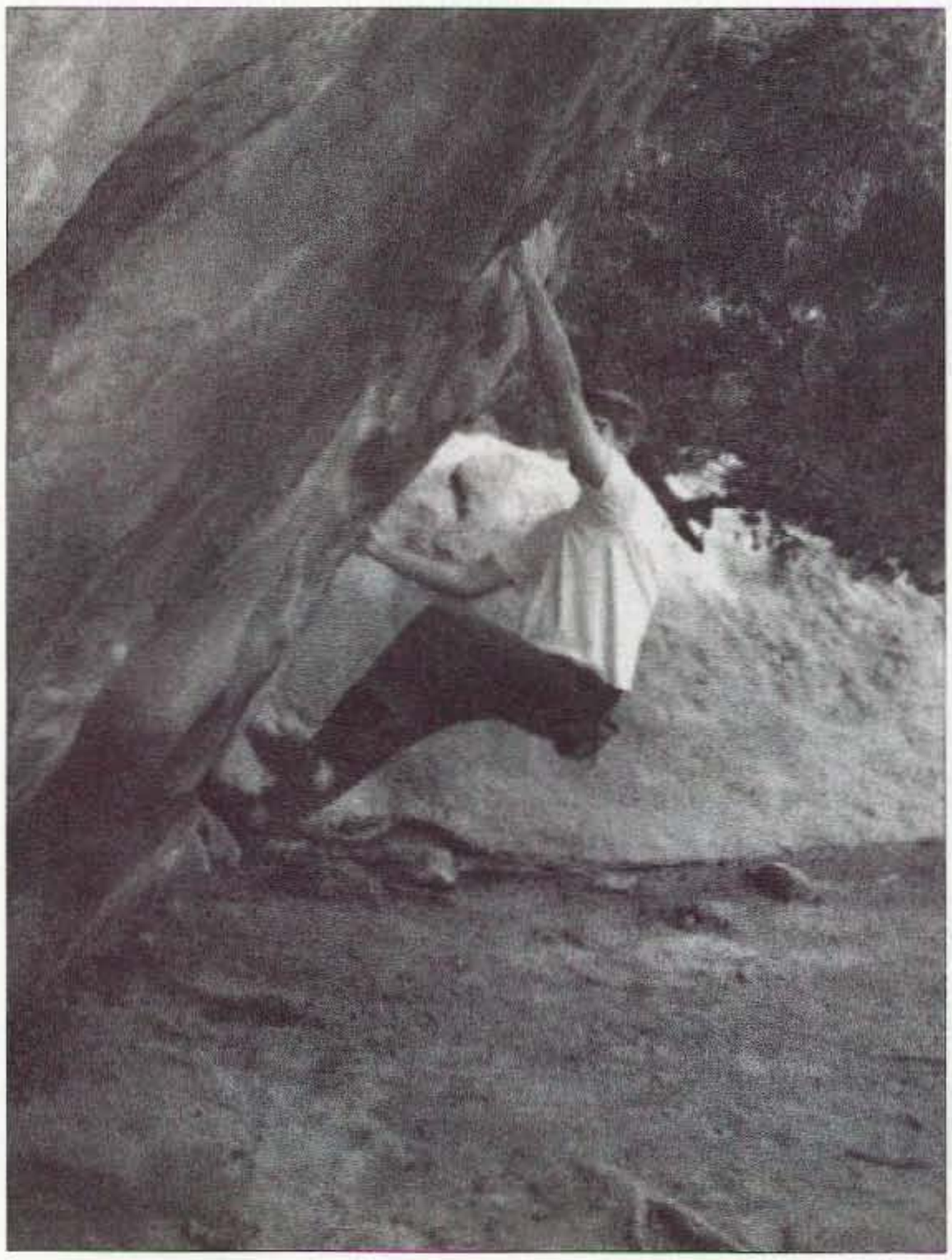

***Photo C.** Mantle climb. One of the easier contest climbs.*

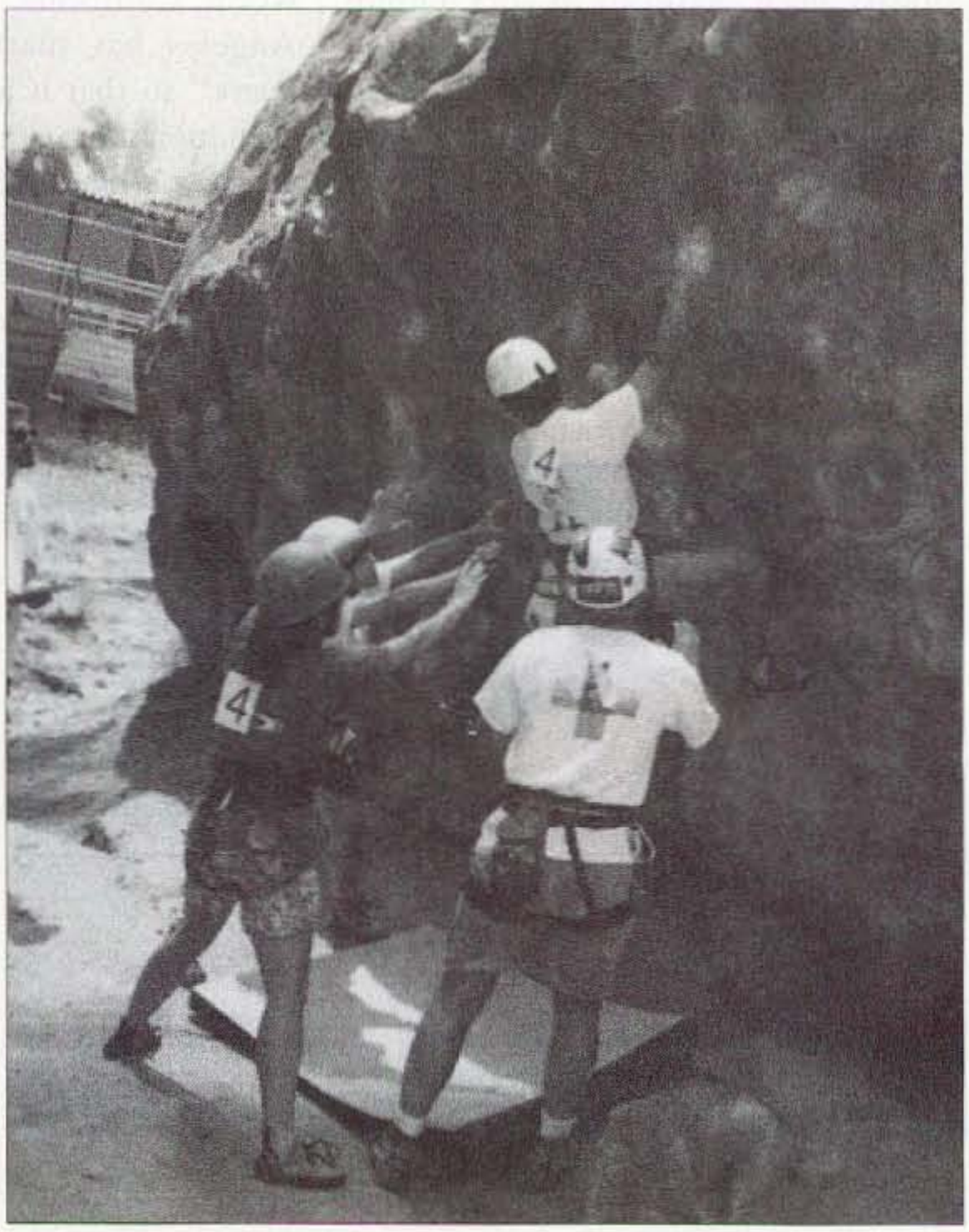

***Photo D.** Boulder climb. Of the contest sites, this climb was considered to be the most difficult.*

which worked out well. Barbara WA6EUB manned the communications center with a handheld while the rest of us followed a judge to a designated contest location. Being the fortunate one with a site only a few hundred yards from the communications center, I was able to carry a folding chair along with my radio gear.

Communications around the area worked reasonably well using handheld radios on a simplex frequency in the 450 MHz band. An exception was one site located on the far side of the rock pile where periodically a communication relay was required. Most of the time, direct communications worked very well. The actual communication content was very informal and related the location of the teams, team completion at an event, and "Hey, where are you?" Fortunately, there were no injuries or accidents during the event, but had there been, the hams were prepared to alert medical services.

Cleanup of the area, though not complete, yielded 110 gallons of glass along with roughly 2,000 pounds of trash and metal. All was accumulated, separated, and placed into plastic trash bags for disposal. Included was a bent up automobile hood and a steel bumper.

Of the 75 persons involved in the cleanup activity, only twenty participated in the climbing contests. The twenty were broken up into teams of four persons each and given a team number. For single person activities, one team member would do an assigned task with a different member for each contest. The strategy was to prevent the strongest or most skilled team member from dominating the contest. Multiple person tasks required all team members to participate. Points were assigned by the site judge based upon the team's ability to complete the task and the "fun" exhibited by the team. Some tasks such as the hide and seek, and relay climb were graded upon the number of tries, time required, or speed of completion. During the speed/timed contests, a designated chip was to be retrieved and returned to ground level. If the incorrect chip was retrieved the "wrong" chip had to be returned to the found location and the correct chip brought down to the judge.

There were five contests provided for the climbers. Each is outlined below along with a photo showing essentially what was expected of the team members. A photo for the relay contest was not available.

Mantle: One team member from each team was required to grasp the rock face using bare hands. The task was to climb up and over the face of the mantle (**Photo C**). Hugh W6WTU was stationed at this event.

Boulder: This was a large smooth faced rock that was considered to be the most difficult contest of all. Of the five teams, only one member from each team was allowed to climb. The objective was to climb and stand on top in the shortest amount of time. Only one person was successful in completing the boulder climb (**Photo D**). Dave W6MIK observed this event.

Blind Climb: For this event, the selected team climber was blindfolded. To assist the climber, two team members

Continued on page 59

***Photo E.** Blind climb. Climbers were blindfolded for this contest. Other team members functioned as coaches.*

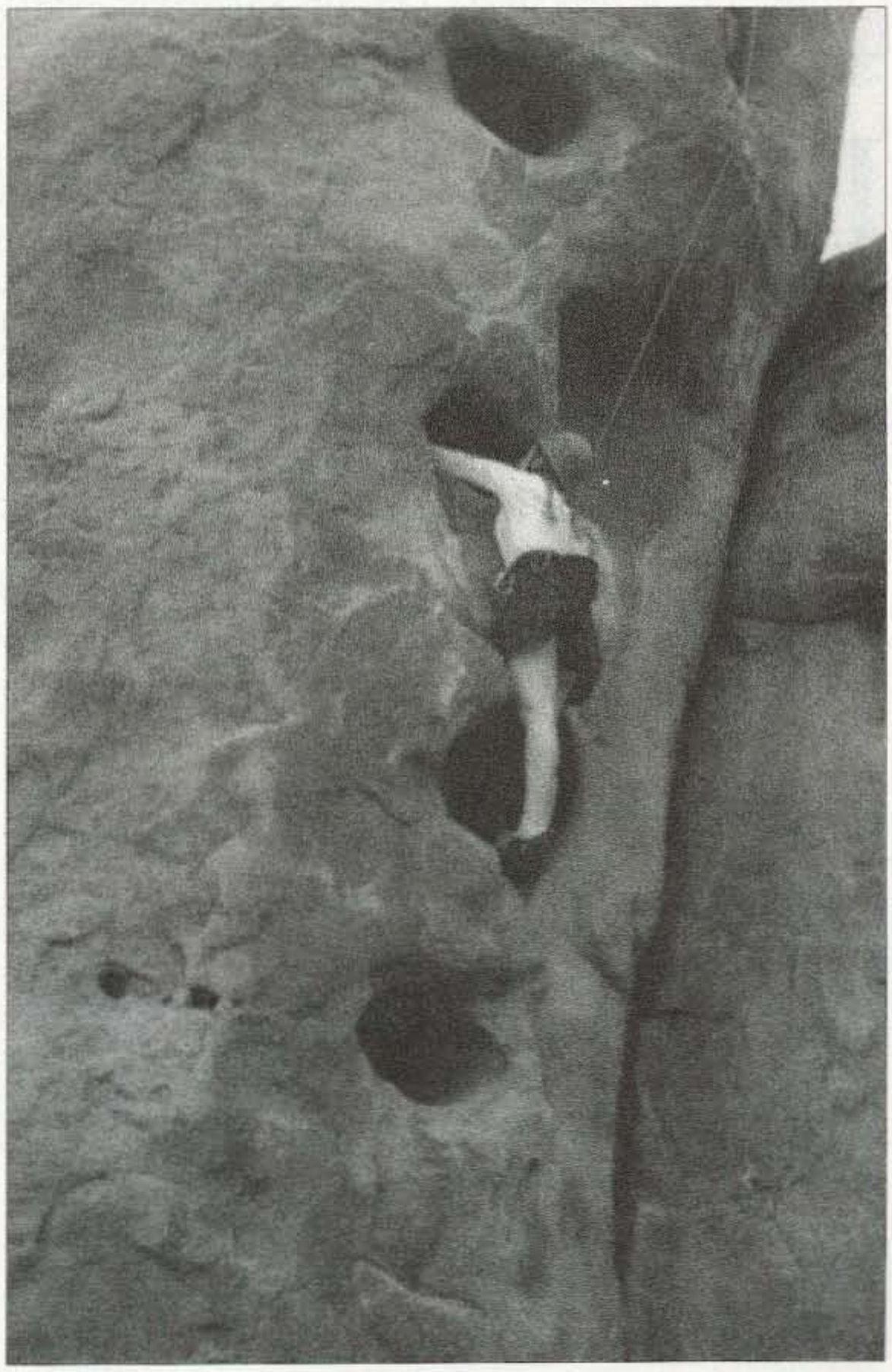

***Photo F.** Hide and seek. Team identifier chips were placed at random in three of the holes. The correct chip had to be retrieved within the shortest time period.*

Chris Waldrup KD4PBJ
4713 Meadow Lake Dr.
Apex NC 27502
[kd4pbj@worldnet.att.net]

Bear Island on the Air

Don't forget to use your antenna duner.

"Beep ... beep ... beep." It seemed like I had just gone to bed, and the clock was already going off. It was 4:30 a.m. on Saturday, May 19th, and I knew that adventure lay ahead.

I was one of three hams going on a sea kayaking QRP expedition to Bear Island off the coast of North Carolina. Bear Island is unique, having dunes that are over 100 feet high. Most of the islands in North Carolina that have high dunes are off the northern coast of the state. Bear Island, part of Hammocks Beach State Park, is approximately 4 miles long, half a mile wide, and has no development or roads, with the exception of a shelter built for the park rangers.

I had packed the car the night before, so after filling my water bottles and getting the food together, all that was between me and a weekend of hamming was the three-hour drive to Swansboro NC, where we would be renting the kayaks. Once I arrived, I met up with the two other adventurers. Paul AA4XX of Raleigh is an experienced kayaker as well as an accomplished QRP operator who lives for microwatting. John WB4OFT, of Greensboro, was new to kayaking, but also was an experienced QRPer. Paul and John had arrived a couple of days earlier — Paul to get an extra night of camping on the island, and John to take some safety classes. We are all members of the Knightlites QRP group based in Raleigh.

Getting to the island was an adventure in itself. We had to wait for a break in the boat traffic before we could cross the Intracoastal Waterway. The trip involved navigating through two and a half miles of channels between

Photo A. *Chris KD4PBJ (left) and John WB4OFT at kayak rental shop in Swansboro NC. Intracoastal Waterway behind. (All photos by Paul Stroud AA4XX)*

Photo B. *Arrival — note small antenna tuning unit below black section of mast.*

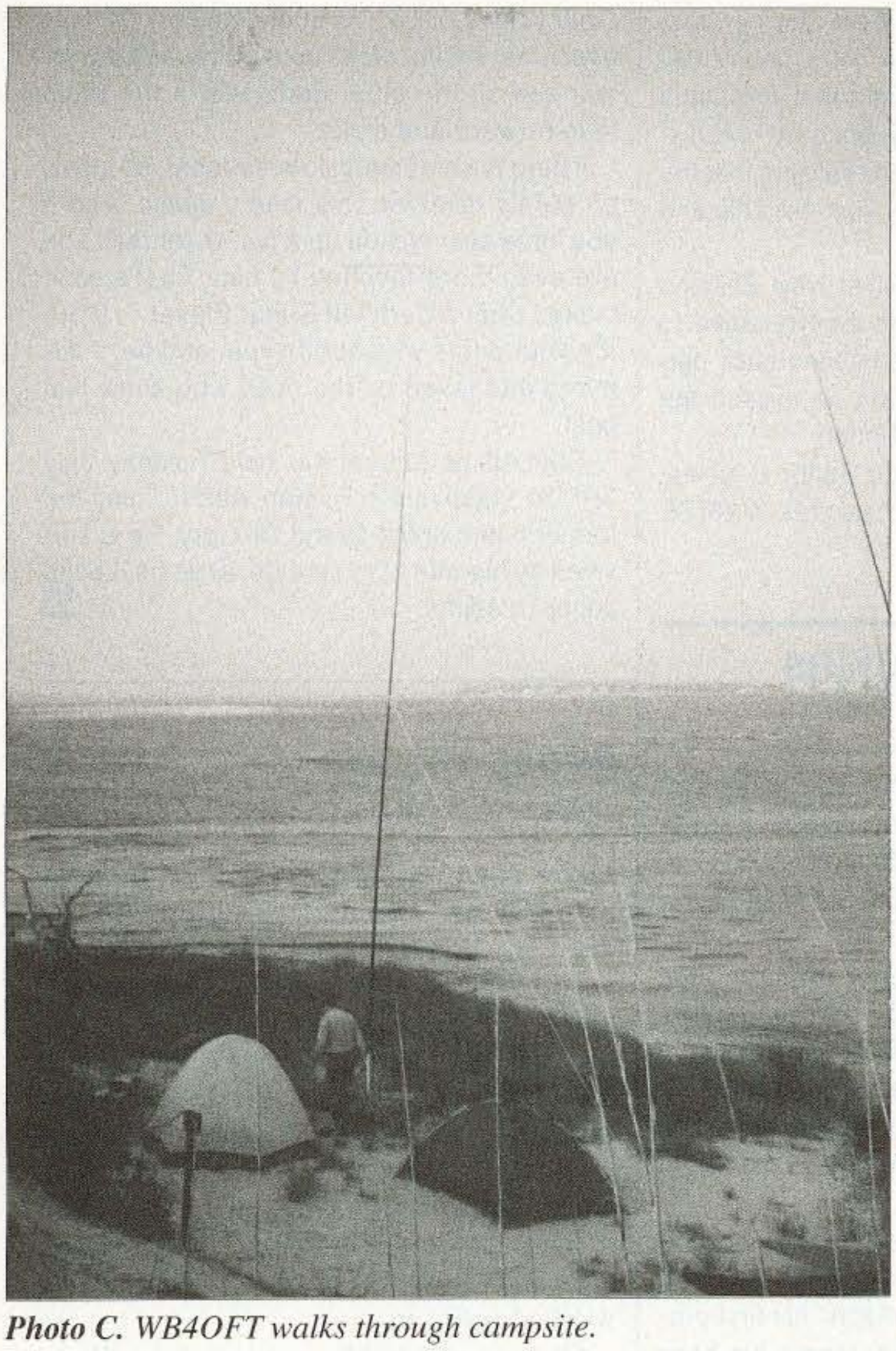

Photo C. *WB4OFT walks through campsite.*

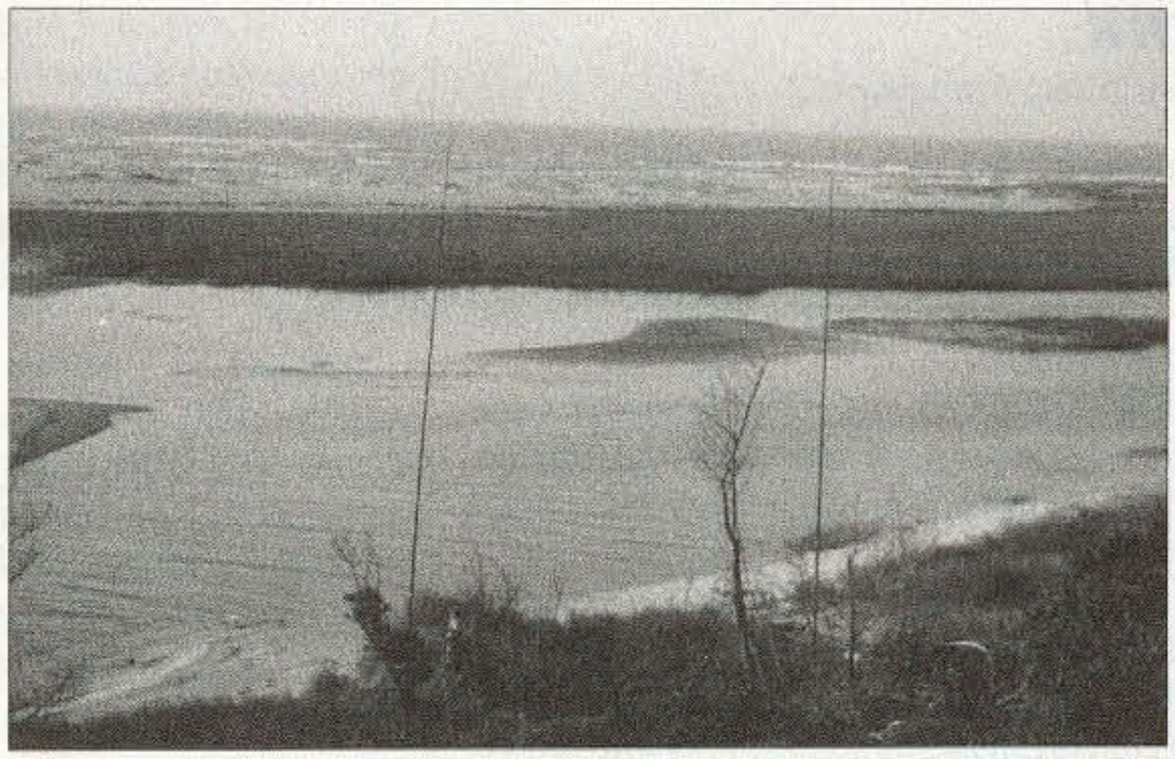

Photo D. *Campsite, Atlantic in rear. One group of boaters we met asked what kind of fish we hoped to catch. The "poles" were really our half-wave verticals. Telescoping masts by Kanga weighed less than three pounds each.*

grass-covered sand bars. We would often get down a channel only to have Paul, who went slightly ahead of us and acted as our guide, come back to tell us that our path was a dead end. Low tide complicated this journey even further, making channels that were 4 feet deep during high tide only 6 inches deep. After three hours we finally made it to the island.

Paul had come out the night before and already set up his tent and the antennas that we were going to use, two half-wave verticals. He had purchased 30-ft. extendible fiberglass poles from Kanga, and attached a wire to the top of each. The wire came down to a tuning box at the base of each pole, where a short length of RG-174 coax went to a homemade phasing control and was connected to our rig, a White Mountain 20-meter QRP SSB radio. We were set up less than 20 feet from the ocean, facing a large sound. Paul had tested the antennas earlier and found them to work just as well without radials as with them, so we did not bother to put out any.

The first contact that I made was with a special event station in White River Junction VT. They were a solid 5-9, and returned a 5-5 for me. They were sure amazed when we gave them our power level … 2 watts! We would answer CQs and usually be acknowledged within three tries. The countries worked this weekend include St. Vincent, Germany, England, Lebanon, Canada, Denmark, Brazil, Russia, Belarus, and Kuwait … all on single sideband with 2 watts and all with home-brew antennas, a kit-built rig and a 7 amp-hour gel cell battery!

Continued on page 61

Photo E. *KD4PBJ at the mike.*

Photo F. *The station: home-made antenna phasing box (top), White Mountain 20m SSB rig, and 7 amp-hour, 12 V battery in rear.*

QRX

continued from page 7

there was only a very short time to get ready for the April 15, 2000, changes, but the VECs and VEs pulled off a miracle. As a result, there was no interruption in testing when restructuring was put in place.

But miracles are not commonplace. It takes hard work to keep the all volunteer testing system in operation. And Creel says that's where you come in.

If you have any ideas on how to improve the system in general and the situation in Alaska in particular, John asks that you please contact him. He prefers E-mail. His address is [creewb3gxw@aol.com].

Who is John Creel WB3GXW?

By way of background, Creel, first licensed in 1977, holds an Extra Class amateur license. His mother, wife, and both daughters are also amateurs. He is a life member of the American Radio Relay League and in 1998 was named the Atlantic Division Amateur of the year.

Creel started volunteering with the Laurel VEC program in the spring of 1989. Since 1990, his VE has tested over 3,000 applicants. WB3GXW started attending VEC conferences in 1991.

But that's not all. As an ARRL Official Bulletin Station, Creel owns and operates the only area repeater that retransmits the Amateur Radio Newsline, the ARRL audio news, and This Week in Amateur Radio. This, on Saturday and Sunday nights starting at 8:00 p.m. on the Silver Spring MD 147.225 MHz repeater that bears his callsign.

The bottom line is that John Creel WB3GXW is a very involved member of our ham radio fraternity who is now taking on another challenge.

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

A Truly Old Message

Here's a story about communications of a different sort. About paper, pencil, a bottle, and the sea. We have all heard the stories of survivors of shipwrecks washing up on an island. Eventually, they put a message in a bottle and toss it out to sea in the hope it will be found and they will be rescued.

Well, not all messages in bottles are emergency messages. And now, 45 years after it was thrown from a ship into the Indian Ocean, a bottle with a message has turned up in New Zealand. And amazingly, not far from the home of the author.

Austrian Hans Schwarz, now 67, wrote the message in English and German while sailing to Australia in 1956 to attend the Melbourne Olympics. Amazingly, the four-decade-old note was found by a man living about 40 miles north of the city of Wellington, which is where Schwarz now lives.

Where it was found and the contents of the message have not been revealed because the finder, who was not named, has signed an exclusive media deal, the newspaper reported. Schwarz, who got a phone call from the finder, was surprised that the bottle turned up at all, particularly since he had dispatched the message without realizing that the continent of Australia lay between his ship and the Pacific.

Schwarz says that he visited New Zealand after the 1956 Olympics and then returned to Austria. Five years later, he headed back permanently to Kiwi-land, saying he missed the "easy-going" lifestyle Down Under.

Thanks to The Worldwide Sailor E-Newsletter, *via* Newsline, *Bill Pasternak WA6ITF, editor.*

Guitarist Chet Atkins W4CGP — SK

Chet Atkins, whose guitar style influenced several generations of county and rock musicians, died Saturday, June 30th, at his home in Nashville TN after a long battle with cancer. He was 77.

Chet was born Chester Burton Atkins on June 20, 1924, on a farm in Luttrell TN some 20 miles northeast of Knoxville. While his brother urged him to learn to play the fiddle, Chet took a fondness to the guitar early on. According to his Internet biography, at the age of nine, he traded a pistol for a guitar.

Atkins learned rapidly, becoming an accomplished player by the time he left high school in 1941. Using a variety of contacts, his first professional job was on WNOX, where his boss was the legendary singer Bill Carlisle. During the 1940s, Atkins toured with many acts, including Red Foley, The Carter Family, and Kitty Wells. RCA executive Steve Sholes took Atkins on as a protégé in the 1950s, using him as the house guitarist on recording sessions. RCA began issuing instrumental albums by Atkins in 1953.

During his long and illustrious career, Chet Atkins recorded more than 75 albums of guitar instrumentals and sold more than 75 million records. He played on hundreds of hit recordings, including Elvis Presley's "Heartbreak Hotel" and the Everly Brothers' "Wake Up, Little Susie." But it was not until 1988, when the American Radio Relay League released its promotional video *The New World of Amateur Radio,* that most of ham radio learned that the world's greatest guitar picker was also one of them: "Hello, I'm Chet Atkins. You probably know me as a guitarist, but I'm also an amateur radio operator. I have been for over 20 years and my call is WA4CZD."

Later, in 1991, Atkins supplied the closing theme for another amateur radio video. This one was the joint ARRL and AMSAT production of Ham Radio in Space. And it was only recently that Atkins made use of the vanity callsign system. The call he chose, W4CGP, is almost certainly based on the words of radio host Garrison Keillor, who wrote the liner notes for the album *Chet Atkins, CGP.* To quote Keillor: "Whenever Chet Atkins picks up a guitar and plays, you see all the other guitarists in the room lean forward and smile.

There is something so emotional, so clear, so purely lovely in this man's music. And if you have ever picked up a guitar yourself you are even more touched by him. That's what makes Chet a Certified Guitar Player — CGP. It's your peers who certify you, and he is admired and loved by the ones who knew him best."

Chet Atkins' funeral was held Tuesday, July 3rd, at Nashville's Ryman Auditorium, the former home of the Grand Ol' Opry. He is survived by his wife of more than 50 years, Leona Johnson Atkins. 73

NEVER SAY DIE

continued from page 4

repair any piece of electronic equipment the navy had. No memorization. No exams. No homework. We had fun and it was exciting. We learned how every piece of equipment worked…radio, sonar, radar, and oscilloscopes. First came the chalk and talk on the theory. Followed by an exam? No way. Followed by a laboratory full of fiendishly disabled equipment. Wow, was that fun! What a challenge! And you had to understand how a piece of equipment worked to fix it.

Our present public school and college systems are based on the fear and punishment system of teaching, so it's naturally doomed to fail. It sure isn't fun, and no kid taking a course in algebra will be found in Barnes & Noble looking for more books on the subject. Ditto trigonometry. After sixteen years of endless punishment it's no wonder so few people have any interest in educating themselves once they're out of school and have a certificate saying they are now educated. What a crock.

It's no wonder that virtually all of our most successful entrepreneurs are either college dropouts, or never bothered to go.

It's also no wonder that Congress had to pass a law forcing children to go to these schools or be taken away from their parents.

Time Spills the Beans!

The 2/5/01 issue of *Time* had a seven-page article on health that was a breakthrough. Of course half of the article was taken up with huge, largely irrelevant illustrations, as usual. The article title was "Repairing The Damage." The subheading read, "Ready to turn your life around? It's simple. Eat right. Quit smoking. Get

fit. Watch your weight. Drink less. And take it easy. Think it's too late to reverse a lifetime of bad habits? The latest research will surprise you."

Hey, isn't that just what I've been preaching?

My *Secret Guide to Health* has essentially the same prescription for repairing the damage you've done, except that I go into the gory details of what eating right means. To pizza and burger addicts it's a very rough transition. Ditto to Coke, Pepsi and Dr. Pooper addicts, who need the temporary lift a huge shot of sugar, caffeine, and a little dissolved aluminum from the can (brain food) provide several times a day.

None of my health prescription is just my advice, I back up every aspect of your needed lifestyle change with solid research references.

Yes, it's tough to take a half hour off from your very busy day just to get out there and fast walk, also getting those needed UVs into your eyeballs. And waste a half hour a day listening to good music just to relax for a while? There's too much that needs to be done. Like watch dysfunctional black families screaming at each other on the court shows. Or some millionaires tussling with other millionaires to get a ball into a hoop, over a goal line or over the fence.

Since most people are convinced they're indestructible, the likelihood that the *Time* article got many people to change their destructive lifestyles is remote. Mother Nature, a.k.a. Big Daddy up there, has to smite you a good one to wake you up. Then, reflexively, you head for your doctor and will be taking his prescriptions for what little is left of your life — thus helping him get all-expense paid vacations to some great places.

Of course, the bright side is that the first warning of a heart attack for 60% of us is death. Well, we sure save a fortune in pharmaceuticals and hospital visits that way. and an awful lot of worry.

Being practical, we don't want to put 90% of our hospitals out of business, nor 100% of our nursing homes and assisted care facilities, right? So, do you want fries with that Big Mac?

Major Bummer

One of my readers recommended that I read *Your Are Being Lied To*, "The Disinformation Guide to Media Distortion, Historical Whitewashes and Cultural Myths." It's a whopper of a book — 9x12 inches and 400 pages ($20). It's new, too — © March 2001. It's a collection of the work of dozens of well-known authors, and talk about iconoclasts, this book shatters many of the myths most of us have been brainwashed by the media into believing. Just the kind of book I love.

Naturally, the first thing I did was to run down the table of contents. Whoa! On page 272, "The Truth About Jesus." Hey, they're not going to mess with Big Guy Junior, are they?

Having been brought up going to Sunday school at the Dutch Reformed Church ever since before I can remember, I was steeped from at least three years old in Jesus' wonders. Now, comes this article, which makes an excellent case for Jesus having been an invention of the early Christian church. I won't go into the details — mostly to keep true-believers from arguing with *me*. Argue with the author and let me know who wins. Warning, this guy really knows his scripture, so if you are a true-believer in Christ, it's best you avoid this article.

Hint: it blows the virgin birth, star of Bethlehem, the manger, the magi, and all of Jesus's miracles out of the water. And it *is* curious that *none* of the historians of that time and area make even one mention of Christ.

The authors do a wonderful job of smashing one belief after another. You'll be driving your family and friends crazy.

Mad Wayne

Anyone who wants to deprogram the religious beliefs of the entire world surely is mad. Anyone who wants to put the world's pharmaceutical industries out of business is obviously crazy.

Talk about a mad revolutionary, I sure fit the bill — only the bomb I'm throwing is printed on paper.

I want to destroy much of civilization as we know it. I want to put our giant food industry out of business. I want to put our school system out of business, including our universities as they are today. I want to put 90% of our hospitals and 100% of our nursing homes out of business. And around at least 80% of our insurance industry. And 90% of our government industry. I want to destroy the politician industry. I want to wipe out the oil, coal, natural gas, and electric companies. Out of this mass destruction of almost everything we have been brainwashed to believe in I want to build a utopia where there is no sickness or poverty — where even a person who never makes more than the minimum wage can retire with a million bucks (read the book by Genetski).

My Utopian Vision

The world of 2020 can be one where 90% of the people live into their hundreds, where there is little sickness, disease or poverty. Where everyone is a genius compared to today, with IQs 50 points higher than now. Where the food supply is grown on remineralized land with no need for pesticides, and where crop yields are ten times what they are today. Schools and universities will have largely been replaced by small DVD players and the inexpensive availability of thousands of DVD programs which are so much fun that everyone is into life long learning.

Schools will mainly be fitted with the equipment needed to help people learn skills, with the classrooms and teachers of today as much of a relic as the one-room schoolhouse of a hundred years ago.

Pollution-free energy will cost a tenth of today's oil and coal, with each building powered by a small cold fusion generator. No more electric companies or power lines.

The "media" will be more into educating us than entertaining us with the troubles of dysfunctional black families. With a new crop of geniuses to write and produce programs, entertainment will as different in the future as today's entertainment is from a hundred years ago — where families gathered in the living room and sang around the player piano or played games under kerosene lamps.

Imagine 2020

A magazine publisher would need have no employees. No salaries. No unemployment insurance. No withholding for the IRS. No medical insurance. No offices. All of the work would be done by independent contracting small companies. Entrepreneurs. They would handle the advertising sales, the promotion, writing, editing, photography, artwork, subscriptions, fulfillment, production and so on, all from their home offices — or even their RVs, as they drive around the country — or any other country.

Mothers would be able, as they should, to nurse their babies for two or more years as they handle subscriptions that come in via the Internet, telephone, mail or fax. The magazine data base would be instantly available anywhere via the Web and satellites. Print and mail magazines? When they can be downloaded daily, weekly or monthly at the customer's demand via the Web and printed out in their homes on inexpensive color printers — or, more likely, downloaded to a DVD to be viewed on a laptop or a big TV screen. That would cut out at least half the cost of publishing magazines right there. No huge presses that have to be run 24/7 just to pay for themselves. No paper by the huge roll. No postage.

Continued on page 62

Carl Herbert AA2JZ
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Newburgh NY 12550
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SK Night — the REAL Meaning!

This guy is pretty spooky.

I guess that you're one of those hams who have been thinking all along that "SK Night" is an event happening in early January, when only "straight keys" are supposed to be used. Well, while there's nothing wrong with the idea, it wasn't the REAL beginning of SK Night!

Way back on October 31st, many years ago to be almost exact, when radio was in its infancy, SK Night was slowly evolving into an annual event! And it had nothing to do with January!

Remember, as a kid, turning on the Philco in the living room on a cool October evening? Remember the crackles and pops coming from the speaker as the unit warmed up? The smell of the dust littered the air as the tubes heated up. Static crashes, and weird screeches made "goose bumps" on your skin.

Yep, sure sounds like signs of SK Night to me.

Let me explain. This hobby, which is often the career of many of our members, is in fact an infectious calamity that forever permeates the body and soul of all who pursue it. Radiation infection has long been known to cause damage to body cells, but what the researchers missed was that the effects remained long after the hobbyist became SK (silent key). Hence, the beginning of SK Night!

Yet today, the lingering effects of this irreversible damage can be witnessed on many bands during the fall and winter periods, most notably centered on October 31st. The howls and shrieks from receivers today are actually the noise generated by our predecessors tuning their rigs in preparation of SK Night. What we call "static" crashes are really spark gap Morse being generated by some ancient operator. And just listen closely to the trees around your shack. The wind carries the "overmodulation" of those SK hams choosing to work AM. The wind is in reality saying "CQOOOOOOOO, CQOOOOOOO."

October 31st was scheduled as the first SK Night long before my time, so I can't really say when the first one was held. There are, though, some clues to substantiate these phenomena. Some of them are:

Earth or ground, used on schematics. A direct path to the originating members of the hobby.

Ghosts, or image frequency — you guessed it! These came direct from the old-timers.

Lost parts. Just because you can't find them doesn't mean that they're lost — they're just "repositioned" or borrowed. I suspect that they were much needed for repairs to ancient equipment, and because you have access to much more, they were "borrowed" by the SK crowd.

Key clicks — Not really a design problem, but just an SK ham trying his "fist" when you are, but slightly out of "sync" with you.

Dead band — Frequencies allocated to SK operators for practice sessions and meetings.

SHF and VLF — Super High Frequency is where I assume we would all like to reside at some time in the future, although we stand a very good chance of being assigned to the Very Low Frequency portion for at least a portion of eternity.

Lid — Not an improper operator as used today, but a word derived from long ago, describing the entry portal of an SK amateur's QTH.

Worm drive — An SK home-brew amateur using whatever is at hand to complete the project.

Continued on page 61

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 January issue, we should receive it by October 31. Provide a clear, concise summary of the essential details about your Calendar Event.

OCT 6

HOLTON, KS The Atchison County (Kansas) ARC will host their 1st Annual Northeast Kansas Ham Radio Swapmeet at Jackson County Fairgrounds, intersection of US-75 and K-16 in Holton KS. This is 1/2 hour north of Topeka. Talk-in on 146.775 (-600), and 146.52 simplex. Gates open at 6 a.m. Admission is $1. Tailgating $1 with one admission; under cover $3 with one admission. Some electric outlets are available. Bring your own tables, etc. For info and advance registration, call *Joel K1CQ* at *(785) 945-3763, E-mail [k1cq@arrl.net]; Darrel KCØEYU, (785) 442-3572;* or *Jim KØYLW, (785) 364-3989.* You can E-mail Jim at *[kØylw@yahoo.com].*

POMPEY HILLS, NY The Radio Amateurs of Greater Syracuse will present its 46th Annual Hamfest at the Pompey Hills Fire Dept., October 6th, from 8 a.m.–2 p.m. Take I-81 Exit #15 onto Route 20 East. At 6 miles look for Henneberry Rd. on the left. This site is located 1400 feet above average terrain, so bring your mobile rig and work some DX. VE exams at noon. Indoor and outdoor flea markets. Indoor tables *must* be reserved, $11 each. Call to reserve indoor tables. Admission $5. 16-years and under free. Breakfast (starting at 7 a.m.) and lunch served. Talk-in on 147.90/.30 MHz. For hamfest info write to *RAGS, Box 88, Liverpool NY 13088;* Tel. *(315) 698-4558.* See the Web site for more details, *[www.pagesz.net/~rags];* or E-mail to *[ragsonline@hotmail.com].*

OCT 7

MEDINA, OH The Medina Two-Meter Group will host the 2001 Medina County Hamfest at the Medina County National Guard Armory, 920 W. Lafayette Rd., 1/2 mile west of the fairgrounds. Vendor set up at 6:30 a.m. Advance tickets $4 each. Tables $9 each, includes one admission ticket per table. Open to the public 8 a.m.–2 p.m. For info about VE exams, please call *Fred* at *(440) 236-3477.* Walk-ins always welcome. Testing starts at 9 a.m. For general table info contact *Mike N8TZY* at *(330) 273-1519.* Please send your remittance, with an SASE, to the *Medina Hamfest Committee, P.O. Box 452, Medina OH 44258.* Advance reservations must be received by September 29th to guarantee space. All tables will be held until 9 a.m. on the day of the hamfest. If you have any special needs or requests, please let M2M know and they will try their best to help.

WALLINGFORD, CT The 9th Annual Nutmeg Hamfest & Computer Show and ARRL Connecticut State Convention will be held October 7th, 9 a.m.–3 p.m. at the Mountainside Special Event Facility located off Exit 15, I-91 in Wallingford CT. Follow signs. Talk-in on 147.36. Inside selling spaces $30 (booth space with 8 ft. table and chair). Outside spaces $20 for a 30 ft. space. If you reserve and pay in full before September 1st, deduct $5. Major vendors will be attending. General admission is $7, children under 12 $3. Sellers, contact Mark Mokoski WA1ZEK at (860) 808-1275 regarding discounts available for payments received before September 1st. Make checks payable to *Nutmeg Hamfest,* and send to *Mark Mokoski WA1ZEK, 944 Killingworth Rd., Higganum CT 06441.* For info regarding VE exams, contact *Joel Curneal N1JEO, (203) 235-6932.* Be sure to take a look at the Web site at *[www.qsl.net/nutmeghamfest].* E-mail to *[nutmeghamfest@qsl.net].*

OCT 14

DIMONDALE, MI The Lansing Civil Defense Repeater Assn., and the Central Michigan ARC, will co-sponsor a Hamfair at The Summit, 9410 Davis Hwy., Dimondale MI, October 14th, 8 a.m.–2 p.m. Take I-96 to Lansing, Exit 98B — Lansing Rd. North. Admission $5 in advance, $6 at the door, 12-years-old and under admitted free. Tables are $10.50 in advance and $12.50 at the door. This is a large location with plenty of parking. Vendor setup at 6 a.m. Talk-in on 145.390(-) and 146.520 simplex. VE exams (ARRL VEC) 9:30 a.m. registration. Walk-ins welcome, but pre-registration is strongly recommended. First come, first served. Info is available at *(517) 589-5263;* or E-mail *[n8vys@voyager.net].* ARRL Forum at 9:30 a.m., hosted by Great Lakes Division Director, George Race WB8BGY and Michigan Section Manager, Richard Mondro W8FQT. A Weather Forum with Kaz Fukita will be held at 11 a.m. Every SKYWARN spotter knows what the "F Scale" represents. Meet the son of the man who originated the "F Scale," and hear about his life and work in this fascinating field. There will be a Fresh Water DXpedition Forum at 12:30 p.m. Come and join Chuck LeMarbre W8VOM, and the gang, as they share the tales of activating United States islands. For reservations please contact *J. Ervin Bates W8ERV, P.O. Box 27321, Lansing MI 48909-7321;* tel. *(517) 676-2710;* E-mail *[w8erv@arrl.net].*

OCT 20

GOLDEN, CO The Rocky Mountain Radio League, Inc. will host their "2001 RMRL Hamfest" 8 a.m.–2 p.m. at Jefferson County Fairgrounds, 15200 W. 6th Ave., Golden CO. Take the Indiana exit from 6th Ave. Talk-in on 144.62/145.22 MHz. Admission is $4 per person. Tables $10 in advance or at the door. Features include an ARRL forum, VE exams, and refreshments. Contact *Ron Rose NØMQJ, (303) 985-8692;* E-mail *[nØmqj@arrl.net].*

OCT 21

KALAMAZOO, MI The 19th Annual Kalamazoo Hamfest will be co-sponsored by the Kalamazoo ARC and the Southwest MI Amateur Radio Team, October 21st at the Kalamazoo County Fairgrounds. Talk-in on 147.040 K8KZO rptr. Plenty of free parking. 54 campsites with electric and water. Vendor set up at 6 a.m.; doors open to the public at 8 a.m. Advance tickets $3, $4 at the door. Trunk sales $5. 8 ft. tables are $12 each. For tickets/tables, send SASE to *Charlie Burgstahler K8BLO, 6658 Carlisle Dr., Kalamazoo MI 49048.* For contact or info, E-mail *[charlieb@net-link.net];* or check the Web site at *[www.qsl.net/k8blo/hamfest.htm].*

QUEENS, NY The Hall of Science ARC Hamfest will be held at the New York Hall of Science parking lot, Flushing Meadow Corona Park, 47-01 111th St., Queens NY. Doors open for vendors to set up at 7:30 a.m. Buyers admitted at 9 a.m. Free parking. VE exams at 10 a.m. Admission by donation, buyers $5, sellers $10 per space. Talk-in on 444.200 rptr., PL 136.5, and 146.52 simplex. For further info, call at night only, *Stephen Greenbaum WB2KDG (718) 898-5599,* E-mail *[WB2KDG@Bigfoot.com].* For VE info only, contact *Lenny Menna W2LJM, (718) 323-3464,* E-mail *[LMenna6568@aol.com].*

SELLERSVILLE, PA The RH Hill ARC will hold their hamfest at Sellersville Fire House, Rt. 152, 5 miles south of Quakertown and 8 miles north of Montgomeryville, on October

Continued on page 61

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Whither e-QSLs?

Technology has engendered a new controversy that nibbles at one of the most sacred of the time-honored traditions of Amateur Radio: the QSL card. The Internet, once thought of as the bane of us all, has made it possible for QSL hunters to "go paperless" with the advent of the e-QSL.

The e-QSL, a sort of acronym for "electronic QSL," is nothing more than a computer-generated graphics file that looks just like the ones we get via snail-mail. It may be sent by one ham to another amateur as an E-mail attachment, or, in the case of a sophisticated server environment, be automatically sent without human intervention.

I am old enough to remember how much controversy swirled around the introduction of a new technology to Amateur Radio known as single-sideband telephony. It polarized the amateur community, and for many years was resisted by those seeking to maintain the status quo. But history has shown us that time wounds all heels, and that SSB is as commonplace as rain static on our amateur bands. Now we have e-QSLs to foment confrontation and lively discourse.

Just think of it! It is possible for QSLs to be sent and received without having to fill them out and lick the stamp. In fact, they can now be sent without any human intervention. Sounds great? Well, hang on there. There are those who would take the bloom from this rose, and for seemingly good reason.

The issue for us is the veracity, or "authenticity," of these QSLs. It has been argued by some that it would be very easy to forge an e-QSL, and that they are not verifiable but groups that judge the authenticity of QSLs submitted for awards.

But I will let you judge for yourself, and to help you, I will solicit the aid of Dave Morris N5UP, the founder of eQSL.cc. Dave runs a server on the Internet that automatically generates QSLs for subscribers who upload their logs to his Web page.

This is quite the dandy setup. I am not really qualified to articulate its inner workings, nor am I as well schooled in the controversies surrounding this new QSO verification medium as he is. Therefore, I have included here some information that Dave has suggested might be profitable for our readers to consider. Take it away, Dave!

Fig. 1. *Here is my e-QSL. Some of you may have already received this — if you're in my e-logbook, that is.*

e-QSL — The Final Courtesy

The world's first and only e-QSL exchange center, www.eQSL.cc, started the year 2001 with a bang. Only a few weeks earlier, on the first of December, it had blown through the 1 million card mark, and now 2 million cards were in the central database. But instead of slowing down, the rate increased as thousands of e-QSL cards were uploaded every hour.

The eQSL.cc site was launched in April of 2000, and included about 1,500 hams who had been part of an earlier experiment in an electronic QSL card exchange. The "big" idea was that e-QSLs should not be sent around from person to person via e-mail, but should be available at any time through a Web-based exchange system and a central database.

Other concepts using e-mail or posting one stock QSL card on a Web page and calling it an e-QSL were not satisfactory, because security could not be guaranteed, e-mail addresses had to be looked up, and the sender had to laboriously design his QSL card using graphic design software.

So, we used our 25 years of software development and database design experience to develop a site where each user could guarantee his identity with a scanned image of his ham license, could lay out an e-QSL card design using simple point-and-click forms, and could upload logbooks either one-at-a-time or by uploading an entire ADIF-format log file at once. The concept is such a breakthrough, we have patents pending on its technology.

To retrieve one of these e-QSL cards, the recipient only need enter the callsign, date, and band of the QSO he wants to retrieve, and if the other ham has entered that QSO

into the system, up pops the complete e-QSL card, ready for printing on a local printer. Furthermore, if the recipient registers his callsign with us, he can get a listing of all incoming e-QSLs, and can just point and click to print each card received. Sending a reciprocal card back is a matter of clicking a button!

Apparently, most everyone else thinks this is the right way to do it, too. Another six weeks after hitting the 2-million-card mark, it appears the number of cards will double again to 4 million.

Many of the members of the eQSL.cc site are using stock images for their e-QSL card designs. But since it is possible to upload a graphic image to use on one's card, there are many custom cards on-line as well. Users are signing up from over 180 countries all over the world. In many places, a stack of 500 traditional QSL cards might well cost the average ham operator an entire year's salary. On eQSL.cc, 500 beautiful full-color cards can be sent for free!

In an era when "dot-coms" are failing left and right, it is noteworthy that the eQSL.cc site, which is supported almost entirely through voluntary donations, has been operating in the black since Day One. Since the site runs virtually without any human intervention, the only ongoing expenses are for development of new features, and for continually increasing disk space, processor power, and bandwidth. A small amount goes to answering the questions and suggestions that come into the web master's office by E-mail. In most cases, replies are returned within the same day.

Not everyone agrees that e-QSLing is the way to go. Some people like to get their hands on that stiff cardboard with the exotic stamps that spent months in transit from the jungles of some island that is only above water for 3 weeks out of the year. Others are bothered that some amateur organizations still have "no electronic transmission" clauses in the rulebooks for their awards. Others still are spooked by the privacy issues that this interconnected new world brings up.

But it's very difficult to argue — as the saying goes — with success. And 4 million cards is success by anyone's measure. At the present growth rate (with the number of e-QSLs doubling every month), eQSL.cc could be home to virtually all of the world's amateur radio operators within a couple of years. Contest "big guns" will be able to "QSL 100%" within a matter of minutes, saving hundreds of hours of time and thousands of dollars in the process. DXpeditions will be able to "QSL 100%" on the spot, whether it be from that desert island with a dial-up Internet connection, or when the crew gets back to "civilization." It's just a quick log file upload, and they are done!

And e-QSLs, unlike their traditional cardboard counterparts, can be verified through automated computer interfaces by amateur organizations wanting to validate award and contest submissions. The presence of a scanned license image on file for each user goes way beyond the simplistic checking that is possible using the older traditional QSL cards.

And now eQSL.cc is also a favorite site for SWLs, because users can identify themselves as either licensed amateur operator or SWL. The e-QSL cards between SWLs and hams are automatically configured to contain proper SWL phrasing, making their lives easier and saving them tons of money.

Complex systems shouldn't be designed in a vacuum, so we have assembled a capable group of hams and SWLs into an

New eQSLs

Action	Call	Date/Time	Band	Mode	Country	AG	Signal Report & Comments	Actions
Display	OH3SR	Nov 12, 1998 21:40	12m	CW	FINLAND		599	Sent Archive
Display	PA2PKZ	Jul 10, 1999 22:36	15m	SSB	NETHERLANDS		59	Sent Archive
Display	VK4EMM	Mar 30, 1997 00:18	15m	SSB	AUSTRALIA		59	Sent Archive
Display	VK4EMM	Dec 13, 1997 19:38	10m	CW	AUSTRALIA		599	Sent Archive
Display	W1MCE	Sep 7, 1999 00:48	10m	SSB	USA		59	Sent Archive
Display	WE9V	Nov 18, 1995 22:10	15m	SSB	USA		59	Sent Archive
Display	WE9V	Mar 30, 1997 22:18	20m	SSB	USA		59	Sent Archive
Display	WE9V	Aug 22, 1999 03:29	40m	SSB	USA		59	Sent Archive
Display	YL2KA	May 24, 1997 02:30	20m	CW	LATVIA		599	Sent Archive

Move checked eQSLs to ARCHIVE

Fig. 2. *Here is a screen shot of the portion of the eQSL.cc Web page that lets me know what QSLs I have received this week.*

Advisory Board. Among these advisors are users with satellite and DX experience, contesting backgrounds, and international origins, as well as technology gurus and people with long-term operating histories. This group discusses current issues and future development plans for the site on a daily basis. Just another feature of the interconnected world we have entered as the 21st century dawns.

There were naysayers when SSB first began to push CW aside. There were those who thought packet radio was just a short-lived fad. Others thought we shouldn't be wasting money on amateur satellites. And some people think e-QSLs are "not natural." But for tens of thousands of hams and SWLs who upload their entire logbooks nightly in an effort to live up to the "100% QSL" promise of amateur radio, the final courtesy of a QSO is an e-QSL.

What about an e-QSL that is transmitted to (an) organization electronically?

This is an entirely different issue. In order for an award-granting organization to accept an e-QSL electronically, it must construct a computer system that is capable of receiving the e-QSLs electronically, collecting them, and associating them with a particular applicant. There is considerable cost associated with this, both in terms of technology infrastructure and in resources required for administration.

If an organization wishes to accept these e-mail submissions and manually review them for now, we have a proposed mechanism for doing this using 100% secure, encrypted, and digitally signed e-mail in our Secure Log Mailer program.

But this is a source of confusion. If an organization says it will not accept electronic QSLs, it might mean: "We will not accept an e-mail containing a QSO log, because it cannot be verified," OR "We will not accept any document that has been electronically transmitted at any stage."

In this essay, we will not discuss electronic submissions, but will instead discuss why organizations should accept a printed card that has been generated from our on-line database.

Let's look at the differences between "traditional QSL cards" and "e-QSL cards."

A traditional QSL card has been printed by a commercial printer. It was filled out by hand, and may even bear a canceled stamp applied by the sender, which might attest to the fact that it was mailed through the postal service.

On the other hand, an e-QSL card was generated automatically by a computer system, based on input from the originator. The type and thickness of paper stock used to print the e-QSL is up to the recipient, not the originator. There will be no stamp and no cancellation marks from a postal service, because the e-QSL was printed by the recipient on his own computer printer.

Ham organizations may dislike the concept of e-QSLs because:

- Since the card is printed on the recipient's printer, it would appear that anyone could "make up" a card and claim credit for a QSO that did not in fact take place. We call this the "Printing Technology Problem."
- Since the card has no handwriting on it, the originator cannot verify that the card was filled in with his/her own handwriting. We call this the "Handwriting Problem."
- Since the card does not have a canceled stamp on it, there is no proof the card originated in the foreign country being claimed. We call this the "Postal Service Problem."

Let's dissect the problems one by one:

- In this day and age, anyone with a color ink jet or laser printer can forge a QSL card and make it look like a "traditional" QSL

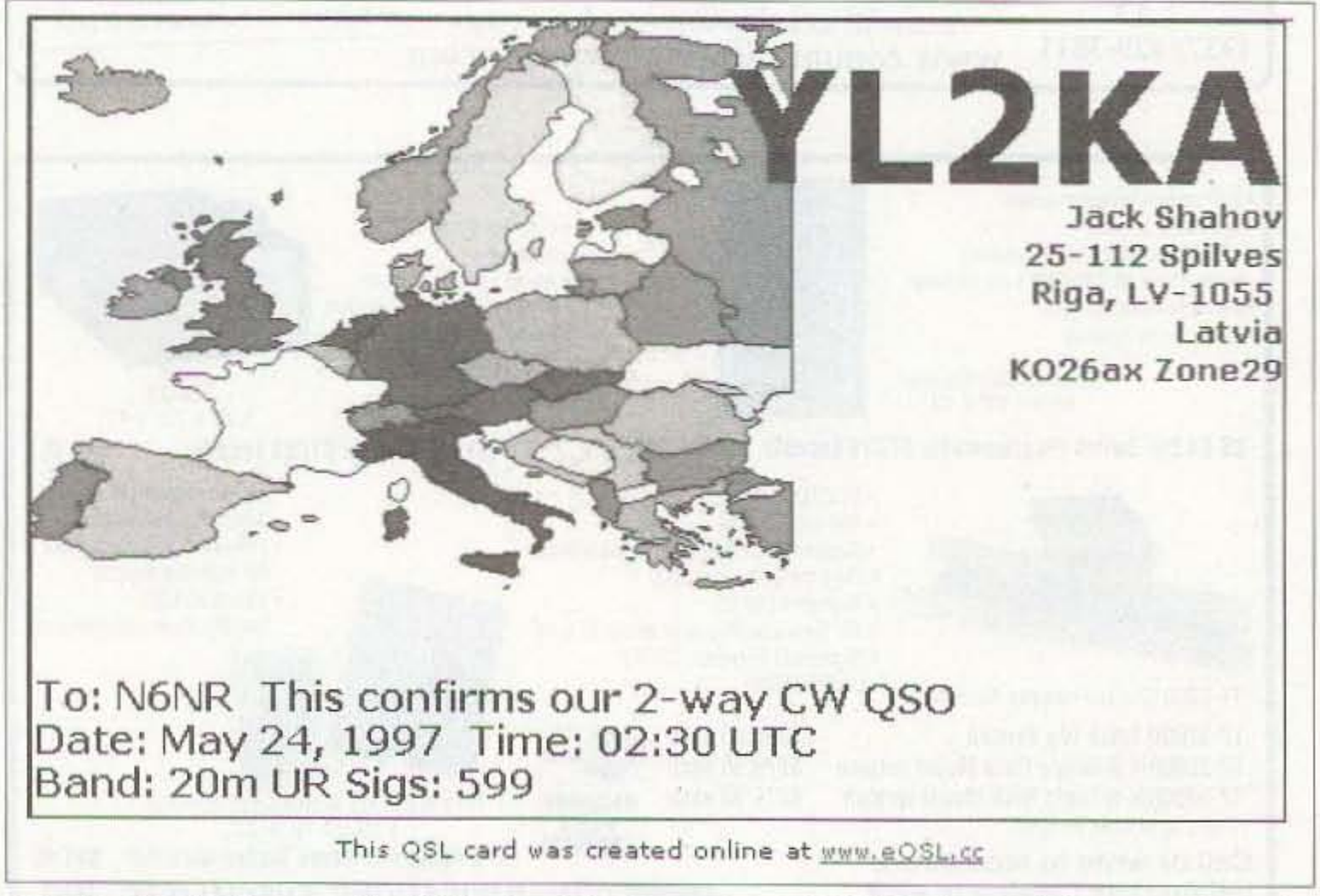

Fig. 3. *By clicking on the "Display" button next to YL2KA, I am able to retrieve the image of his QSL card. If I so desire, I can print it on my color printer and hang it on the wall. Cool, huh?*

card by simply using a heavy card stock. The forged card could then be submitted along with other authentic cards, fooling the organization. Thus, one cannot rely on thickness of card stock and colors to prove a card's authenticity. It doesn't matter whether this is a "traditional" card or an e-QSL! Printing technology is sophisticated enough that even the government has gone to extraordinary lengths to change our paper currency. If someone wants to make DXCC that badly, they will be able to make a card to fool anyone!

• Many people do not hand-write their "traditional" cards now, especially when sending out hundreds of cards. They use labels or type or print the information into the correct spots on a "traditional" card. Thus, one cannot say that only handwritten cards are authentic.

• Some hams like to mail QSL cards in an envelope to avoid having the postal service "mess up" the nice image or create folds, nicks, and bruises on the card. U.S. hams often mail "green stamps" along with their traditional cards to make it easier for DX hams to respond. Thus, a good percentage of traditional cards do not have a canceled stamp on the card itself. In addition, the concept of a QSL Manager and QSL Bureaus make the stamped, postmarked QSL card even more of a rarity. Thus, one cannot say that only stamped, canceled cards are authentic.

How might someone create a fictitious QSL card?

Note that, again, we do not believe award-granting organizations will be willing to accept e-QSLs electronically in the foreseeable future, because of the expense involved in doing so. So, we are still talking about creating a fake printed card.

A person wanting to create a "traditional" QSL card for a QSO that did not actually take place could use PhotoShop, CorelDraw, Adobe Illustrator, or any one of a number of different software packages to create a nice-looking QSL card in the correct size, and print it on heavy card stock in a color ink jet or laser printer.

How would the organization know the card was fake?

Right now, organizations cannot tell for sure if a "traditional" card is a fake, unless the person checking the cards has some suspicion that the card looks bogus. He or she would then contact both hams listed on the card and verify that the QSO actually took place. This could take weeks or months, because typically this verification must be done by writing a letter. Phone numbers are not always available and long distance calls cost too much.

How does eQSL.cc simplify this verification process?

We have a computer-to-computer QSO verification program that organizations can build into their automated QSL-checking software to verify any e-QSL against our database in an automated fashion. Instructions are in the VerifyQSO.txt file.

Alternatively, the person checking the cards would simply enter the callsigns, the date, and the band from the e-QSL retrieval screen, and the eQSL.cc system will verify that the originator did in fact place that log entry into the eQSL.cc database.

Could an unscrupulous person register as the "other" ham and create bogus log entries?

Yes, he or she could register and post fake log entries. This is why we created the Authenticity Guaranteed program. Under this program, a person can upload a scanned image of his/her amateur radio license. Another person wanting to check to see if the "other" ham might be bogus can click on the "Authenticity Guaranteed" logo and see the scanned license image.

Can the scanned license image be faked?

Go ahead and try! Most government authorities have selected a paper stock that would be very difficult to duplicate by amateurs. If a person is that hungry for a bogus DXCC certificate, he or she would surely be able to fake out even the most persistent attempts at validation, regardless of whether the card was submitted as a "traditional" or e-QSL card.

Can someone obtain an e-QSL card and modify the graphic to show a bogus QSO?

Let's say that someone wanted to obtain a DXCC certificate from ARRL by fraudulent means. This is the process he would have to follow to obtain an e-QSL and to corrupt it:

1. Obtain the date, callsign, and band of a legitimate QSO (from where?).
2. Retrieve the card that was supposed to go to the "other" ham.
3. Save the card on disk
4. Modify the graphic using photo manipulation software, overcoming the tamperproof coding in the graphic and without distorting the graphic when the bogus callsign is inserted (not as easy as you may think!)
5. Print the card and submit it
6. Hope that ARRL does not use the VerifyQSO software to verify the QSO against our log database

Don't be fooled by people wildly dismissing e-QSLs as being too easy to falsify. Anybody with a color ink jet printer can create any QSL card he wants to nowadays. The difference is that the eQSL.cc system is more secure and less easy to "fake," because every card can be verified all the way back to its source! — *Dave Morris N5UP*

Thanks, Dave, for submitting this for our consideration. It is clear that e-QSLs will continue to increase in popularity, and I hope they do. I also hope that organizations like the ARRL will see the benefit of on-line verification of QSOs, especially in the case of large DXpeditions, as well as other on-air awards. But it is also clear that the old-fashioned "snail-mail" variety will be with us for generations to come.

So, how do you feel about this new technology? Do you agree with Dave or not? Good or bad, I would love to hear back from some of you on this issue. I would like to include some of your opinions in the next installment of The DX Forum.

So until then, 73, and good DX!! 73

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Troubleshooting

A lot of us like to build our own gear. It's great fun! But what happens when you can't get the stuff to work like it should? All of a sudden it's no longer fun. And sometimes, you can feel totally frustrated. This month, I'll show you some troubleshooting tips that I've discovered over the years. And, we will look into some very common problems that face the homebrewer.

The more power out mystery: If you have ever built a QRP transmitter, I know you have come across this one.

The design says you should see about two watts at 7.040 MHz. But, when you measure the power output with your wattmeter, lo and behold you're getting eight watts out. But, the current being pulled from the power supply is only 150 mA! How can this be?

Well, you're being lied to. Here's what is happening. The final PA stage is oscillating. Instead of being an amplifier, it's an oscillator, too. The stage may be singing on the broadcast band, the VHF or UHF bands or all three at the same time.

The wattmeter measures RF. It's not really sure where the RF is coming from, it only sees RF. The RF could be from anywhere from DC to light. Most of the wattmeters we use are not very frequency-selective. The Bird model 43 is more frequency selective, because of the frequency sensitive slugs used, but it can be fooled, too.

The clue is the collector current. Since power is the result of current times voltage, it's not hard to see that with 150 mA and 13.5 volts we should see an INPUT power of about two watts. You can't have eight watts on the meter with an input of only two watts! Nope, sorry, can't be.

On the other hand, sometimes everything seems to be OK with a dummy load connected to the transmitter. When an antenna is connected, you see more power than you should have. The problem is the same, the PA transistor is singing. I've had the PA transistor go up in smoke when connected to an antenna, but work just fine into a dummy load.

The fix

There are several places you need to look, the first being the stages that drive the PA. Here is a case in which you really do need to use a scope. The scope will show you the purity of the signal being produced by the oscillator and or mixers. A spectrum analyzer would be ideal, but most of us just don't have access to one. If nothing else, drag out an old AM transistor radio. Use this guy to listen to low frequency oscillations in the broadcast band and below.

I take this a few steps further. If I have a problem with a transmitter, I will turn an FM radio on and a scanner running in the background. If you key the transmitter and you stop the scanner, you've got trouble! The transmitter is producing a signal the scanner can hear. Talk about a dirty signal!

Most simple QRP transmitters should be traced from the oscillator toward the PA. Look for a nice clean sine wave. If you come across a stage where the wave shows distortion, then you need to clean things up before moving toward the PA.

Usually, in a homebrew transmitter, lead length causes most of the trouble. All leads should be as short as possible. Make all ground connections as large as possible. In other words, if you're laying out a PC board for the project, use all the copper you can to make a low impedance connection to ground. Don't just run a trace from the ground to the transistor, use a lot of copper instead.

Keep the collectors decoupled from the supply lines. Usually a small choke will do the job. I've put in 22 µH chokes in most of my designs. You can set down and do the math to calculate the exact value needed if you so desire.

Also bypass capacitors on the RF ground side of the chokes will be helpful. I normally use some 0.01 caps and 0.001 caps to keep UHF critters off of the supply line.

Be mindful of the tuned circuits between stages. It's quite easy to get the stage to double a frequency instead of just amplifying the signal. If the stage has a trimmer capacitor to get the circuit resonate, adjust the trimmer for the cleanest signal and not for the strongest signal. It's amazing how a slight tweak of a trimmer in the oscillator stage can clean up the transmitter.

Check how the stage is being keyed. I've found emitter keying of a driver stage can cause problems if the key line is too long. The best fix is to use a small relay driver between the keyer and the transmitter.

If you find the stages before the PA to be clean, then the PA transistor is doing the singing. The fixes are just about the same. Make sure the emitter lead of the PA transistor is as short as possible. Make sure the emitter is tied to a large ground pad and not just a trace leading off of the emitter to ground. The trace, if long enough, will become an inductor and cause all sorts of critters to grow.

Depending on the design of the output filter, you might need to rework things a bit. Most of the simple one coil and two capacitors designs used in simple one-watt rigs are just the bare minimum. Improving the filter can sometimes fix the problem.

Here's a hint. If you are having problems keeping the PA stage happy, run the transmitter into a dummy load for a few minutes. Now, quickly feel the output filter's components. Find any really warm or out-and-out hot? Hmmm. They're not supposed to do that.

And don't forget to add bypass and decoupling capacitors to the collector of the PA transistor. The collector needs to have an RF choke in series with the supply line,

Continued on page 62

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Cutting-edge hamware from DXLab

Ham radio is a high-tech hobby these days, but I have to say the software you find displayed in this month's column is better described as the scientific approach to hamming. I was sitting on the sidelines for some time watching the DXLab discussion group and was, frankly, intimidated by some of the ideas presented.

My curiosity got the best of me and I simply had to see what this was all about. I had been a bit busy to get into the fray earlier, so this was discovery time for me. I could see ahead of time that this was going to be a project for a special display and wondered if it could work on my teeny little monitor. It did and it can work for you as well. Bigger is better, and I have noticed the price of larger monitors is receding, so I may meet you at the computer mall before we know it.

Anyway, after I got all this software up and running and arranged so it was useful, it was a real blast to just "click and pick" my way around without making contacts. Even after completing a half dozen QSOs and getting them nestled in the log module, it was still fun to go back and run the various modules through their paces just to watch them work.

Anyway, here is a whole new group of free stuff for your digital ham station. If you are using the WinWarbler PSK31 software you are probably aware of these new offerings from Dave AA6YQ. However, it has been a while since we discussed the WinWarbler program, so I will recap the story and give a rundown on the related goodies.

In the beginning, things were simple. PSK31 was developed and it was possible to communicate successfully with some basic software over great distances with low power under some pretty adverse conditions. Sounded good, and along came the developers bent on introducing us to bells and whistles, as the saying goes.

After a year or so some very nice pieces of software had been written and there was a PSK31 engine developed by Moe Wheatley AE4JY, that started to intrigue some clever programmers. Dave came on the scene and wrote the first version of WinWarbler and it was a bit different (revolutionary?) and showed great promise.

This new software took full advantage of the new PSK engine and produced three receive panes, all in parallel horizontal patterns. It was not the first multi-paned PSK program. WinPSK already contained a similar feature because it was one of AE4JY's products.

Dave felt he had a mission to accomplish and this first version he released, though it resembled the screenshot in today's column, underwent many changes. If you go to the URL listed in The Chart you will find a history of the fixes and improvements that make the current version a truly great piece of work.

As a standalone program it performs great and works well on my old slow 120 MHz CPU machine with the 32M RAM. But, as I started taking advantage of the new goodies available, I found it necessary to install this software in the slightly faster computer, property of the XYL. It has 500 MHz CPU and 64M RAM and seems adequate for the operation.

I mention some of this because it was necessary to install all the components in that machine and you will find the installation procedures are outlined on the download page of the Web site, so all that is necessary to accomplish a trouble-free installation is laid out for you there. Just follow the directions and life is good.

To be clear on the matter of speed and memory needs, I found the individual programs were able to run fine on the slower machine but the interaction did not take place. For example, the frequency readout was not shared by the co-existing programs. When they have enough resources, everything works as advertised.

What it does and it is easy

I installed just three of the six programs to begin with. WinWarbler all by itself is a lot of fun. There is one item I should stress. The WinWarbler, somewhere, about a year ago, midway in its evolutionary process, began to require an 800 x 600 display on the monitor. Many computers display most software quite well set at 640 x 480. You can change this by going to the Windows Control Panel and selecting Display, then click on the Settings tab.

The possibilities in my slower machine with Windows95 seem to stop with a choice of 640 x 480 or 800 x 600. With that machine the 800 x 600 works best for most of the ham software these days as long as only one panel is displayed at a time.

Windows98 is on the faster machine here in the shack and the drivers and monitor combination afford a wider latitude of settings. It normally runs in the 800 x 600 display and a lot of your monitors may already be doing the same.

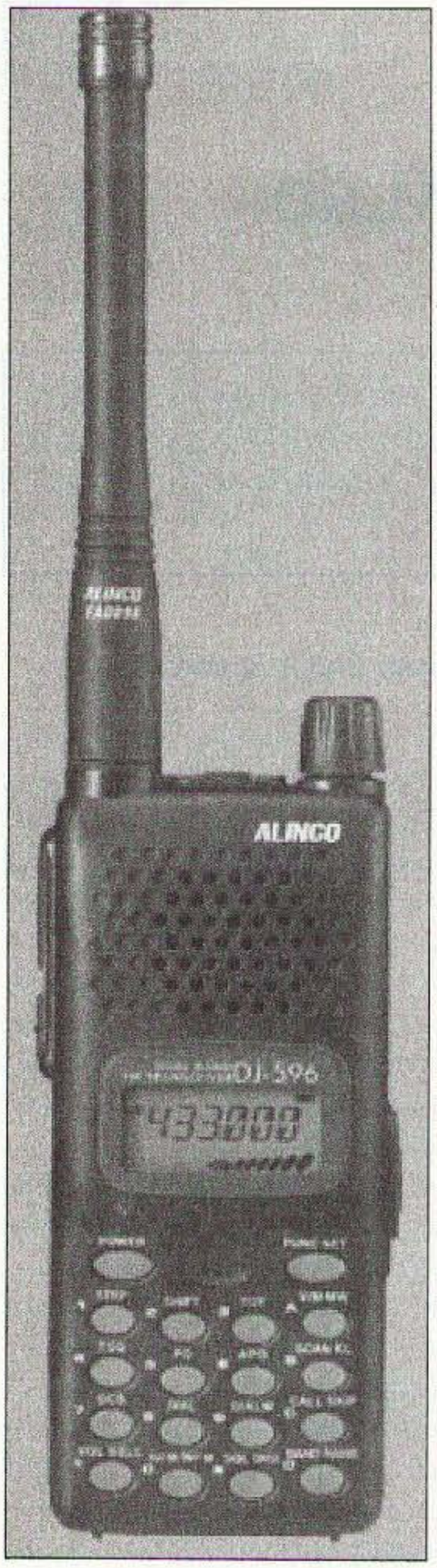
I find with multiple programs being displayed it becomes inconvenient to stick to the 800 x 600 display because one program display will just about cover anything else and you find it necessary to do a lot of clicking on the task bar to see what is going on "underneath."

Therefore, if you want to enjoy the real benefits of the software, you will need to achieve displays such as you see in the screenshots today. You can do this if you can get the display into the "higher numbers' such as 1152 x 864.

Also, it is a great help if you have the biggest monitor you can fit through the door of your shack (an average-size monitor is

Continued on page 50

New Products



Alinco Introduces DJ-596 Dual-Band HT

Alinco has introduced the DJ-596 VHF/UHF HT, a compact unit that can transmit up to 5 watts output on the 2 meter and 70 cm bands in analog wide or narrow FM; with the optional EJ-43U digital board, digital voice communications are also possible. The announcement of the new unit was made by Craig Cota of ATOC Amateur Distributing, which distributes Alinco products to dealers in the USA and Canada.

The DJ-596 has 100 memory channels, full coverage of the 2-meter and 70 cm USA Amateur bands, extended receive capabilities, CTCSS and DCS encode+decode, three scan modes, the ability to work and save in memory any number of odd split transmit/receive offsets and it can transmit and receive in both the wide and narrow FM modes. A nickel metal hydride battery is standard and the unit will accept and operate on a wide range of input voltages, from 6 to 16 VDC. Illuminated keys and display add to operator convenience in low-light conditions. The large display can also show alphanumeric designations for each memory channel. A theft alarm and experimental "mosquito repelling sound" are among the unique features, along with more traditional items such as nine autodial memories. A new feature is External Terminal Control, which can output 5 VDC at 5 mA from the mic jack, which can be used by experimenters to control external devices.

Digital Voice Option

Alinco is also introducing an optional Digital Voice Communication Board, EJ-43U, that can be used in conjunction with similarly equipped DJ-596 units to achieve digital voice communications. Simultaneously, Alinco is also introducing the EJ-40U Digital Voice Communications Board for use in its new line of mobile radios, the DR-135/235/435 series.

The digital boards allow the operator to easily select between analog FM communications and digital voice operations. The Alinco digital boards use the open ITU-TV.32 protocol. This processed signal modulates the VCO in GMSK direct frequency modulation using a GMSK modem. It is then transmitted as a 20F3E conventional FM signal.

Alinco terms these boards as a "first step" in the use of digital communications by an Amateur Radio manufacturer. It acknowledges that the digital audio has a "processed" sound due to several limitations, specifically restrictions on bandwidth, the ability of the transceiver to switch between analog and digital operations, and cost constraints that keep the unit affordable for the widest possible audience. It added that commercial digital radios have price tags in the thousands of dollars, while the DJ-596 is very competitively priced in the dual-band Amateur Radio marketplace, with an MSRP of $301.95. ("Street" prices set by dealers are often lower than the MSRP.)

Alinco emphasizes that the digital protocol used is an open format and is no different in principle from the use of other widely used digital protocols such as AX.25, Pactor, GTOR, PSK 31, and the like. Signals transmitted from the units are not encrypted and can be monitored by any similarly equiped unit or any station able to receive and decode the ITU-TV.32 protocol. Alinco has posted a detailed FAQ about its digital operations at its Web site, [www. alinco.com].

Operational Features

The DJ-596 is designed in accord with Alinco's "Simple, Clean, Dependable" philosophy. As such, controls are kept to a minimum with an emphasis on easy operations. Frequency can be input directly from the keypad, then saved into memory. The volume and squelch levels are set by pressing the appropriate key and then turning the dial to the desired level, which is preserved electronically, reducing the chance that settings could unintentionally be changed. The 100 memory channels are easily programmed and can be allocated in any combination of VHF or UHF frequencies. The transceiver can also operate in a split-band mode. Additional user-activated options include time-out timer, busy channel transmit lockout, battery save, scan modes, and more. The DJ-596 can also be used for 1200 bps packet operations with an external TNC.

Technical

The DJ-596 can output a full 5 watt signal yet weighs just 11 oz. It has a standard BNC antenna connector and has an amazing ability to accept a wide range of input voltages, from 6 to 16 VDC. While connected to an external DC power source the NiMH battery is recharged but not overcharged.

For further information, contact ATOC Technologies, Inc., 23 S. High St., Covington OH 45318-1309; or phone Alinco at (937) 473-2840.

Mini Paddle System

Morse Express is now carrying a new miniature paddle system from Palm Radio in Germany. Designers Hannes DL9SCO and Dieter DJ6TE have produced a small (1x1x3-in.) and light paddle system that covers all the bases for portable, mobile, and shack operation.

The system consists of the retractable paddle mechanism and housing (available in three versions), a snap-in mount which can be attached to a radio or other surface (with screws, magnets, or adhesives), molded connecting cord, and super strong magnets.

Priced from $69.95 to $74.95 (plus s/h), the Palm minis are available from Morse Express via phone at (800) 238-8205 or E-mail at [n1fn@MorseX.com]. The Web site is [www. MorseX.com].

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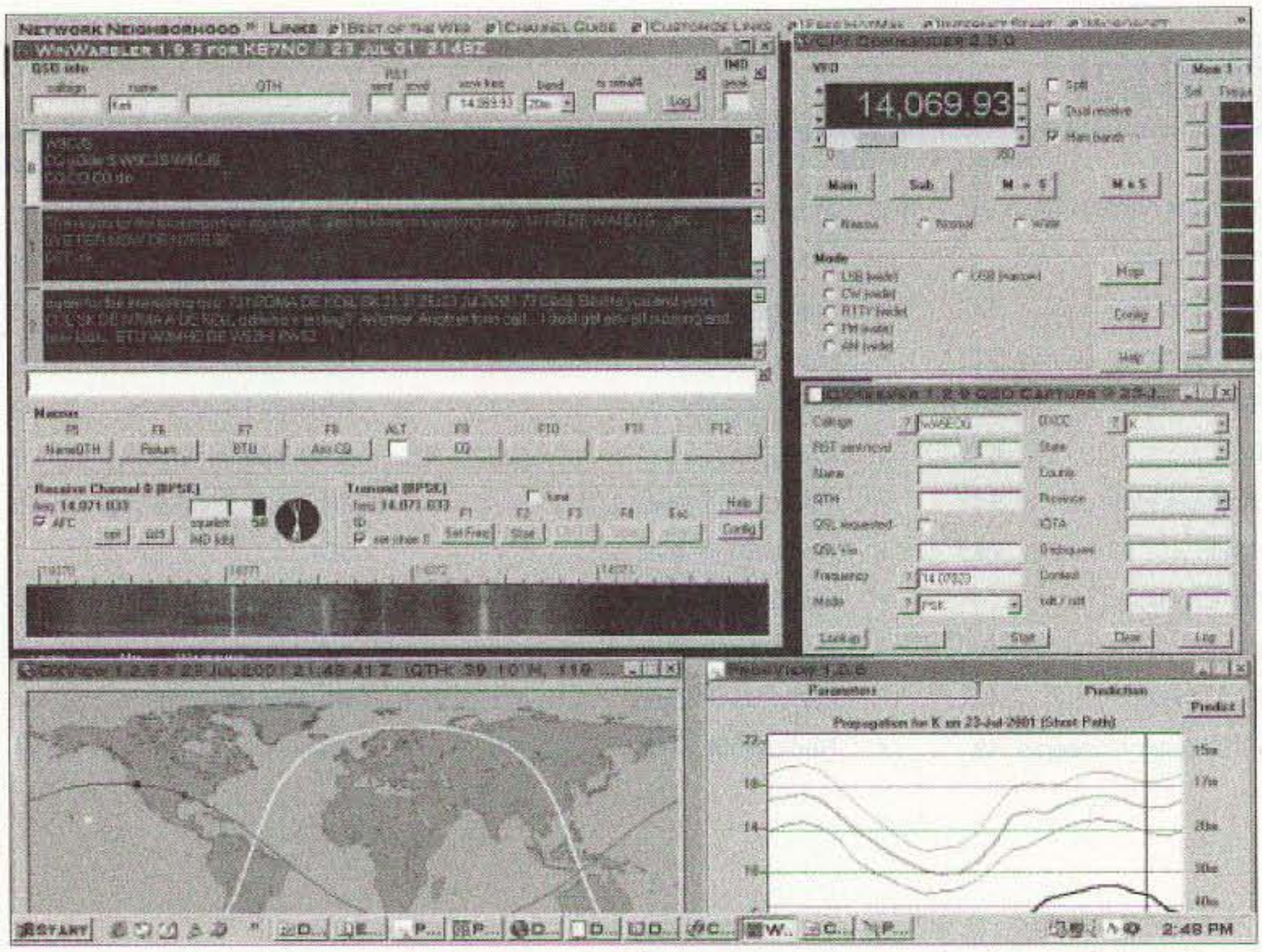

Fig. 1. *Suite screenshot — These are the five interacting panels of DXLab's suite of freeware. The upper left is the WinWarbler PSK31 program. This receives and displays text for three simultaneous signals. When you click or double-click in a receive pane your transmission is then on the frequency of the pane's color-coded trace in the waterfall. Macros are a snap to program. This is a fresh installation, so much of the configuration is minimal, but adequate to support testing and communications. WinWarbler was featured in this column in November, 2000. That was version 1.6.5. This is version 1.9.3. When you double click a callsign, it is not only placed in the callsign box you see in the upper left, it also is grabbed by the two programs partially displayed at the bottom. From there beam heading and propagation is determined by DXView and PropView. These two panels can be moved into full view on this monitor by grabbing their top bar and sliding them upward. The light colored line whose upper midpoint is over Europe is the terminator line depicting sunrise and sunset. The other line passes through a dot at my QTH and a dot in 5-land because there was a stateside callsign entered at the time. This works just as well for any callsign in the world to provide instant beam headings and give info to a computerized rotator. More about these two lower panels elsewhere. The panel in the upper right is the CI-V rig control. The frequency displayed matches the rig frequency and sets the scale at the left of the waterfall. From there the WinWarbler program calculates the exact frequency of the station you are copying. The small entry window for DXKeeper is in the right middle. You must make a manual entry of the callsign and then you can click Lookup and the "?" marked boxes will be recorded, plus a search for previous contacts is performed. From there you enter info you require. Pressing start records the beginning of the contact. Pressing Log records the info to the database and clears the boxes for the next contact. All the programs have on-line Help available by clicking the Help button.*

THE DIGITAL PORT

continued from page 47

good, two sizes up is better; if it requires a crow bar to get it through the door-opening it is just right.). I have not applied this update as yet, so I resort to the squinty-eye approach to viewing all those panels, but it works and it is fun.

Rig control

The second program I installed to work with the WinWarbler was the CI-V Commander. It can be downloaded from the same URL as the WinWarbler and comes with its full complement of installation instructions. This is one more portion of Dave's vision of the complete computer controlled ham station.

I had an earlier experience with the CI-V Commander and this is an update with more bells and whistles and very easy to configure. This is the only program in the group that is specifically written for the Icom line. I am in good shape for this because that is what is in the shack. If you do not have Icom, there is still great value in the rest of the freeware offerings you will see here.

What was fun for me was the fact that I had these two programs working and I couldn't resist making a contact. During the QSO I stopped for a moment and explained to the ham on the other end that I must go take a look at the rig, that I could not see the front of it on the operating table next to the desk where the computer was mounted.

It wasn't necessary to see the rig because the frequency was reading on both programs on the monitor in front of me and it was only necessary to go over and verify the soundcard drive was correct. I was sure it would be okay but I could not recall checking it that day. The ham at the other end was, needless to say, as impressed as I was.

Though I didn't describe what I was doing at the time to establish bragging rights, it is fun to realize you are working with a novelty others only dream of. I guess that is why I am writing this. You too can have these wondrous devices in your shack.

You would like a log to go with this?

Although WinWarbler has its own basic logging program that exports in ADIF format, Dave has written a highly sophisticated, separate, self-contained, full-function logging program to be run in conjunction with the two programs I have mentioned thus far.

It is DXKeeper, and will track your awards, print QSL cards or labels and just about everything you ever wanted a log to do for you. And this will run in the background with WinWarbler and CI-V Commander and share automated entries.

This piece of software is also available with installation instructions at the same URL. You can get a feel for the entry process from the small panel in the main screenshot. The small entry screen takes care of the usual information you are accustomed to along with special extras. The main page for the DXKeeper log system requires a full screen to present. It is self-explanatory when you see it and very easy to navigate.

You can import current data from your current log program(s) you may be using in several formats including ADIF. Then you simply take it from there. Track your progress for whatever awards that are your goals or just simply keep track of QSOs with their attendant QSL exchanges until you become curious how many countries you have worked on which bands and in which modes. Makes it easy.

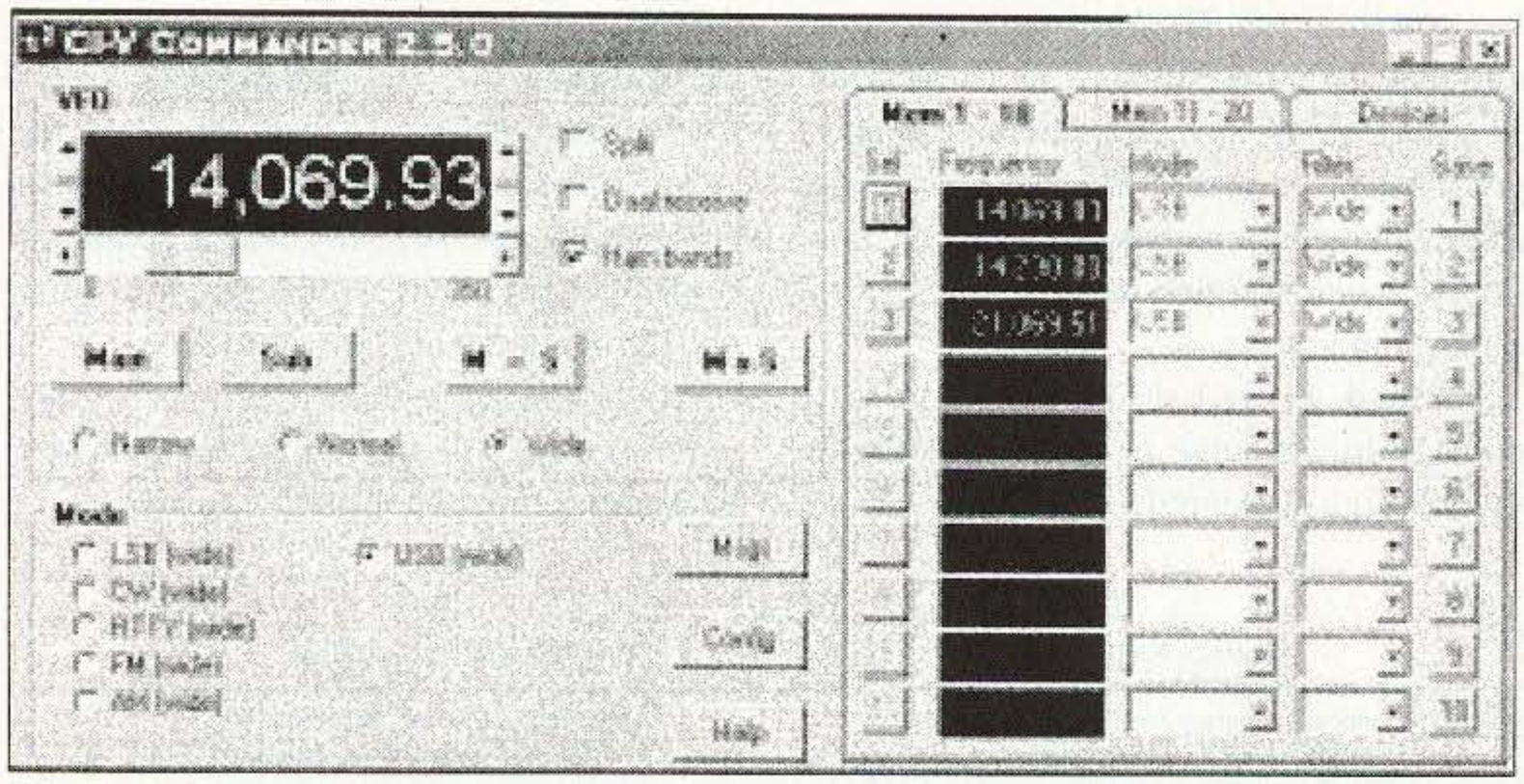

Fig. 2. CI-V Commander screenshot — This is the best program I have used for rig control with my Icom rigs. It is intuitive. You can click the controls around the frequency display and it will take only a minute or so to master changing frequencies. Also changes modes and filters easily. And it takes but a few seconds to get the hang of programming frequencies in the boxes at the right. Again, I only did a few to see how it works and a frequency on another band is no problem at all. Just a click away.

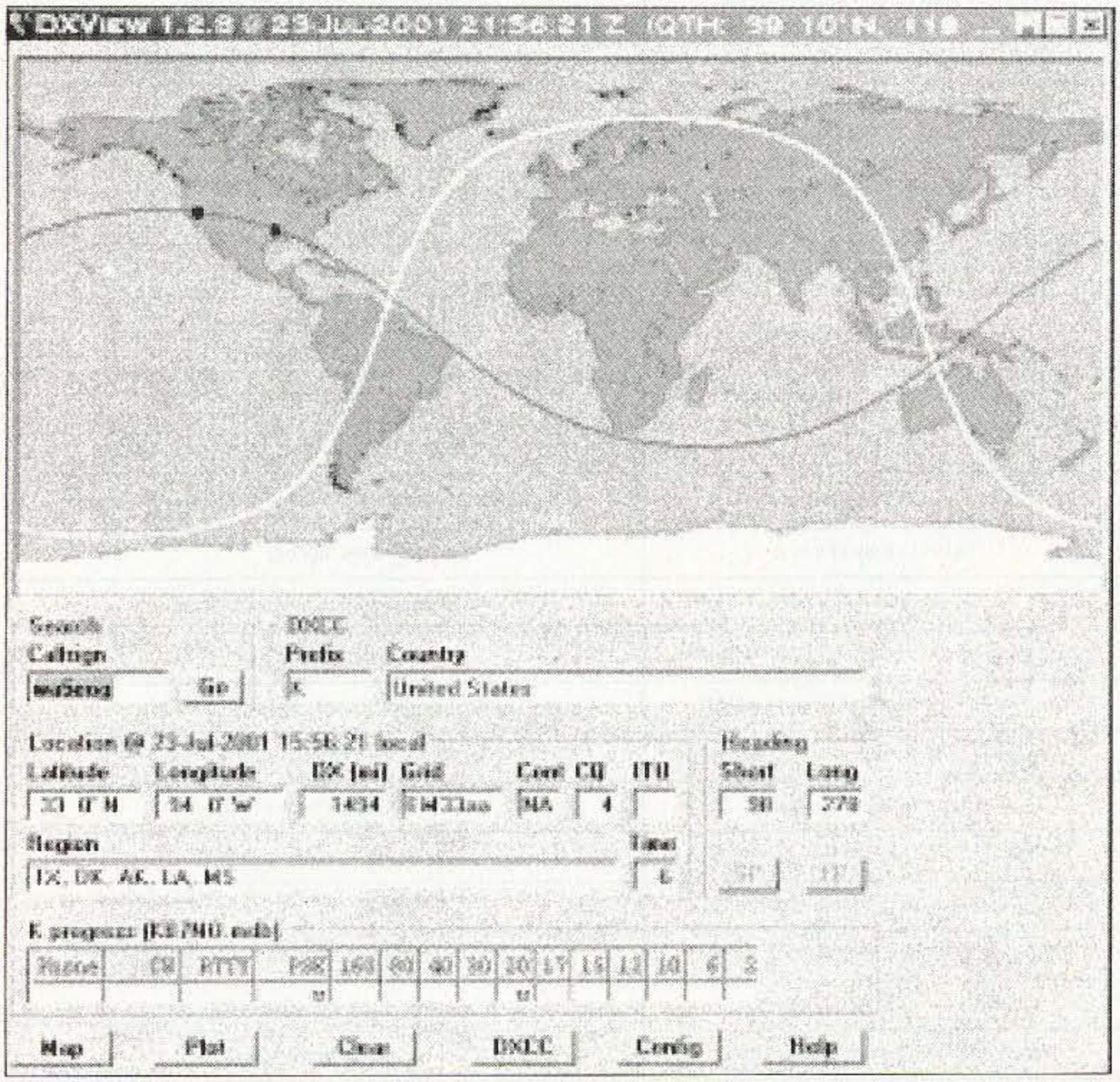

Fig. 3. DXView screenshot — This is one of the fascinating panels that is really fun to play with. As mentioned elsewhere, the program grabs the callsign from the WinWarbler and starts calculating and plotting immediately. You can see the terminator line depicting sunrise-sunset which updates with a little blink frequently. The other line plots beam heading for both short path and long path. The main part of configuration on your part is entering your latitude and longitude. You will need to slow down and follow instructions to get that correct. A real eye-catching graphic show presents itself when you click the Map button. A well defined map of the area where the other station is located comes up and you know exactly what the other ham is telling you about his neighboring terrain. I found myself entering fake callsigns with worldwide prefixes just to watch it work.

On to propagation

After installing PropView, it looked as though this might push me into the learning curve to figure what all the little boxes require for input. But no, this was all taken care of. A box popped up and said I needed DXView running and I would not have to be nearly so clever, or words to that effect.

I had forgotten to install the latter software, but as soon as I did and brought up the DXView program, things fell into place. I clicked a few buttons, made an entry and, suddenly, PropView loaded itself and, showed me the two programs spoke fluent ham-chatter to each other. All the good things had happened before I had a chance to hunt down the instructions and read about it.

What I am saying is the software is

beyond intuitive. It takes you by the hand and leads you into dimensions of hamdom you may never have seen before. When I got all the five pieces of software running and displayed I found there was much more interaction than simply keeping track of frequency and mode.

I found when I double clicked on a callsign in a receive pane in WinWarbler, the callsign appeared in DXView, which immediately performed the calculations to tell me where this station was located, spot it on the included world map, show how far away it was as well as which direction to point the beam. And if I had a computer controlled rotator it would give it a little nudge to aim the antenna as well.

All this happens plus the PropView only requires a click on the Predict button and it determines the probability per propagation

Source for:	Web address (URL):
Mix W Soundcard program for PSK31, RTTY, new modes, MTTY, FSK31, more	http://tav.kiev.ua/~nick/mixw2/ www.nvbb.net/~jaffejim/mixwpage.htm
FREE MMHam site — MMTTY — MMSSTV	www.geocities.com/mmhamsoft/
FREE VK7AAB — SSTV-PAL — PSK-PAL	http://users.origin.net.au/~crac/
Much ham info w/SSTV downloads	www.conknet.com/~kb1hj/index.htm
TrueTTY — Sound card RTTY w/ PSK31	www.dxsoft.com/mitrtty.htm
Pasokon SSTV programs & hardware	www.ultranet.com/~sstv/lite.html
PSK31 — Free — and much PSK info	http://aintel.bi.ehu.es/psk31.html
Interface for digital - rigs to computers	www.westmountainradio.com/RIGblaster.htm
Soundcard interface info — includes Alinco	www.packetradio.com/psk31.htm
Interface info for DIY digital hams	www.qsl.net/wm2u/interface.html
WinWarbler info and DXLab Suite	www.qsl.net/winwarbler/
MFSK-related tech info — how it works	www.qsl.net/zl1bpu/
Throb — New — lots of info	www.lsear.freeserve.co.uk/ www.btinternet.com/~g3vfp/
Download Logger, also Zakanaka	http://www.qsl.net/kc4elo/
PSKGNR — Front end for PSK31	www.al-williams.com/wd5gnr/pskgnr.htm
DigiPan — PSK31 — easy to use	http://members.home.com/hteller/digipan/
TAPR — Lots of info	www.tapr.org
TNC to radio wiring help	http://freeweb.pdq.net/medcalf/ztx/
ChromaPIX and ChromaSound DSP software	www.siliconpixels.com
Creative Services S/W Multimode w/PSK	http://www.cssincorp.com/products.htm
Timewave DSP & AEA (prev.) products	www.timewave.com
Auto tuner and other kits	www.ldgelectronics.com
XPWare — TNC software with sample DL	www.goodnet.com/~gjohnson/
RCKRtty Windows program with free DL	http://www.rckrtty.de/
HF serial modem plans & RTTY & Pactor	http://home.att.net/~k7szl/
SV2AGW free Win95 programs	www.raag.org/index1.htm
Source for BayPac BP-2M & APRS	www.tigertronics.com/
Int'l Visual Communications Assn. — nonprofit org. dedicated to SSTV	www.mindspring.com/~sstv/
Hellschreiber & MT63 & MFSK16 (Stream)	http://iz8bly.sysonline.it
HamScope — multimode w/ MFSK16	http://users.mesatop.com/~ghansen/
YPLog shareware log — rig control — free demo	www.nucleus.com/~field/
WinLink 2000 System info	www.winlink.org/k4cjx/
Airmail — free program to use WinLink 2000	www.arimail2000.com/

Table 1. *The Infamous Chart ... updated monthly.*

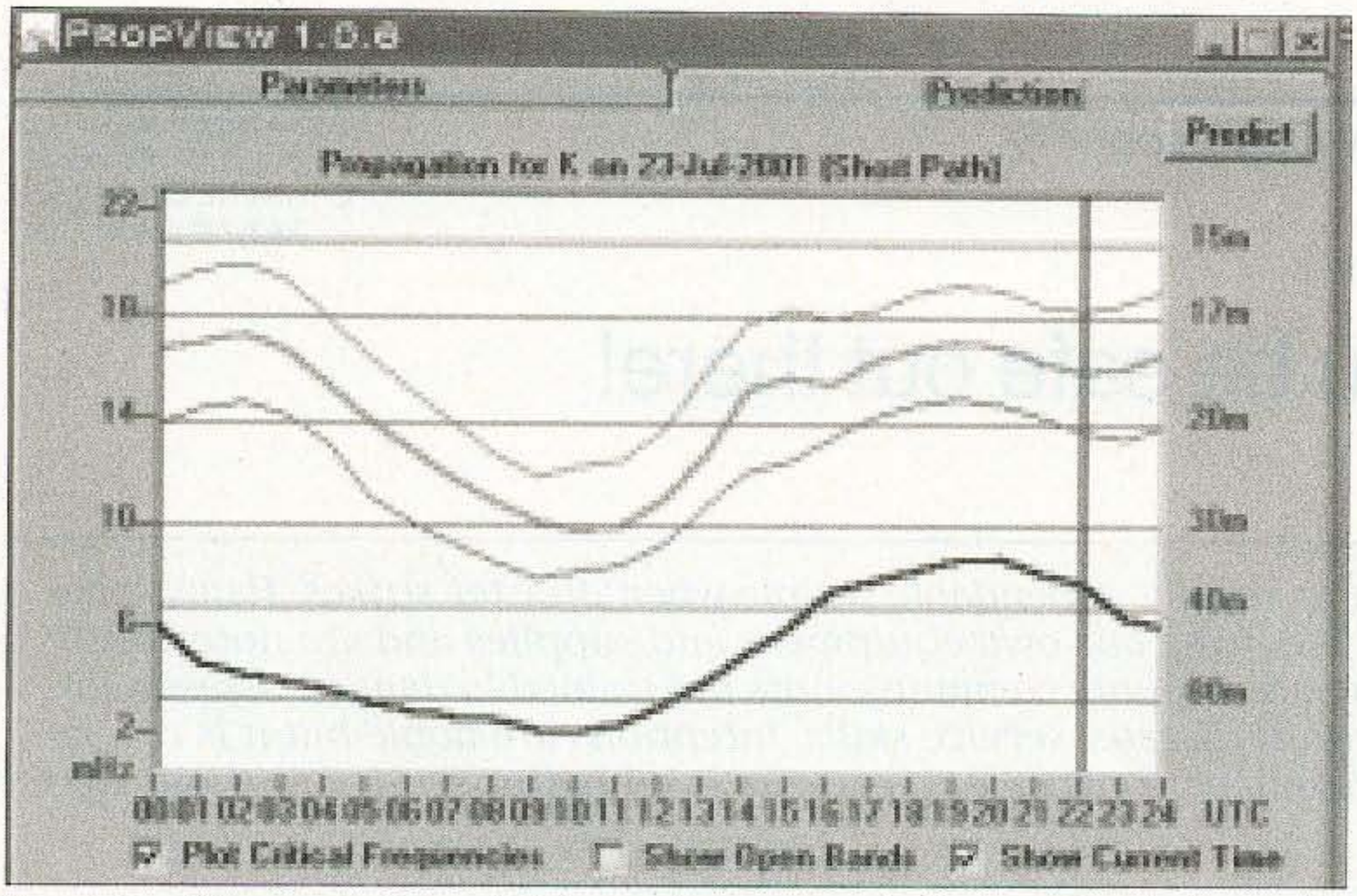

Fig. 4. PropView screenshot — This is another program that is fun to watch. Again, this is displaying propagation for a station in the 5 call area. As you read the very clear instructions to understand the meaning of the wavy lines it becomes obvious what frequency at what time will be the best to make contact. Users report great success in following the readings. The vertical bar toward the right of the graph represents the current time as depicted across the bottom. The horizontal bars represent frequency with MHz displayed at the left and bands on the right. It takes just a few moments to calculate for a new callsign or update the current information.

you have of working the particular station on which bands. Getting back to the DXView, there is another handsome feature where it is only necessary to ask (click) and it will display a map of the region where your potential contact is located.

If this isn't enough, I was a little concerned that this might not interest a lot of us who mainly make stateside contacts. The program furnishes all the same info and does the calculations for a station located anywhere on this continent, regardless of its proximity to your station. It makes it even more fun as you can bring up a map of that area of the U.S. and get a closer feel for the ham you are talking to. Another quick lesson in geography makes it almost like being there.

More in the future

According to a note on the DXLab Web site there is more ham software about to appear from this prolific author. He has posted for all the world to see that he intends to add a RTTY module and a CW module.

I hope this comes about. It is possible, given some time and a little inspiration, sometime soon there could be a super multimode entrant for the use of the ham community. From what I see with other rig control software it could be a little difficult to match the rig control up with other transceivers such as Kenwood and Yaesu. It seems to be easier to write the software for the various modes, but we can always hope somehow this can come about.

As I sit watching this late into the evening, I am impressed with the stability of the software. I think just once today, I managed to do something out of order and one of the modules shut down. It didn't crash, just simply had to reload the one program and it has run fine ever since. Plus, I checked into the Internet connection with the software and the rig running and that didn't bother it. Kept right on truckin'.

Why didn't I answer the E-mail?

There have been some real problems in E-mail land around here. This is July when I am writing this and I don't know when the previous long-standing ISP is going to stop accepting your E-mail messages to me. They left me a message over two weeks ago that they had sold to another outfit. Within hours, I lost the ability to sign-on and retrieve my E-mail.

I called, sent E-mails by the handfuls and got no response. Then I learned several things about which I have no control. One is that I could not even cause the credit card people to shut off the billings from the ISP; the ISP has to do it. The other is the new ISP owner seems to have no control over putting a stop to this problem.

So you folks who have sent E-mail to the old address after July 6th will never receive a reply because of this. I signed on with the largest company I could find hoping to avoid this problem in the future. Some of their software does not do what I would like but I will live with that as long as I don't experience the disappearing-in-the-night syndrome again. Of course, there are no guarantees. You pays your dues and you takes your chances. There is one good result; the spam is gone for the time being, at least.

A little note on the summer condx

As I mentioned, this is July and usually propagation dies this time of year. It is sporadic where we like to hang out but just the other evening, I came into the shack to shut down the computer and checked on 20 meters and recognized a Hellschreiber signal. MixW 2 was up and running, so naturally, I had to see if it would print on the monitor.

It was weak but it was F8RZ and I managed to copy the signal well enough to get the callsign and give it a try. Jean came back even though I too was producing a weak signal. I tweaked the beam heading and we had good enough copy to call it a success during which time he explained he was using a vertical and not a lot of power.

I felt good about the QSO mostly because the evening after this I felt fortunate to get readable signals in any mode from the east coast. So digital is making a lot of low power communications possible and the more this happens the more activity we will see even during the normally poor condition times.

That is about it for this month. Keep on having fun. If you have questions or comments about this column, E-mail me [KB7NO@worldnet.att.net]. I will gladly share what I know or find a resource for you. For now, 73, Jack KB7NO. 73

ON THE GO

Mobile, Portable and Emergency Operation

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Omaha NE 68130-1529
[ke8yn@netzero.net]

You be safe out there!

Ham operators are among the most readily dependable people when disaster strikes. Hams come ready, willing, and able to help. We bring our own equipment and supplies and are notoriously innovative and enthusiastic. Many are not only communicators but trained in damage assessment, shelter management or other critical disaster service skills. Intentions are noble but it is results that count. How can we improve our performance to provide even better service to those who depend on us?

First and foremost is to remember that old maxim from the sixties, "If you're not part of the solution, you're part of the problem." Actually, for our purposes I'd like to turn that around and say, "If you're not part of the problem, you're a better part of the solution." When hams are called to provide assistance, one of the assumptions that everyone makes is that we will be part of those who render assistance rather than be among those who need assistance. Any volunteer who is rendered ineffective due to an injury becomes just one more victim who needs attention and it is an instant transformation from an asset to a liability. Sometimes it will happen no matter how careful we are, and is just part of living in an imperfect world. Most problems are preventable, so we should make every effort to plan well enough and think through the situations so that we can avoid as many problems as possible.

The first priority I feel each of us should have is to ensure that those who depend upon us every day are adequately cared for first. We can only concentrate on the tasks at hand if we are not unduly concerned about the family and their safety. This seems like such a basic thought that it may be embarrassing to some to even see it written down. While I wouldn't suggest that any ham would intentionally leave the wife and kids to their own devices in a disaster, it can happen. Take this example; the potential for severe weather has been identified. You head down to the local weather service office or your storm spotter location to assist. The situation deteriorates rapidly and you find yourself cut off from your family. You are unable to determine if your family is safe and it is impossible to get to them. Where is your mind apt to be? (I'd be remiss if I didn't interject here that this is another excellent reason for the wife to go from XYL to YL by getting her ham license. If nothing else, your chance of checking in with the home front increases significantly when the contact is via ham radio!)

Make sure that your family has an emergency plan for such common emergencies as weather (both summer and winter) events, flooding, etc., before you take off to assist. Do they have something comparable to your "grab and go" kit that contains radio, flashlight, drinking water, munchies, extra batteries, etc. Even if no one else is licensed, a scanner with the local repeaters programmed in may be appreciated. If duct tape is an essential part of your kit, doesn't your family emergency kit deserve its very own roll? Pack everything into a large plastic container such as a storage box or even a garbage can and make it accessible in the area where your family might take refuge. Does everyone have a clear understanding of what to do if you and the family do get separated? Although the primary plan is to stay at home as long as it's safe, what if your home is damaged? Where do you meet then? It's a good idea to have a standing plan that everyone knows.

A disaster does tend to bring out the best in neighbors, but if there is a neighbor who counts on you for a little extra help on a regular basis you really should plan ahead for what they'll need when something significant happens. Likewise, having a "mutual assistance" understanding with a neighbor or two can turn a potential nightmare into a more enjoyable and even a social event. Pooling resources and efforts always make for better results even under the most adverse of conditions.

Once you're sure that your family is taken care of, and you head out to offer your assistance, you will probably be better able to focus on your duties if you know the family is safe. Next, you need to make sure that you keep yourself as safe as possible. First, don't show up until you know that you are needed. Don't be shy about asking, but it takes a little time, even when a disaster recovery effort has been well planned, to determine what resources are needed and where they should be deployed. Not everyone is going to be needed in the first hours of the recovery efforts. In fact, it may be several hours until the majority of people will be able to be effectively used. Fires must often be dealt with, as well as downed power lines, natural gas leaks, etc., before relief efforts can begin.

If and when your services are needed, don't forget to dress appropriately. Although it may be second nature to dress for the weather, there are other factors during a disaster. If you will be walking through the disaster area to perform damage assessment, your shoes will be your most important piece of clothing. Sneakers may be the most comfortable, but if there's the chance of debris, something with a durable sole that can protect you from nails or other pointed objects will be helpful. Myself, I still use my old combat boots with the appropriate cushioned socks. If there is flooding, assume that the water has just flowed through all kinds of nasty conditions, and try to avoid it if possible.

Assume the worst in most situations. A downed power line should always be considered live. The power may actually have

Continued on page 62

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Wildlife tracking update — burrowing owls found, saw-whets sought

Since it was first used in World War I, radio direction finding (RDF) technology has progressed steadily. In this first year of the second century with RDF, we have high-rate VHF/UHF doppler sets that can share bearings via APRS, and a network of government HF-RDF base stations that can triangulate transmissions in seconds. But some RDF tasks are still done mostly the old-fashioned way, with simple receivers and beam antennas. One of these tasks is wildlife research.

You may have seen Web sites that show the movements of migratory animals tracked by Argos satellites. This technology has been a boon to biologists studying large birds, such as the sandhill crane and Harpy eagle. But it takes at least a half watt to get the signal to a satellite. At 20 to 30 grams, Argos transmitters are too big and heavy to be put on most small birds, mammals, and reptiles, so these species are tracked directly from the ground or aircraft.

Government regulations require researchers to use tag transmitters that are only 3% to 5% of a bird's weight (**Photo A**). Six to twelve months of tracking data is needed for migratory studies, so long-life lithium batteries are the favorites. Transmitters are pulsed for a millisecond at a time to conserve these batteries. Weak short-pulsed signals are not suited to spread spectrum or doppler technology, so sensitive narrowband receivers and high-gain beam antennas are still the tracking method of choice.

There's a need to search a lot of territory once the animals to be studied have dispersed. Small aircraft can cover lots of ground, but that's very expensive and usually it's not effective during a cross-country migration, due to weather interruptions. That's where amateur radio comes in. Hams are almost everywhere and most of us already have suitable equipment. We can monitor for days and weeks at a time, letting the animals come to us.

Burrowing owls in XE-land

Back in August 1998, I first told readers about the Burrowing Owl Project (**Photo B**). Researchers in Saskatchewan and Alberta are trying to understand why these ground-dwelling raptors are diminishing in northern prairies. Surveys show a contraction in range and a steady reduction in numbers of about 16% per year from about 3,000 pairs in the late 1970s to fewer than 1,000 pairs currently. A similar trend has been noted in the USA.

Low return rates after migration, especially for young birds, suggest either high mortality or dispersal outside the study areas. Four years ago, scientists fitted some juveniles

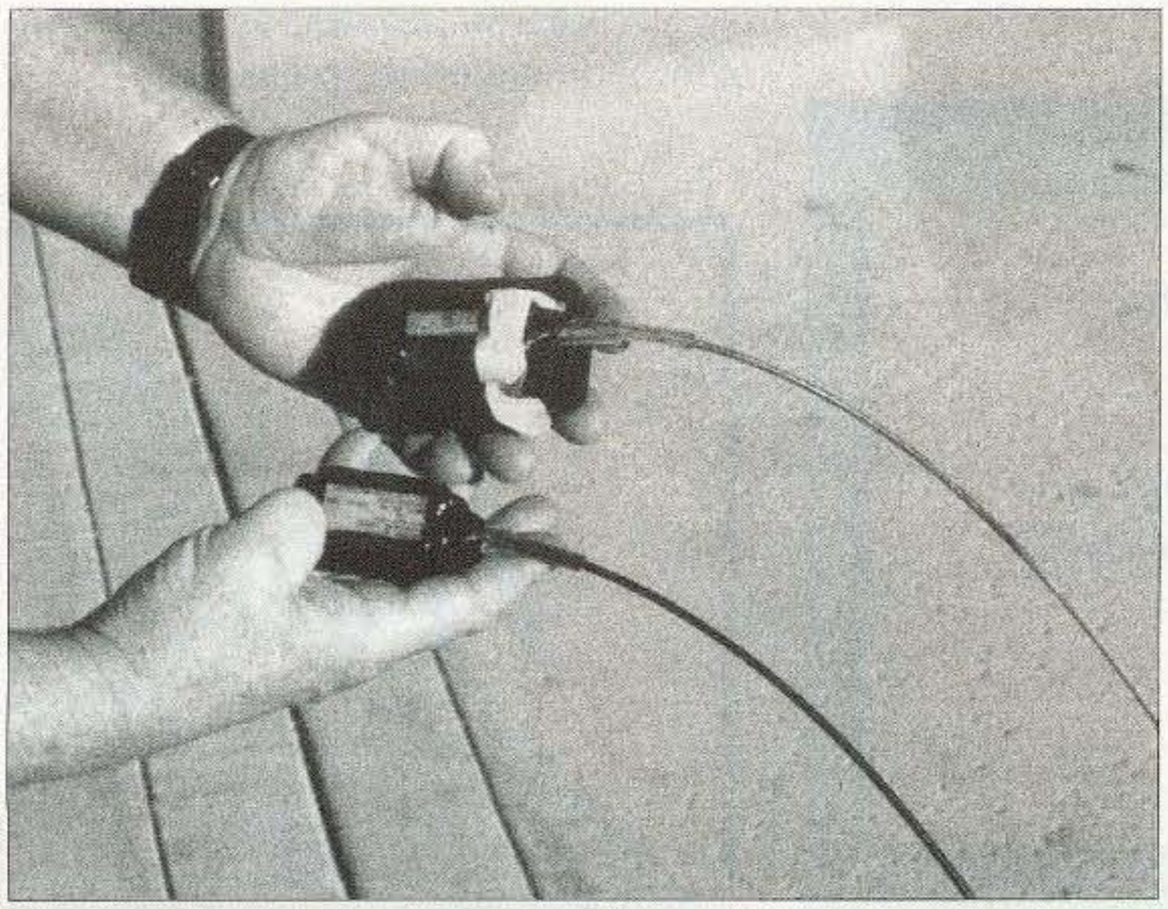

Photo A. *To get higher power and longer life, the battery size and weight of radio tags must increase. Transmitters like these are too heavy for burrowing owls, but are suitable for larger waterfowl, such as pelicans.*

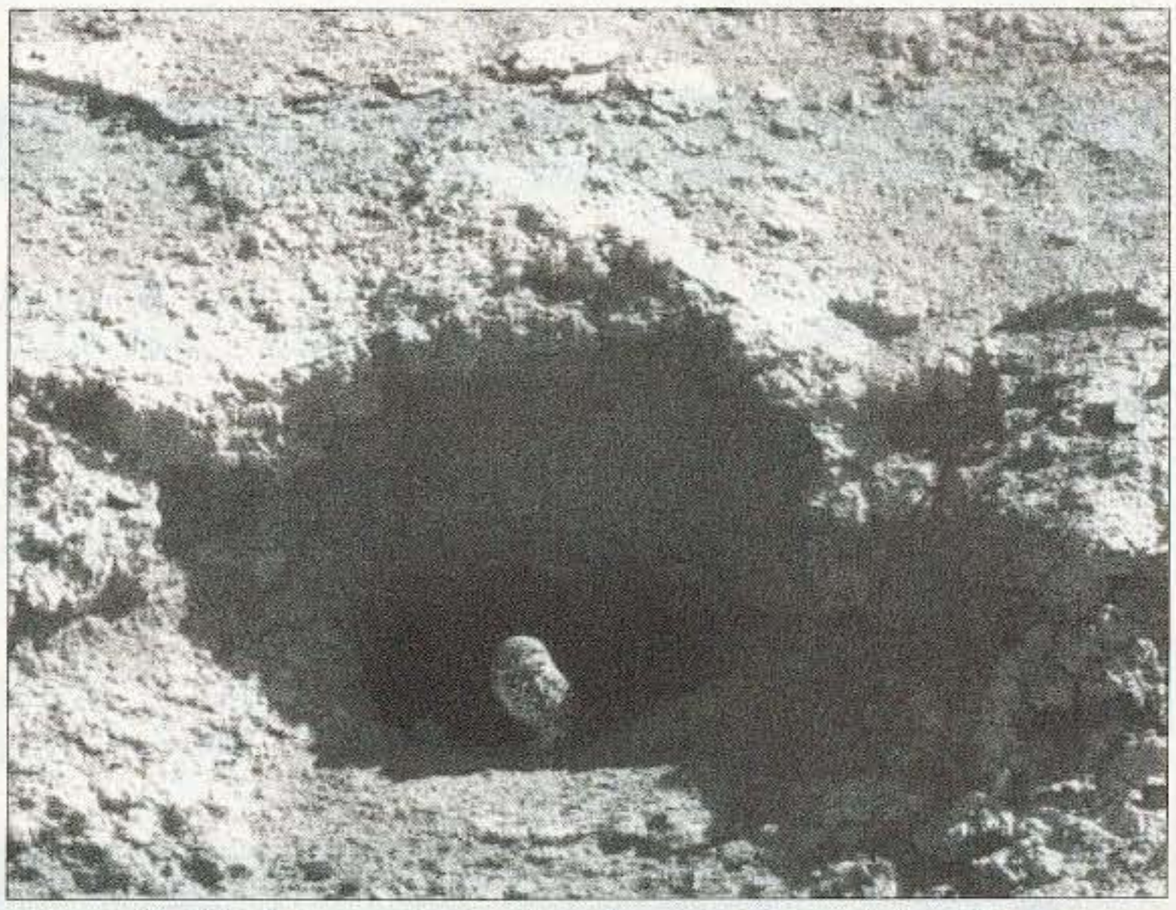

Photo B. *The burrowing owl is the only ground-dwelling raptor species, taking over other animals' holes such as this to raise its young. Hams are helping researchers understand why their numbers are diminishing.*

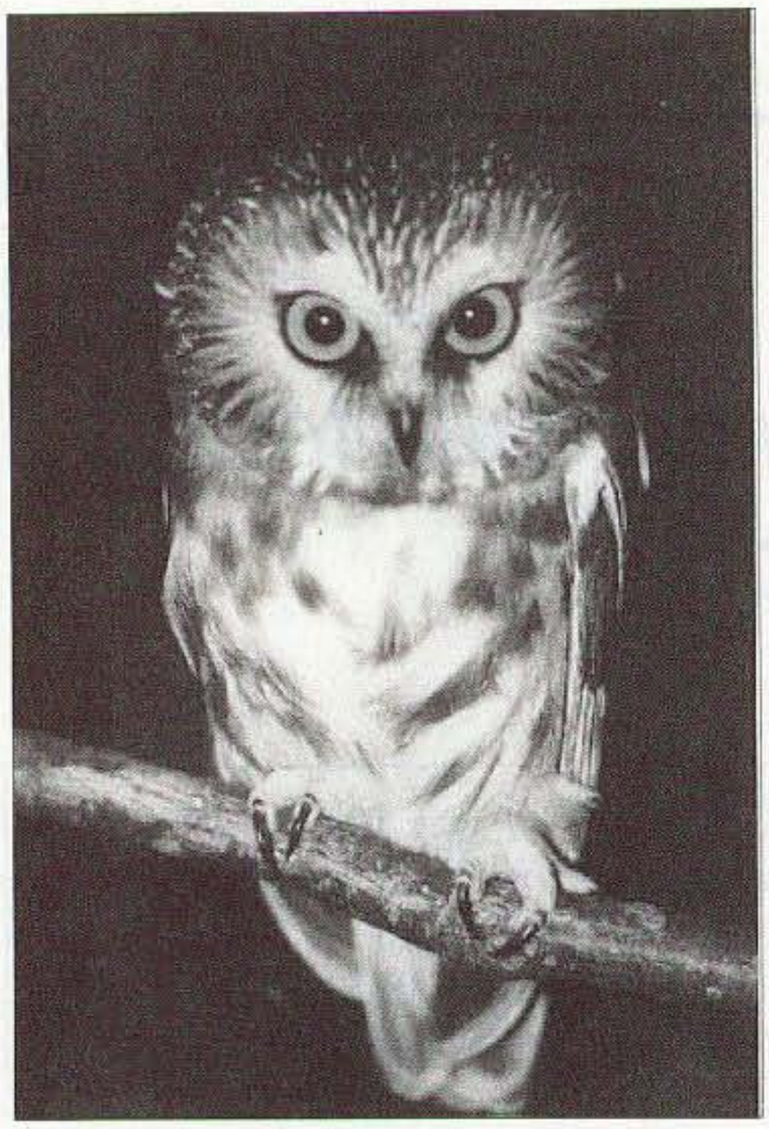

Photo C. *Charming and mysterious, the northern saw-whet owl* (Aegolius acadicus) *is the smallest owl in eastern North America. Researchers are asking hams and VHF monitoring enthusiasts for help in tracking them. (Photo courtesy of Scott Weidensaul)*

with 6-gram VHF radio tags and attempted, unsuccessfully, to follow them south in the fall to find and study their wintering grounds. They needed help.

Since publication in "Homing In" and on my Web site, many ham operators have monitored for the radio signals from these threatened birds during fall and spring migration periods. Others, such as "Cactus Charlie" Hoffman K5SBU, have opened their ranch lands to the researchers for this and similar studies. Signals thought to be from owl tags were heard and recorded, but the owls were not verified.

Success finally came in January 2001, as two biologists from Environment Canada flew a Cessna aircraft more than 9,000 miles over the Gulf Coast lowlands and central Mexico. Two signals were heard and later verified on the ground by a pair of Canadian graduate students. One transmitter was under a tree in an orange grove on the side of a small volcanic hill in northern Veracruz state. The ground nearby was littered with owl feathers, indicating that the tag-wearing owl had been killed and plucked by a predator. The finding was surprising, because orange groves are not a habitat for these owls in the USA and Canada. This owl had been banded in Saskatchewan and at least two other living unbanded owls were nearby.

The second transmitter was 250 miles southwest of the first. It was still attached to a live adult male owl that had been banded on the grassy plains of southern Alberta. It and several other owls were in a patch of cactus-thorn shrubland on a hillside surrounded by cornfields and pasture in northern Michoacan, just south of Guanajuato. The tagged owl had traveled 2,175 miles from the location where it had been banded six months before.

Scientists still have much to learn. With ham help, many wintering burrowing owls have been discovered in eastern Texas, especially near Corpus Christi. Are they permanent residents, or do they migrate north in spring and summer? Jerry Batey, a graduate student in Texas, is doing a two-year study to trap, band and place transmitters on these birds to study their dispersal and migratory activities. You can help by monitoring if you live in a central state.

As this issue arrives in your mailbox, the fall migration season is under way, and ham radio volunteers may be needed. Check the "Homing In" Web site to find out the latest Burrowing Owl Project information and active tag frequencies. You'll also find a detailed history of the project and suggestions for equipment and antennas. If you're not on the Web, send a self-addressed stamped envelope (SASE) to me and I'll mail the latest update to you.

CQ saw-whet?

Recently, another researcher has asked for volunteer monitors. Scott Weidensaul of the Ned Smith Center for Nature and Art wrote: "The northern saw-whet owl, named for its rarely-heard call likened to a file 'whetting' the teeth of a saw, is a small forest-dwelling bird that preys primarily on mice and small rodents (**Photo C**). It breeds in thick forest across southern Canada and the northern USA, and down the Rockies and Appalachians. Secretive and rarely seen, it is more often heard; the male's territorial call is a repetitive 'tooting' very much like the backup alarm on large trucks.

"It is the smallest owl species in eastern North America," Scott added. "It weighs barely as much as a robin and stands just 8 inches tall. Saw-whets are common within their range, but their shy nature makes them very difficult to study. Until a century ago, no one knew that they are highly migratory, and until researchers in Wisconsin invented a technique using a tape recording of the male's call to lure them into mist nets, they were very difficult to catch for banding. Much remains to be learned about their ecology and behavior, and radio telemetry is one of the most promising techniques."

Photo D. *After an embarrassing incident, Stockholm's ARDF enthusiasts put plaques like this on their radio foxes instructing passersby to not disturb them or reveal their locations to anyone.*

Photo E. *This radio-orienteering logo, in orange and white, goes on all my ARDF foxboxes.*

This fall, a few saw-whets will be fitted with 1.9-gram radio tag transmitters. The tags, including three-month batteries, are to be attached using a figure-eight harness made of elastic beadwork cord, designed to allow the transmitter to fall off after several months. The tagging site is Schuylkill County, Pennsylvania, about 15 miles north of Reading.

"The Ned Smith team is not attempting to follow the owls in active migration," Scott wrote. "The mountainous terrain in the central Appalachians makes that extremely difficult. The research focuses instead on how the owls behave and live during 'stopovers,' the periods when they take a break from active migration, lasting days or even weeks. Owls that are caught twice within a couple of days are the ones to be fitted with radios. It is hoped that they will stick around at least a few days more, giving researchers a chance to study their habitat use, roost selection and diet.

"In November and December these owls can be expected to either continue south through the Appalachians, or to move south and east into the Piedmont and coastal plain. It is believed that most Saw-whets migrating through Pennsylvania spend winter in the mid-Atlantic states from Maryland to the Carolinas. But little is known about their winter range, and the tagged owls might show up anywhere between the Mason-Dixon Line and Alabama or Georgia, and west through the Appalachian and Cumberland plateaus. If any hams or VHF monitors pick up their signals, it will provide valuable information about where they eventually wind up."

The saw-whet migration begins to pass through Schuylkill County about the first week of October and reaches its local peak around Halloween. It ends by about Thanksgiving in most years, though a few birds may trickle through until after Christmas. Scott's project began with one transmitter on the 172 MHz band in 2000, with more to be fitted this year. To find out the current state of this project, including all frequencies in use, visit the "Homing In" Web site or send an SASE.

Monitoring is only half of the bird-tracking task. Once heard, signals must be positively identified for the data to be useful. Most animal transmitters don't send any "station ID." To provide maximum battery life, the transmitters simply "blip" about once a second. That pulsed signal you hear on your receiver might be an owl tag, but it could be on a completely different animal.

Many local, state and federal agencies use such transmitters. For instance, cougars are collared and monitored in the county where I live. Occasionally they wander down from the mountains into city parks and backyards, where they have killed pets and mauled children. Needless to say, officials want advance warning of their visits whenever possible.

If you have a directional antenna and want to attempt to pinpoint the exact location of a radio-tagged owl, that's great. But keep in mind that these birds must be treated with respect if they are to survive. Observe them only from a distance with binoculars or a spotting scope. Do not disturb them or their burrows. Never forget that other researchers use 172 MHz radio tags, and you might be tracking something much larger and more dangerous than an owl!

If you spot a radio-tagged bird, please observe closely with binoculars to determine if it is banded, plus the band colors and band number, if possible. Note the date, time, exact frequency, your location, and any other distinctive signal characteristics. Make tape recordings or digital audio files if you can. Notify the researchers as soon as possible, using the addresses at my Web site.

All of the Canadian radio-tagged burrowing owls also have aluminum Fish and Wildlife bands with numbers and plastic color bands. Individual owls can be identified by noting the color of the bands and their sequence, as well as which leg they are on. Contact the birding enthusiasts in your area and your local Audubon Society for more information on observation techniques and birdwatching etiquette.

To have the latest information about volunteer wildlife monitoring projects sent directly to your E-mail box and participate in discussions about these projects, subscribe to the "biotrackers" mailing list at Yahoo Groups. Subscription information is at my Web site.

Tracking for dollars and preventing theft

Maybe your radio skills and volunteer monitoring efforts could lead to part-time or full-time employment. E-mail came this week from Terry Hudson KT9V of Solsberry, Indiana, who has put on radio-orienteering events to help train Team USA members. He wrote, "I have had a dream come true for me. I am tracking radio-collared

bobcats with the Indiana Department of Natural Resources (DNR).

"I have one cat that is assigned to me," Terry continued. "I go out three times per week, E-mail in my report to DNR and they put it into a program with the other eight cats that have collars. As I write this, I am heading out to the airport where I will fly with the head biologist in a helicopter with tracking antennas. We are going to locate all the cats by air today.

"I'm having a ball with this. I use my all-mode AOR hand-held VHF receiver in the SSB mode and a homebrew, 5-element log-periodic antenna that I made. My gear works just as well as the DNR equipment, maybe better. I use a GPS set in the UTM mode to provide exact location data to the DNR. With the pulsed transmitters, DNR gets about two years out of a battery on the cats.

"I have been a Telecommunications Supervisor for the Indiana State Police for 25 years and I occasionally get to hunt interference there, but it would be nice to track radio collars full-time. DNR also has transmitters implanted on rattlesnakes and tracks them, but I have not tried that yet. You have to get very close to the snakes, but I still want to do it."

Also in the mailbag recently have been several inquiries from hams who want to know how to label their foxboxes to help protect them from theft or vandalism. In 25 years of competitive T-hunting in southern California, I know of only one ham's hidden transmitter that was stolen. (However, several have been "relocated" by hunters so that the hider ended up having to hunt his own transmitter!) No label is 100% effective, of course, so most huntmasters secure their foxboxes to an immovable object. Inexpensive bicycle chains with combination locks, costing a few dollars at the hardware store, are sufficient.

Nowadays, a greater concern might be a foxbox being mistaken for something sinister or dangerous. A few years ago, I interviewed Per-Axel Nordwaeger SBØBGU about 80-meter foxhunting in Sweden, where the transmitters are in plastic toolboxes with long antenna wires. "We had a competition outside Stockholm not far from the new royal castle," he recalls. "On that island is the most secret radio installation in Sweden. This competition was very close to that area.

"We stopped hearing one of the transmitters and went to investigate. It was on a peninsula in a very swampy area between the mainland and the island. Normally nobody would go out there except silly foxhunters, but two young girls came out in a canoe and happened to find it. They didn't know what it was, so they rolled up the antennas and took it home to daddy.

"I had to go to the police to report the theft because it was close to the military installation. In the meantime, the hunt organizer put flyers on lampposts around the area. One happened to be in front of the house where the girls lived. The homeowner saw it and we got it back, but it took a week. Now we put signs on the foxes." (See **Photo D**.)

If your foxbox is for an international-rules ARDF event, a radio-orienteering logo such as the one in **Photo E** should be prominent on the box. Some groups paint all sides of the box orange and white in this standard orienteering-flag design. I also put a sticker on my ARDF foxes: "RADIO-ORIENTEERING BEACON, DO NOT DISTURB, MONITORING IN PROGRESS" My pager number is prominent on the box, so that a finder can contact me to verify that the device is benign.

If you want to try to scare off a determined (but not illiterate) thief, try a sticker with wording like this: "This radio transmitter is licensed by the Federal Communications Commission. Federal law provides severe criminal penalties for tampering with licensed radio communications equipment. The FBI investigates theft and vandalism to these units."

I always enjoy feedback, foxhunting stories and photos from "Homing In" readers. Send E-mail and postal mail to the addresses at the beginning of this article. Happy hunting! 73

LETTERS

continued from page 8

This, by the way, is the only time I had ever known about a ham class to go to.

Since I needed a lot of refreshing, I had my 16-year-old daughter, the aforementioned baby we were expecting, go over the test pool questions for Element 2. She learned very quickly — I began taking her to class with me, and on 29 May 01 we passed our Element 2 exams, missing only 3 questions each. On 1 June 01 we were granted our licenses. Mine is KD7NKW, and Catherine's is KD7NKX.

Now, here is what I want you to know. You, Wayne Green W2NSD/1, are my personal hero in ham radio! As soon as I signed up for the class I went to get a new *73*. None at the supermarket. Nor the magazine shop, the ham shop, not even Barnes & Noble or the public library. Some said you were dead. Others said *73* was dead. One said you died together. I scurried around to find all the old *73*s I could. Sure glad I kept a few in the garage.

I didn't like the idea of becoming a ham with no Uncle Wayne around. One morning I happened to have a phone call come in. Next to the phone was one of my old *73s*. I called the number inside and got a real estate office. The lady at the real estate office helped me find your new location and phone number. So, after all of that, here's my subscription! But that's not enough! I want back issues. How about a CD-ROM with every *73* in it? Ever think of that one? I'll prepay, whatever — I just want them all.

I've never met you — I probably never will. — What I want you to know is that I look up to you and respect you. You are the giant voice of sanity and fair play in the world of amateur radio. Subscribing to *73* was to me next in line to the license itself. Right! I haven't even bought an HT for Catherine or me. Another couple of paydays should do it, I think.

Thanks for everything you've done — please don't quit now.

"Aw, shucks," I said, modestly kicking some dirt with my toe. "If they'd had CB when I got started in radio, I'd have been right in there having a ball, just like you did. Why, during the early CB days I often had more luck making contacts with my little CB set in rented cars while visiting new towns than with my 2m HT. When I'd call into a repeater and ask someone to make a phone call for me, I'd get nowhere. On the CB there never was a negatory. Well, this was before cell phones. But, hey, don't tell the hams you work about this, okay? Richard, you and Catherine set up a nice tower and beam, and you'll be sitting there working the Marshall Islands every morning, and with no Candy Company to worry about."
— Wayne. 73

Antenna Tuning at the Speed of Light

continued from page 15

out. The first time I tested my system to include the transceiver I used a dummy load as the antenna. I did this so I could observe the system components and not have RF being radiated. Keep in mind, with a dummy load the tuner will tune up quickly because it sees a near-perfect load. This is a good first test and worth doing. If the system passes the dummy load test, continue

as follows. Next, connect the antenna you're planning to use to the tuner output, with an SWR indicator between the tuner and the transmitter; turn the system on and apply low power (about 15 watts) RF to the system. Then push the TUNE button. The SWR should dance around up and down, the relays in the tuner will clatter, and then the SWR should dip down to a lower reading and the tuner should stop. The system is now tuned; which should take about 3 seconds.

Postscript

You now have experience with a microcontroller and a pulsewidth modulation control system connected by fiber optic cable, giving you a control and antenna system that should tune a wet noodle. I have described how I used this fiber optic control system to operate my antenna tuner. But the use of this system in other jobs is limited only by your imagination. It is a relatively cheap, reliable system which will keep you from running a rat's-nest of wires. It provides complete electrical isolation and gives you several control functions over one path. So use at least a part of what I have created and control the world.

Sources

The Velleman-Kit kits are available from Skagit Whatcom Electronic, 1 (800) 736-7269, [www.Electronic-Supply.com], and others.

For the LED detectors/emitters, fiber optic cable: [Digi-Key.com], 1 (800) 344-4539.

Filters are available from EMI Filter Company, 1-800-323-7990 or [WWW.EMIFILTERCOMPANY.COM], Part number B7 or similar. 73

Your Long-Lost Transistor Notebook

continued from page 24

now be removed and should be a thing of the past.

A myriad of computer programs have been developed to perform the calculations for circuit design, and have reduced the amount of time required to perform a design. However, the use of a computer program removes much of the understanding and insight you might desire as to "why choose those values?"

Although the tour covered only the aspects of a Class-A audio amplifier, it did lay the ground work for the more complex design and consideration for working with transistors in an RF environment. To further your understanding of transistors, I encourage you to dig out all of the transistors from your junk box and create sets of characteristic curves for each type. By building a notebook of the data obtained, I firmly believe that your understanding of transistors will soar to new heights. Enjoy, and have fun with your projects! 73

The QRP Asylum That Almost Closed

continued from page 32

MFJ Enterprises, Box 494, Mississippi State MS 39762. [www.mfj-enterprises.com]

Newkirk, David, "A 40 Meter Regenerative Receiver You Can Build," *QST,* 9/92, p. 35. Reprinted in the ARRL book *QRP Power,* 1996.

NorCal QRP Club, 862 Frank Ave., Dos Palos CA 93620. [http://www.fix.net/~jparker/norcal.html]

Radio City, 2663 County Road I, Mounds View MN 55112. 1-800-426-2891. [www.radioinc.com]

RF Parts, 435 South Pacific Street, San Marcos CA 92069. 1-800-737-2787.

Ramsey Electronics, 793 Canning Parkway, Victor NY 14564. (716)-924-4560. [http://www.ramseyelectronics.com/]

Small Wonder Labs, Dave Benson K1SWL (ex-NN1G), 80 East Robbins Ave., Newington CT 06111 [http://www. smallwonderlabs.com/]

Westgard, E., "QRP Drives Ham Nuts," 73 *Amateur Radio Today,* 3/01, pp. 28–30. 73

Cleanin' and Climbin'

continued from page 35

positioned themselves beside and above the climber and functioned as coaches. One team member held the loose end of the safety rope and functioned as an anchor (**Photo E**). Terry KC6VCL attended this event.

Hide and Seek: A near vertical rock face with "pigeon holes" was chosen for this event. Natural holes in the rock face provided convenient hiding places for the designated team chip. This was a timed event where the participant would climb to each hole and search for the designated chip and return to the ground in the shortest amount of time.

Upon first arrival at this contest site, a rattlesnake was observed. Of course, a rattlesnake is afraid of people and activity, so it scurried off to hide in the rocks while it had a chance to escape (**Photo F**). Norm K6YPD observed the activities at this event.

Relay: A fairly steep rock face was chosen for this event. Safety ropes were used by the climbers to reduce the danger of falling. Climbers were timed on their speed to climb the rock face, retrieve a chip and return to ground level. The chip was handed off to the next team member who would return the chip to a designated location at the top of the climb. All team members participated in this event to create a total team "time for completion." Doug WA6LXB worked this event.

At the completion of all tasks and the return of the teams to the staging area, prizes were awarded to the winning teams. A raffle having multiple prizes was held for all participants in the cleaning operation so that everyone participating took home a token of the event.

It was nearly 4 p.m. when we packed up our tent and got back onto the road for home.

Talk about a fun day! Judging from the comments and the hearty hugs and handshakes, everyone enjoyed being a participant in the affair. An ample number or photos were taken as a remembrance of the event. For the hams,

Continued on page 61

Jim Gray II
[akdhc2pilot@yahoo.com]

Spooky

It appears that October will be slightly better than average for HF propagation, with overall conditions favoring the better side of FAIR. The solar surface ought to remain quiet to unsettled for most of the month, so the geomagnetic index should rarely deviate from "low" to "moderate" or "active" levels.

The greatest potential for instability is from the 22nd through the 27th, with a 60% chance of a CME or strong flare occurring during the period. My guess is that we will observe a moderate proton event on the 23rd, with effects reaching us on the 25th, possibly causing a radio blackout of about 12 hours duration across the higher latitudes. Don't forget to look for bright auroral displays on clear dark nights during these proton "showers." E-mail your questions and comments to [akdhc2pilot@yahoo.com].

Band-by-Band Summary

10/12 meters

Openings progress from east to west with the sun. Look for European or African signals in the morning, Central and South American stations around midday, and Pacific or Asian contacts before sundown. Expect some noontime fading and a short-skip of 1,000 to 2,000 miles.

15/17 meters

DX paths also progress from east to west with the daylight, but openings occur somewhat later. Try Europe before noon, Africa after noon, and Asia or the Pacific in the early evening. Short-skip will average about 1,000 miles with the strongest signals usually peaking at mid-path local noon.

20 meters

Most areas of the world will be workable from sunrise through the early nighttime hours. Peaks often occur just after sunrise and

October 2001

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

EASTERN UNITED STATES TO:

GMT:	00	02	04	06	08	10	12	14	16	18	20	22
Central America	15/17	17/20	17/20	17/20	17/20	15/17	15/17	10/12	10/12	10/12	17/20	10/12
South America	15/17	15/17	20	30/40	30/40			10/12			12/15	12/15
Western Europe	30/40	30/40	17/20	17/20				10/12	10/12	12/15	17/20	17/20
South Africa	20/30	40	20/30	20/30					10/12	10/12	12/15	12/15
Eastern Europe	17/20	30/40	40/80	40/80	30/40			15/17	10/12	15/17	15/17	17/20
Middle East	20	20	20						10/12	10/17	15/17	15/20
India/ Pakistan	17/20	17/20						15/17				
Far East/ Japan	10/12		17/20				17/20	17/20			15/17	10/12
Southeast Asia	15/17		17/20	17/20			17/20	15/17	10/12			15/17
Australia	10/12	17/20	20	20	20	30/40	30/40	17/20				10/12
Alaska	10/12		20				17/20	20			15/17	10/12
Hawaii	10/12	12/15	17/20	17/20	20/30	20/30	17/20	17/20				10/12
Western USA	20/30	20/30	20/30	30/40	30/40			10/12	10/12	10/12	15/17	17/20

CENTRAL UNITED STATES TO:

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

WESTERN UNITED STATES TO:

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

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.*

again in the late afternoon. Occasional peaks may be found before midnight on Good (G) days. Expect short-skip to be 500 to 1,000 miles during daylight hours and 1,500 to 2,000 miles after dark.

30/40 meters

Occasional daytime openings can be worked (with short-skip up to 1,000 miles), but nighttime will provide the best DX opportunities, especially on trans-equatorial paths toward the south and southwest. Short-skip will vary from 500 to 2,000 miles at night but atmospheric noise from thunder storms will act to degrade signals.

80/160 meters

On Good (G) days you can work more parts of the globe between sunset and sunrise — provided that atmospheric static is low to moderate. Short-skip will average between 1,000 and 2,000 miles, with peak opportunities often occurring along the day/night transition zone (grayline). 73

Cleanin' and Climbin'

continued from page 59

it was an opportunity to use our talent and equipment in support of a really nice event. Many of the climbers were introduced to "ham radio" for the first time during this event, which made the hams very proud!

Although it was a busy day, the fresh air and moderately warm temperature made us feel invigorated as we traveled homeward bound. 73

Bear Island on the Air

continued from page 37

We operated the rest of the day, stopping only to paddle over to the ocean side of the island to take a walk on the beach. After dinner we were back at it until 9 p.m., when the band started to die and we went to sleep. It was still early, but four hours of paddling combined with an early start to the day sure wore us out. I gave myself one last spray of bug repellent to keep the black flies off and put my sleeping bag out on the sand so I could look up at the stars for a little while before going to sleep.

At sunrise we began packing the equipment up for the return trip. I was amazed to find the 30-ft.-high antennas that had withstood a lot of wind this weekend were held in the sand with 4-ft. pieces of PVC pipe "screwed" into the sand.

It sure was a weekend to remember, and the rig performed beautifully. I'm already psyched up for the next time that John, Paul, and I can do this. I still want to work Iceland — now, how about with a half a watt on SSB? 73

SK Night — the REAL Meaning!

continued from page 40

Spaghetti — The hollow insulator slipped over bare wire to protect it from shorting was actually invented by Marconi, I'm told. The original "thin" pasta was a success, but the larger specimens were a failure. To avoid embarrassment and retain the good name of the inventor, shorter sections of the device were created and named after the inventor. Due to a spelling error, though, these will always be known as "Macaroni."

K SK — Operator practices have suggested that we use K SK, following our final transmission for the evening. I assume that this is a "salute" or wave of the hand to prior earthly amateurs, to show proper respect.

Nighttime activity — Why is it that communications seem to be so much better at night! Is it because the previous operators have slept the day away and are now out there communicating? Are all of those stations real? Or are some of them "SK"?

And there you have it! I rest my case. SK Night, as used today to describe a fun-filled evening of hand-generated Morse code, began as something entirely different. Honest. 73

Calendar Events

continued from page 41

21st. Talk-in on 145.31. VE exams 10 a.m.–1 p.m., all classes. Bring documents. Indoor spaces $12, table included; outdoor $6, bring your own tables. Admission is $5. For more info check the Web site at *[www.rfhill.ampr.org]*, or contact *Linda Erdman, 2220 Hill Road, Perkiomenville PA 18074.* Hamfest Hotline *(215) 679-5764.*

OCT 27

ST. LOUIS, MO The 10th Annual Halloween Hamfest will be co-sponsored by The Gateway to Ham Radio Club and the St. Louis ARC, at the Kirkwood Community Center, 111 N. Geyer Rd. Talk-in on 146.31/.91. VE exams, forums, and great homemade food are among the featured items at this event. Admission $1 each, 6 for $5 in advance; $2 each, 3 for $5 at the door. Tables $10. Vendors $15. For more info call *Steve Welton, (314) 638-4959,* or see *[http//www.halloweenhamfest.com].*

WATERFORD, CT The Tri-City ARC will hold an Auction October 27th at the Senior Citizens Center, Waterford Municipal Complex, Route 85, south of Exit 77 off I-395 or north of Exit 82 off I-95. Set up at 9 a.m. Doors open to the public at 10 a.m. Handicapped accessible. Refreshments will be available. Bring your items to be auctioned. Bid cards $1 each. Talk-in on 146.97, PL 156.7. For more info contact *Darryl DelGrosso* at *(860) 443-7799,* or at *[DDelgrosso@aol.com].*

OCT 28

CANTON, OH The Massillon ARC will hold their "Hamfest 2001" October 28th, 8 a.m.–3 p.m., at Stark County Fair Grounds, 305 Wertz Ave. NW. From I-77 N take downtown exit, turn left (W) on W Tusc., turn right on Wertz to Fairgrounds. From I-77 S, take 4th St. NW exit, turn right (W) into grounds. Set up at 6 a.m. Admission $5, under 12 years old admitted free. 8 ft. tables with electric, $10. Handicapped accessible. 32,000 sq. feet indoors and heated. Free parking. Talk-in on 147.18(+) club rptr. For tables, contact *Terry Russ N8ATZ, 3420 Briardale Cr. NW, Massillon OH 44646; tel. (330) 837-3091.* E-mail can be sent to *[w8np@qsl.net].* Visit the Web site at *[www.qsl.net/w8np].*

NOV 10

MONTGOMERY, AL The Montgomery ARC will host the 24th annual Montgomery Hamfest and Computer Show in Garrett Coliseum at the South Alabama State Fair grounds located on Federal Dr. in the North Eastern section of historic Montgomery. Admission $5. Free parking. Inside flea market setup 3 p.m.–8 p.m. Friday evening, November 9th; and 6 a.m.–8 a.m. November 10th. Doors open to the public 9 a.m.–3 p.m. CST. VE exams on site beginning at 8 a.m., by CAVEC. Bring original and a copy of your current license, picture ID

Continued on page 62

Calendar Events

continued from page 61

and a $3 fee. Talk-in on 146.24/.84 call W4AP. Ragchew on 146.32/.92 (with phone patch, *up/#down), 147.78/.18, 449.50/444.50, and 449.45/444.45. Flea market reservations required to assure a table. Tailgaters welcome at $5 per vehicle space. For more info write to *Hamfest Committee, c/o 7173 Timbermill Dr., Montgomery AL 36117-7405;* or phone *Phil* at *(334) 272-7980 after 5 p.m. CST.* E-mail *[k4ozn@arrl.net].* Visit the Web site for late breaking news and events, *[http://jschool.troyst.edu/~w4ap/].* 73

QRP

continued from page 46

too. This choke must be capable of handling the current required by the transistor. Sometimes, collector current can be very high, up to an amp or more, depending on design.

If you're designing from scratch, try adding some negative feedback between stages. This will usually calm things down enough to prevent unwanted oscillations without reducing efficiency.

Look for the stupid things

I worked on a small homebrew transmitter for a week one time. Nothing I seemed to do could fix the problem of the PA taking off. After hours and hours of trouble shooting, I did find the problem; an open in the cable between the RF meter and the dummy load. So, look for silly things like that if you can't find the problem.

Fixing the symptom

When you catch a real knee-knocker cold, you take a cold pill. The pill does nothing for the cold; it will go away on its own. All the pill does is hide the symptoms of the cold.

And one way to fix the symptom of the run-a-way PA stage is to slip a ferrite bead on the base lead. This little bead will almost always stop the transistor from taking off by itself. The problem is still there; we just fixed the symptom!

Another way to fix the symptom is to use a transistor in the PA stage that has an overall lower beta. If you have ever used a 2N3866, you know what I mean. This guy will be quite happy at 400 MHz. It's not the best device to use at 7 MHz. Using a low gain transistor will prevent the stage from taking off, at a cost of output power and overall efficiency. 73

On the Go

continued from page 54

been disconnected, but a long run of many miles in parallel with a live wire can induce a current in a supposedly safe one. Parallel wires can act like a very large air core transformer.

Likewise, it is best to assume that there may be a gas leak somewhere. I've seen people light road flares to warn of a gas leak. Fortunately I observed that from a distance! It is best to be very careful with any flames or anything that sparks. Speaking of sparks, be very careful of where you put the spare battery packs for your radio. More than one battery pack placed in a pocket or backpack with a set of keys or a toll has shorted and started to smolder.

While most of us might think that we're too careful to make such a mistake, don't underestimate the impact of either adrenaline or fatigue. When a disaster strikes, the adrenaline rush tends to affect our ability to objectively reason. As the event continues and fatigue sets in, we tend to take a few shortcuts in our efforts to get things done. To be effective, we have to be safe. Besides, I always hate to see a fellow ham get hurt when trying to help out. 73

Never say die

continued from page 39

How about shopping? When you can get an interactive sales video over the Internet, who needs to drive to a shopping mall? Think mail order with unlimited catalogs available.

In the computer business most of the sales these days are being made by a small group of mail order houses. You get their almost weekly catalogs, call in your order, and the next day it's there via UPS. My wife sells her how to dance videos, shipping them via priority mail, so someone who orders a video on Monday often has it in hand by Thursday. Almost anywhere in the country. She sells them via a video preview catalog which shows a little bit of the almost a hundred different videos she has in stock. She even has beginning, intermediate and expert lessons for most of the popular ballroom dances. And the price is right, with each one-hour video providing as much material covered as one would normally get during three hours of personal instruction.

As the Web bandwidth expands she'll be able to deliver her videos to customers who will download them to their DVD recorders. Talk about instant gratification!

Just as my wife has produced her how to dance videos using dancing instructors who have won many awards, we'll be seeing thousands of other skill-teaching videos being made available. Horseback riding? Skiing? Bow and arrow? The top experts of the world will be available to help you build your skills.

How about food? Despite the failure of early Web shopping services, we're going to see our food being delivered instead of our having to drive to the supermarket. As people decide that they would rather eat healthy food than get sick and suffer for years, we're going to see the demise of the food giants. TV dinners, food in cans and boxes will go the way of the cracker barrel of a hundred years ago. I'll get my regular supply of super-organic fruits and veggies delivered to my door. Super-organic means not only with no pesticide sprays or chemical fertilizers, but also grown in remineralized ground — spread with rock dust or Azomite.

Why should I drive a mile or so to a supermarket to shop for fruit and veggies if I can look at their counters via in-store cameras over the Web and make my selections? Their costs will be lower, with one fruit stand doing the work of 100 or 1,000 stores. No expensive store in a shopping plaza. No checkout persons. All automated from warehouses in the lowest of low-rent areas.

With your help we can make this a reality. Or you can concentrate on cheering for your favorite team and let someone else worry about helping us to progress.

Help Wanted

I'm looking for one or two readers to give me a hand solving a problem, and have fun doing it.

The problem is how to get the back issues of the magazine we've got on hand into the hands of readers who will benefit from some of the great articles they've missed.

Sure, I could reprint the tables of contents in a catalog, but I want something more persuasive than that. I'd like to see a short review of the articles in each issue — something that would explain what the articles are about that's more than a title and subtitle, and do it with a sense of humor.

What's it pay? You're asking W2 Never Spend a Dollar about pay for a fun project like this? You mercenary wet blanket. Well, okay, you don't get quality if you don't pay for it, but this'll mean I have to make the customers pay for you to have all that fun. I'd like to

Continued on page 64

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, 2001 expanded edition (156p). $10 (#05)

The Secret Guide to Wealth: Just as with health, you'll find that you have been brainwashed 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 Bioelectrifier 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! The circuit can be built for under $20 from the instructions in the book. $10 (#01)

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)

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)

Cold Fusion Journal: They laughed when I predicted the PC industry growth in 1975. PCs are now the third largest industry in the world. The cold fusion ground floor is still wide open, but then that might mean giving up watching ball games. Sample: $10 (#22)

Julian Schwinger: A Nobel laureate's talk about cold fusion—confirming its validity. $2 (#24)

Dowsing. Yes, dowsing really does work. I explain how and why it works, opening a huge new area for scientific research with profound effects for humanity. $2 (#84)

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 it's 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 are right, we're in trouble. I explain 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 – like Hapgood, Einstein, Snow, Noone, Felix, Strieber. $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 readers who worked for NASA. This book cites 45 good reasons I believe the whole Apollo program had to have been faked. $5 (#32)

Classical Music Guide: A list of 100 CDs which will provide you with an outstanding collection of the finest classical music ever written. This is what you need to help you reduce stress. Classical music also raises youngster's IQs, helps plants grow faster, and will make you healthier. Just wait'll you hear some of Gotschalk's fabulous music! $5 (#33)

The Radar Coverup: Is police radar dangerous? Ross Adey K6UI, a world authority, confirms the dangers of radio and magnetic fields, including our HTs and cell phones. $3 (#34)

Three Gatto Talks: A prize-winning teacher explains what's wrong with American schools and why our kids are not being educated. Why are Swedish youngsters, who start school at 7 years of age, leaving our kids in the dust? Our kids are intentionally being dumbed down by our school system — the least effective and most expensive in the world. $5 (#35)

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)

$1 Million Sales Video: The secret of how you can generate an extra million dollars in sales just by using PR. This will be one of the best investments you or your business will ever make. $40 (#52)

Reprints of My Editorials from *73*. Very few things in this world are as we've been taught, and as they appear. 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.

1996 Editorials: 120 pages, 100 choice editorials. $10 (#72)

1997 Editorials: 148 fun-packed pages. 216 editorials. $10 (#74)

1998 Editorials: 168 pages that'll give you lots of controversial things to talk about on the air. $10 (#75)

1999 Editorials: 132 pages of ideas, book reviews, health, education, and anything else I think you ought to know about. $10 (#76)

2000 Editorials: 76 pages (thinner magazine as a result of our slowly dying hobby) $5 (#77)

Silver Wire: With two 5-in. pieces of heavy pure silver wire + three 9V batteries you can make a thousand dollars worth of silver colloid. What do you do with it? It does what the antibiotics do, but germs can't adapt to it. Use it to get rid of germs on food, for skin fungus, warts, and even to drink, Read some books on the uses of silver colloid, it's like magic. $15 (#80)

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

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

Wayne's Bell Saver Kit. The cable and instructions enabling you to inexpensively tape Art Bell W6OBB's nightly 5-hr radio talk show. $5 (#83)

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

Cold Fusion Six-Pack: Six Cold Fusion Journal back issues to bring you up to speed. $20 (#19)

NASA Mooned America: René makes an air-tight case that NASA faked the Moon landings. This book will convince even you. $30 (#90)

Last Skeptic of Science: This is René's book where he debunks a bunch of accepted scientific beliefs – such as the ice ages, the Earth being a magnet, the Moon causing the tides, etc. $30 (#91)

Dark Moon: 568 pages of carefully researched proof that the Apollo Moon landings were a hoax—a capping blow for René's skeptics. $35 (#92)

Dark Moon Video: 222-minute exposé nailing NASA with their own photos. If you've watched the NASA films of the astronauts walking on the Moon you wondered at their weird gait. Wait'll you see it speeded up. It looks exactly like they're running on Earth! They catch NASA in dozens of giveaways that the photos and films had to have been faked. $46 (#93)

1X

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Barter 'n' Buy

Turn your old ham and computer gear into cash now. Sure, you can wait for a hamfest to try and dump it, but you know you'll get a far more realistic price if you have it out where 100,000 active ham potential buyers can see it, rather than the few hundred local hams who come by a flea market table. Check your attic, garage, cellar and closet shelves and get cash for your ham and computer gear before it's too old to sell. You know you're not going to use it again, so why leave it for your widow to throw out? That stuff isn't getting any younger!

The *73* Flea Market, Barter 'n' Buy, costs you peanuts (almost)— comes to 35 cents a word for individual (noncommercial!) ads and $1.00 a word for commercial ads. Don't plan on telling a long story. Use abbreviations, cram it in. But be honest. There are plenty of hams who love to fix things, so if it doesn't work, say so.

Make your list, count the words, including your call, address and phone number. Include a check or your credit card number and expiration. If you're placing a commercial ad, include an additional phone number, separate from your ad.

This is a monthly magazine, not a daily newspaper, so figure a couple months before the action starts; then be prepared. If you get too many calls, you priced it low. If you don't get many calls, too high.

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?

Send your ads and payment to: *73 Magazine*, Barter 'n' Buy, 70 Hancock Rd., Peterborough NH 03458 and get set for the phone calls. The deadline for the December 2001 classified ad section is October 10, 2001.

220 MHz Award; see W9CYT on WWW.QRZ.COM for information. BNB645

K8CX HAM GALLERY [http://hamgallery.com]. BNB620

TELEGRAPH COLLECTOR'S PRICE GUIDE: 250 pictures/prices. $12 postpaid. **ARTIFAX BOOKS**, Box 88, Maynard MA 01754. Telegraph Museum: [http://wltp.com]. BNB113

New miniature oscillator modules are now available ... all under $20 ... plus our great reference book is still for sale. Write to **RMT Engineering**, 6863 Buffham Road, Seville OH 44273 or see our Web site at **[www.ohio.net/~rtormet/index.html/].** BNB640

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Exotic 2002 Caribbean Hamboree -- Join us in meeting with Caribbean hams, visiting interesting Georgetown, Guyana, operating from great DX location. March 29-31/02. For information contact KK4WW, 8R1WD or [www.public.usit.net/dlarsen]. BNB640

NEVER SAY DIE

continued from page 39

give the back issues away free, but I'll have to cover the cost of picking, packing, and postage anyway, so what the hell.

With an average of around 50 copies of each back issue, if I pay $6.50 per back issue for your golden prose, that'll only add 13¢ to the cost.

If you're interested in helping pick any back issue you have around and let me see what you can do. If your entry is a winner I'll send you a bundle of ten back issues and a computer disk for a test hop. No, you won't have to return them. If the mustard is cut well you'll get a bunch more — and a check. Or would you prefer cash?

Oh, my call used to be W2 Never Spend a Dime, but inflation drove it up. I'm not cheap, just thrifty — as the readers of my two *Wayne's Travels* books know. Very thrifty.

Please send your entries to Big Bucks, Box 360, Hancock NH 03449. Make me laugh. 73

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SEND FOR "HOW TO WRITE FOR *73*"

144 220 +440

Everything adds up: Kenwood's new FM Tribander (144/220/440MHz) offers dual-channel RX capability and prime performance in a superbly compact design.

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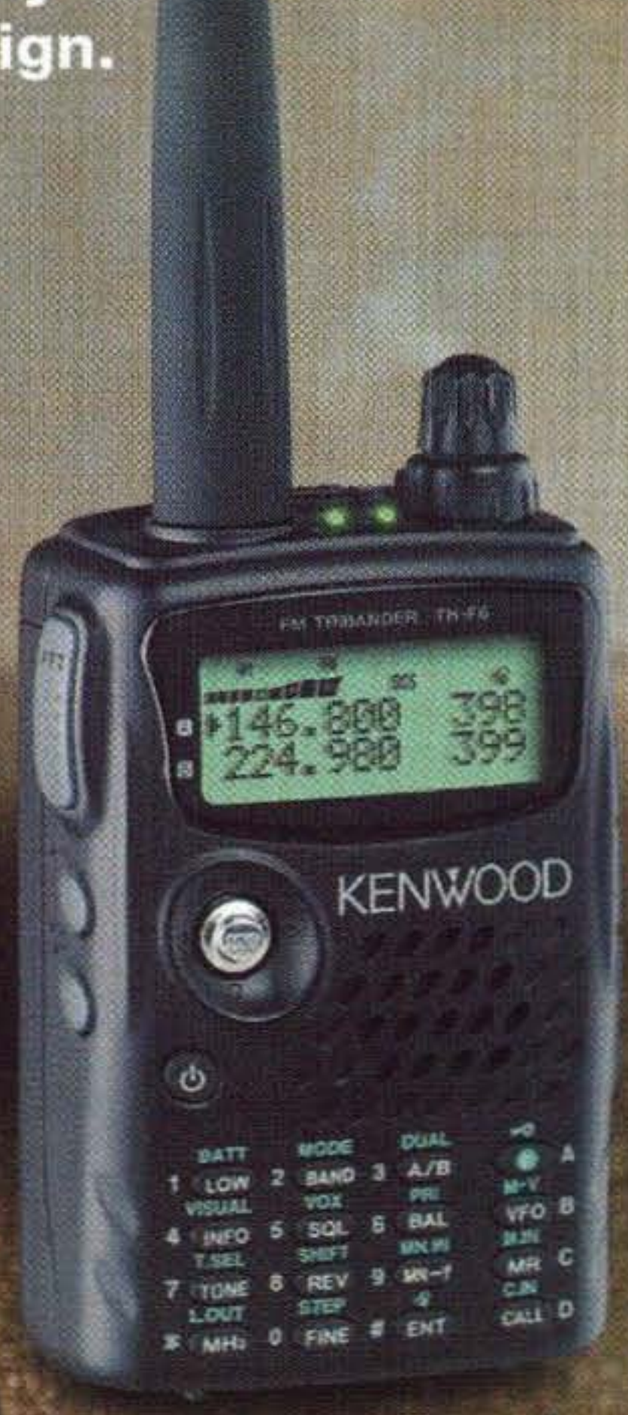
- Battery indicator • Internal VOX • MCP software

[1] Note that certain frequencies are unavailable. [2] 5W output

"Specifications subject to change without notice."



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Today's elite-class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics on the front panel save you seconds in a pile-up or a contest "run," and Yaesu's HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

Ⅰ. Interlocked Digital Bandwidth Tracking System (IDBT)

Ⅱ. Variable RF Front-End Filter (VRF)

Ⅲ. 200 Watts of Transmitter Power Output

Ⅳ. Class-A SSB Operation

Ⅴ. Multi-Function Shuttle Jog Tuning/ Control Ring

Features

■Frequency Coverage: (RX) 100 kHz-30 MHz; (TX)160-10 m Amateur Bands ■Dual In-band Receive w/Separate "S" Meters ■Ten Pole Collins® Mechanical Filter Built-in ■RX DSP Noise Reduction and CW Peaking Filter ■High-speed Automatic Antenna Tuner ■Two TX/RX Antenna Jacks plus RX-only Jack ■TX Microphone Equalizer ■RF Speech Processor ■Direct Digital Synthesis ■CW Spot and Two Key Jacks ■Two Headphone Jacks (1/4" and 3.5 mm) ■Low-Level Transverter RF Drive Jack ■Separate FP-29 Power Supply (30 V/13.8 V DC Output)

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VSPC (Variable Side Pressure Control)

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MD-200A8X

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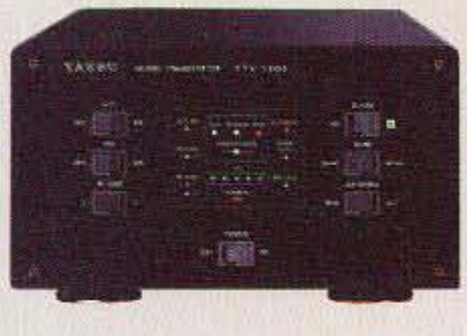

Specifications

Frequency Range:	50-54 MHz
Antenna Impedance:	50 Ohms
Power Output:	200 Watts PEP
Spurious Emissions:	At least 60 dB down
Power Source:	DC 30 V and 13.8 V (supplied by FP-29 Power Supply of MARK-V)
Dimensions:	9.6" x 5.4" x 13" WHD (243.5 x 136.5 x 331 mm)

200 W 50 MHz Transverter

FTV-1000

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Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

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