SEPTEMBER 2001
ISSUE #490
USA $3.95
CANADA $4.95

THE NEW!

73® Amateur Radio Today

INSIDE:
22 *Great* Articles and Features!

Work the World With Alinco!

Base, mobile, portable or marine, Alinco HF transceivers open a world of possibilities at prices that are down to earth. Check out this great equipment and the low Alinco price at your favorite dealer!

DX-70TH HF+6m

Mobile/Base/Portable

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.**

EDX-2 Automatic Wire Antenna Tuner

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!

Simple ▪ Clean ▪ Dependable

ALINCO®

AMATEUR RADIO'S VALUE LEADER℠

Distributed in North America by ATOC Amateur Distributing LLC

23 S. High St., Covington, OH 45318 • (937) 473-2840 • www.alinco.com

Specifications subject to change without notice or obligation. Performance specifications only apply to Amateur Bands. Transceivers intended for use only by properly licensed Amateur Radio operators.

SEPTEMBER 2001
ISSUE #490

Business Office
Editorial - Advertising - Circulation
Feedback - Product Reviews
73 Amateur Radio Today Magazine
70 Hancock Rd.
Peterborough NH 03458-1107
603-924-0058
Fax: 603-924-8613

Reprints: $3 per article
Back issues: $5 each

Printed in the USA

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.

THE NEW! 73® Amateur Radio Today

TABLE OF CONTENTS

FEATURES

REVIEW

DEPARTMENTS

E-Mail
design73@aol.com

Web Page
www.waynegreen.com

QRX . . .

Anagrams

An anagram, as we all know, is a word or phrase where letters are rearranged to form another word or phrase:

Dormitory = Dirty Room
Evangelist = Evil's Agent
Desperation = A Rope Ends It
The Morse Code = Here Comes Dots
Slot Machines = Cash Lost in 'em
Animosity = Is No Amity

Continued on page 6

ASTRON CORPORATION
9 Autry Irvine, CA 92618
(949) 458-7277 • (949) 458-0826

E151765 E151765 LISTED 2F29

...POWER ON WITH ASTRON

SWITCHING POWER SUPPLIES...

MODEL SS-10TK

MODEL SS-12IF

SPECIAL FEATURES:

- HIGH EFFICIENCY SWITCHING TECHNOLOGY SPECIFICALLY FILTERED FOR USE WITH COMMUNICATIONS EQUIPMENT, FOR ALL FREQUENCIES INCLUDING HF
- HEAVY DUTY DESIGN
- LOW PROFILE, LIGHT WEIGHT PACKAGE
- EMI FILTER
- MEETS FCC CLASS B

PROTECTION FEATURES:

- CURRENT LIMITING
- OVERVOLTAGE PROTECTION
- FUSE PROTECTION.
- OVER TEMPERATURE SHUTDOWN

SPECIFICATIONS:

INPUT VOLTAGE: 115 VAC 50/60HZ
OR 220 VAC 50/60HZ
SWITCH SELECTABLE

OUTPUT VOLTAGE: 13.8VDC

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

MODEL SS-18

DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅜ x 6 x 9	3.4
SS-18	15	18	1⅜ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅜	4.2
SS-30	25	30	3¾ x 7 x 9⅜	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅜	4.2
SS-30M*	25	30	3¾ x 7 x 9⅜	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 9⅜	6.5
SRM-30	25	30	3½ x 19 x 9⅜	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅜	6.5
SRM-30M	25	30	3½ x 19 x 9⅜	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 9⅜	10.5
SRM-30-2	25	30	3½ x 19 x 9⅜	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅜	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

RAMSEY

GET YOUR COPY TODAY! *Over 100 NEW products!*

Keep up-to-date!
Receive our FREE newsletter.
Register on-line at ramseykits.com

COMMERCIAL 35W FM TRANSMITTER

Clean and powerful, plus an on board computer that's your "virtual" station engineer! We can now supply turn-key packages for your community or LPFM station. Call or visit our broadcast web site, www.highpowerfm.com, for more details.

PX1 **$1,795.00**

BROADCAST YOUR MP3 AND .WAV FILES

Our FM broadcaster designed specifically for PC sound-cast. Broadcast MP3s, internet radio and more to any FM radio in your house or yard. You can't buy an assembled broadcaster this powerful or clean. Kit includes case and power supply.

MP3FM **$99.95**

FM100 SYNTHESIZED FM STEREO RADIO STATION

- Synthesized 88 to 108 MHz for no frequency drift !
- Built in mixer – 2 line inputs and one microphone input!
- Strappable for higher power output
- 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**

FM STEREO RADIO 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**

CARPET ROVER II ROBOT KIT

This advanced kit is an 8 x 8" differentially steered base that is excellent for carpet or tiled floor experimentation. It uses the Next Step microcontroller, a BASIC Stamp 2 controller that can use the BS2 or BS2-E (sold separately). A host PC is required to download programs to the robot. This complete kit includes the Rover, programming cable, IR proximity detector, bumper switch kit, and line follower kit.

RK3000 **Carpet Rover II Complete Kit** **$185.00**

COMBUSTIBLE GAS DETECTOR KIT

Build this kit and detect combustible gases and vapors including natural gas, gasoline, propane, and dozens more. Model GLD1000 is a local alarm only, GLD1010 includes a relay to control external alarms.

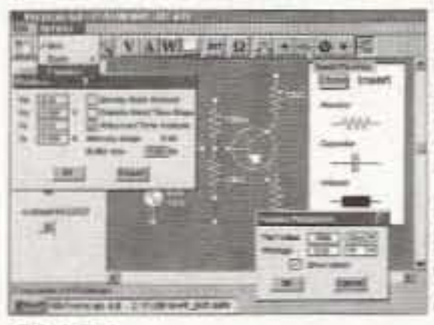
GLD1000	**$29.95**
GLD1010	**$39.95**

BUILD YOUR OWN STEREO!

We've got the kit! Our K4500 is a synthesized FM stereo tuner, the K4100 is a matching pre-amp. Both are fully digitally controlled with an optional IR remote control (kit also). Add our K4020 2 x 155W Class A power amplifier kit to complete your drop-dead stereo. We also have tube amplifier kits. Visit us on the web, or request our new catalog for more information.

K4500	**Synthesized FM Stereo Tuner Kit**	**$399.99**
K4100	**Digital Preamp Kit**	**$399.99**
K4101	**IR Remote Control Kit**	**$69.95**
K4020	**Solid State 310W Power Amp Kit**	**$499.99**

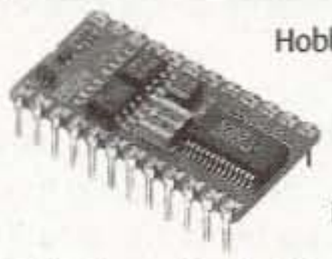
ELECTRONIC PROTOTYPING SOFTWARE...



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 **$49.95**

RAMSEY NOW CARRIES BASIC STAMPS



Hobbyists and educators have embraced the Basic Stamp family of microcontrollers thanks to their power, ease of programming and simple interface. Ramsey now offers popular BS boards, kits, and trainers. If you've been wanting to learn microcontrollers, or build them into a project, now's the time!

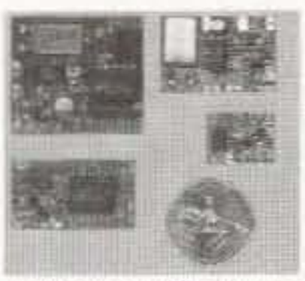
BS1IC	**Basic Stamp I Module**	**$34.00**
BS2IC	**Basic Stamp II Module**	**$49.00**
27205	**Basic Stamp 1 Starter Kit**	**$109.00**
28150	**Board of Education Full Kit**	**$109.00**

MINI-KITS

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

BN9	**Super Snoop 2W Audio Amp**	**$8.95**
MB1	**Mad Blaster 15W Warble Alarm**	**$4.95**
TS1	**Touch Switch**	**$6.95**
SA7	**RF Broadband Preamp +20 dB**	**$14.95**
TT7	**Touch Tone Decoder**	**$29.95**

RF WIRELESS LINK MODULES

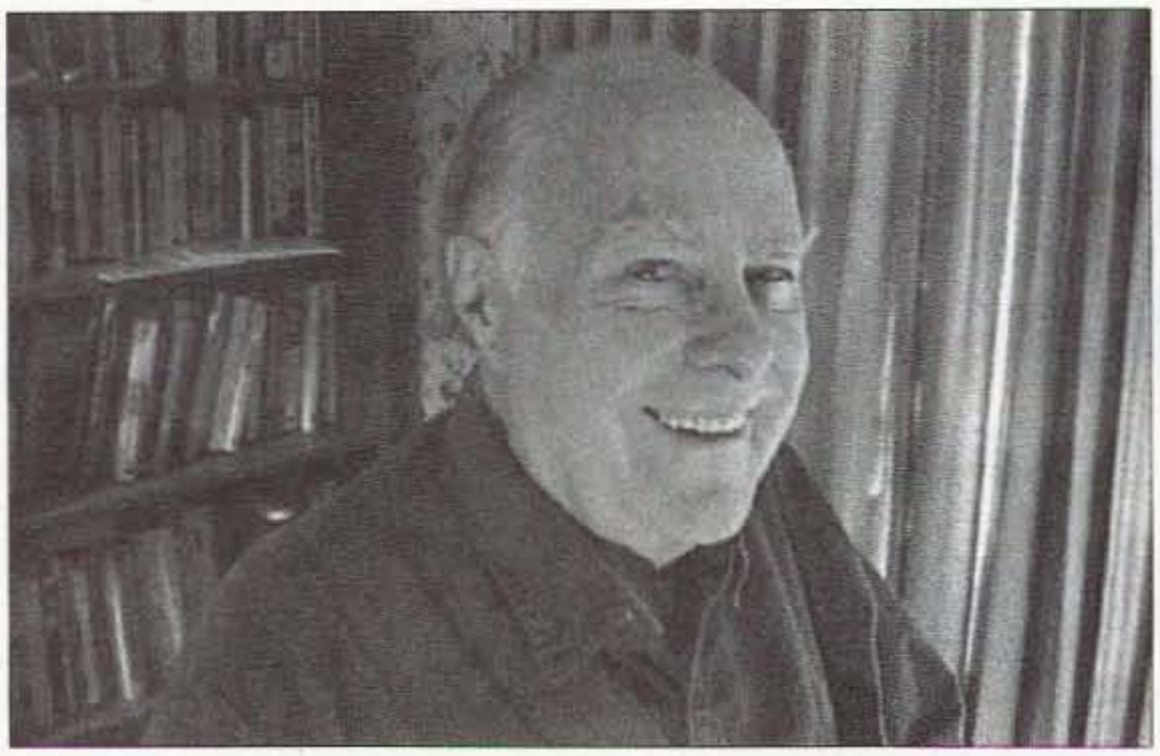


- SAW Resonators for high stabillty – NO Drift!
- Powerful +10 dbm output
- Range up to 600'
- 433 MHz license-free band.
- Sensitive superhet receiver with RF LNA
- Stable over full 3–12 VDC range
- Optional on-board 12 bit encoder/decoder using Holtek HT12 series chips

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**
TX433	**433 MHz Data Transmitter Mod., Assembled**	**$19.95**

VISA MasterCard AMERICAN EXPRESS DISCOVER

Ramsey Electronics • 793 Canning Parkway • Victor, NY 14564
Order Toll Free: 800-446-2295 • Technical Info or Order Status: 716-924-4560
See our catalog online and register to receive our FREE newsletter: www.ramseykits.com



Wise Up & Beat the Odds

NEVER SAY DIE

Wayne Green W2NSD/1
w2nsd@aol.com
www.waynegreen.com

Ham Club Talks

The Santa Barbara club broke the ice when Untied Airlines was unable to get me further than Chicago on my way to give a talk to the club. What a frustrating day that was! Finally, around two in the morning, I managed to get back home. The simple solution, which I should have thought of years ago, was to give my talk via the telephone, just as I do my talk radio interviews. They put an amplifier on their phone and it worked like a charm.

Since then I've done similar talks with clubs in Sheboygan and Nashville. How about your club? I'm available for an hour talk without the club having to fly me there and put me up for the night. Give me a call at (603) 588-0107 or E-mail me at [w2nsd@aol.com] and we'll set up a date.

I've been hoping that club program chairmen or presidents would take the initiative to set up similar phone talks with ham industry luminaries. It would sure make meetings more interesting and help build attendance.

Another Birthday

On Sunday morning, September 3rd, 1922 at 6 a.m., Dr. Giles assisted Mrs. Cleo Green in the birth of Wayne Sanger Green II in the Littleton (NH) hospital. His dad was in flight training in the Army Air Force at Kelly Field, San Antonio, Texas, and thus unable to attend my coming out ceremony.

Born in the age of the Model T, silent movies and vaudeville, I grew up around planes, the Victrola, then talkies and radio programs such as Jack Armstrong, The All-American Boy, Little Orphan Annie, and Buck Rogers In The 25th Century—all 15-minute after school radio programs.

Then, at 14, the amateur radio bug bit, causing a lifelong infection I've never been able to shake.

Next year I'll be 80, and if I follow my own health advice, I'll be as healthy as most men of 40.

It's been an interesting life, going from the Model T to a Honda van with a global positioning map built in, a telephone with a ringer crank on the wall to today's E-mail and Internet, and a Waco biplane to the Concorde (yep, I flew to London and back on it). I've also watched inflation take 2¢ letter postage to 34¢ (and going up again soon). Radio has gone from the NBC red and blue, CBS and Mutual networks to 200 channels of satellite delivered television drivel.

Doom Update

It's one thing to see some crazy walking around with an The End Is Near poster, and another to read prophecies by guys whose past predictions have turned out to be on target…all telling us the same thing: The End Is Near! So how much is there to all this? Is there enough for you to worry about the safety of your family?

I've just finished updating my *Human Extinction Prophecies* book (#31 – $5), so the material is fresh in my mind. I've also just finished writing a booklet which explains how and why dowsing works, citing the scientific research supporting every step in my explanation. As far as I know, and I know pretty far, no one has figured this out before. This is *Dowsing* (#84 – $2).

Yes, dowsing really does work. Yes, there's solid scientific data supporting it. A good dowser can find anything, or anybody anywhere. And yes, prophecy is also on proven scientific ground—once you put the pieces of the puzzle together.

Most of the scientific data has been cited in books I've reviewed in my editorial essays, and are also reviewed in my *Secret Guide to Wisdom* (#02 – $5).

By the time you've read Chris Bird's *Secret Life of Plants*, *Secrets of the Soil*, and his *The Divining Hand*, you'll begin to see the parts of the puzzle coming together. Then read Stone's *The Secret Life of Your Cells;* Boone's *Kinship of All Life;* and Sheldrake's book on morphic resonance, *The Presence of the Past*.

Well, just as people who've read my *Secret Guide to Health* (#05 – $10) now understand that the *only* reason they get any sickness is because they are putting poisons into their body which are impairing their immune system and are unable through force of habit to stop poisoning themselves, even though the alternative is a slow, painful death—coming to grips with the possibility of the predicted coming earth changes to protect one's self and family will also mean major lifestyle changes. The option is to die, along with almost everyone else.

Are you willing to bet your family's life that Nostradamus, Edgar Cayce, Albert Einstein, Charles Hapgood, Ed Dames, Gordon Michael Scallion, the ancient Incas and Maya, are *all* wrong? Oh yes, add Chet Snow and David Jacobs too.

Their unanimity of prophecy has to do with a soon-to-come and very sudden pole shift. Paleontologists tell us that this has been happening about every 14,500 years. Guess what! The last pole shift was 14,500 years ago. We're talking 200 mph winds, mile-high waves wiping out every shoreline city in the world, and re-arranging the continents as the tectonic plates are suddenly shifted. Earthquakes, volcanoes, the works.

Nostradamus and Edgar Cayce both predicted that about 3% of humanity will survive. Chet Snow's research (*Mass Dreams of the Future*) agrees with their estimate.

If you're willing to bet your family's life that these guys are all wrong, then you don't need to worry about it and turn to the newspaper sport pages. It's best you don't read my updated book. However, if you want my advice on how your family can survive the next few years, read my book.

One key element will be your ability to get on the air

Continued on page 58

Big Savings on Radio Scanners

Uniden® NEW! SCANNERS

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.

Our Bearcat TrunkTracker BC245XLT, is the world's first scanner designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS and EDACS® analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. Our scanner offers many new benefits such as Multi-Track - Track more than one trunking system at a time and scan conventional and trunked systems at the same time. 300 Channels - Program one frequency into each channel. 12 Bands, 10 Banks - Includes 12 bands, with Aircraft and 800 MHz. 10 banks with 30 channels each are useful for storing similar frequencies to maintain faster scanning cycles or for storing all the frequencies of a trunked system. Smart Scanner - Automatically program your BC245XLT with all the frequencies and trunking talk groups for your local area by accessing the Bearcat national database with your PC. If you do not have a PC simply use an external modem. Turbo Search - Increases the search speed to 300 steps per second when monitoring frequency bands with 5 KHz. steps. 10 Priority Channels - You can assign one priority channel in each bank. Assigning a priority channel allows you to keep track of activity on your most important channels while monitoring other channels for transmissions. Preprogrammed Service (SVC) Search - Allows you to toggle through preprogrammed police, fire/emergency, railroad, aircraft, marine, and weather frequencies. Unique Data Skip - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. Memory Backup - If the battery completely discharges or if power is disconnected, the frequencies programmed in your scanner are retained in memory. Manual Channel Access - Go directly to any channel. LCD Back Light - An LCD light remains on for 15 seconds when the back light key is pressed. Autolight - Automatically turns the backlight on when your scanner stops on a transmission. Battery Save - In manual mode, the BC245XLT automatically reduces its power requirements to extend the battery's charge. Attenuator - Reduces the signal strength to help prevent signal overload. The BC245XLT also works as a conventional scanner. Now it's easy to continuously monitor many radio conversations even though the message is switching frequencies. The BC245XLT comes with AC adapter, one rechargeable long life ni-cad battery pack, belt clip, flexible rubber antenna, earphone, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, ESAS or LTR systems. Hear more action on your radio scanner today. Order on-line at www.usascan.com for quick delivery.

More Radio Products

Save even more on radio scanners when purchased directly from CEI. Your CEI price after instant rebate is listed below:

Bearcat 895XLT 300 ch. Trunktracker I base/mobile scanner	$179.95
Bearcat 780XLT 500 ch. Trunktracker III base/mobile	$339.95
Bearcat 278CLT 100 ch. AM/FM/SAME WX alert scanner	$159.95
Bearcat 245XLT 300 ch. Trunktracker II handheld scanner	$189.95
Bearcat 248CLT 50 ch. base AM/FM/weather alert scanner	$89.95
Bearcat Sportcat 200 alpha handheld sports scanner	$169.95
Bearcat Sportcat 180B handheld sports scanner	$149.95
Bearcat 80XLT 50 channel handheld scanner	$99.95
Bearcat 60XLT 30 channel handheld scanner	$74.95
Bearcat BCT7 information mobile scanner	$139.95
AOR AR8200 Mark II Wide Band handheld scanner	$539.95
AOR AR16BQ Wide Band scanner with quick charger	$209.95
ICOM ICR8500 wideband communications receiver	$1,469.95
ICOM PCR1000 computer communications receiver	$379.95
ICOM R10 handheld wideband communications receiver	$279.95
Uniden WX100 Weather Alert with S.A.M.E. feature	$49.95

AOR

AOR® AR8200 Mark IIB Radio Scanner

AOR8200 Mark IIB-A wideband handheld scanner/**SPECIAL $539.95**

1,000 Channels • 20 banks • 50 Select Scan Channels
PASS channels: 50 per search bank + 50 for VFO search
Frequency step programmable in multiples of 50 Hz.
Size: 2$^{1/2"}$ Wide x 1$^{3/8"}$ Deep x 6$^{1/8"}$ High

Frequency Coverage:
500 KHz to 823.995 MHz, 849.0125-868.995 MHz, 894.0125-2,040.000 MHz
(Full coverage receivers available for export and FCC approved users.)

The AOR AR8200 Mark IIB is the ideal handheld radio scanner for communications professionals. It features all mode receive: WFM, NFM, SFM (Super Narrow FM), WAM, AM, NAM (wide, standard, narrow AM), USB, LSB & CW. Super narrow FM plus Wide and Narrow AM in addition to the standard modes. The AR8200 also has a versatile multi-function band scope with save trace facility, twin frequency readout with bar signal meter, battery save feature with battery low legend, separate controls for volume and squelch, arrow four way side rocker with separate main tuning dial, configuarable keypad beep/illumination and LCD contrast, write protect and keypad lock, programmable scan and search including LINK, FREE, DELAY, AUDIO, LEVEL, MODE, computer socket fitted for control, clone and record, Flash-ROM no battery required memory, true carrier re-insertion in SSB modes, RF preselection of mid VHF bands, Detachable MW bar aerial. Tuning steps are programmable in multiples of 50 Hz in all modes, 8.33 KHz airband step correctly supported, Step-adjust, frequency offset, AFC, Noise limited & attenuator, Wide and Narrow AM in addition to the standard modes. For maximum scanning pleasure, you can add one of the following optional slot cards to this scanner: CT8200 CTCSS squelch & search decoder $89.95; EM8200 External 4,000 channel backup memory, 160 search banks. $69.95; RU8200 about 20 seconds chip based recording and playback $69.95; TE8200 256 step tone eliminator $59.95. In addition, two leads are available for use with the option socket. CC8200 PC control lead with CD Rom programming software $109.95; CR8200 tape recording lead $59.95. Includes 4 1,000 mAh AA ni-cad batteries, charger, cigar lead, whip aerial, MW bar antenna, belt hook, strap and one year limited AOR warranty. Enter your order now at http://www.usascan.com.

Buy with Confidence

Order on-line and get big savings

For over 32 years, millions of communications specialists and enthusiasts worldwide have trusted Communications Electronics for their mission critical communications needs. It's easy to order. **For fastest delivery, order on-line at www.usascan.com.** Mail orders to: Communications Electronics Inc., P.O. Box 1045, Ann Arbor, Michigan 48106 USA. Add $20.00 per radio transceiver for UPS ground shipping, handling and insurance to the continental USA. Add $13.00 shipping for all accessories and publications. For Canada, Puerto Rico, Hawaii, Alaska, Guam, P.O. Box or APO/FPO delivery, shipping charges are two times continental US rates. Michigan residents add sales tax. No COD's. Your satisfaction is guaranteed or return item in unused condition in original packaging within 61 days for refund, less shipping, handling and insurance charges. 10% surcharge for net 10 billing to qualified accounts. All sales are subject to availability, acceptance and verification. Prices, terms and specifications are subject to change without notice. We welcome your Discover, Visa, American Express, MasterCard, IMPAC or Eurocard. Call anytime 1-800-USA-SCAN or 800-872-7226 to order toll-free. Call 734-996-8888 if outside Canada or the USA. FAX anytime, dial 734-663-8888. Dealer and international inquiries invited. Order your radio scanners from Communications Electronics Inc. today at www.usascan.com.

For credit card orders call

1-800-USA-SCAN

e-mail: cei@usascan.com

www.usascan.com

PO Box 1045, Ann Arbor, Michigan 48106-1045 USA
For information call 734-996-8888 or FAX 734-663-8888

COMMUNICATIONS ELECTRONICS INC.™
Emergency Operations Center

Visit WWW.USASCAN.COM • 1-800-USA-SCAN

QRX . . .

continued from page 1

Mother-in-law = Woman Hitler
Snooze alarms = Alas! No more Z's
Alec Guinness = Genuine Class
Semolina = Is No Meal
A Decimal Point = I'm a Dot in Place
The Earthquakes = That Queer Shake
Eleven Plus Two = Twelve Plus One

From the Sept. 1998 issue of Feedback, *the newsletter of the Johnson County RAC, Bill Eperson WBØCEF, Editor.*

UK Cell Phone Safety Campaign

The British government launched a high-priced package of safety precautions for cellular telephone users. The measures include $10 million for more research and disclosure of the radiation levels emitted by every phone model, and an audit of radio wave emissions from base stations.

Britain is the first country to embark on such a broad precautionary response to health concerns. Leaflets will summarize the safety research to date. They will note that experts have concluded that although no evidence exists that using a cell phone causes brain tumors or other ill effects, a health risk cannot be ruled out, particularly for children. For this reason the leaflets will advise that young children be discouraged from using the handsets of cellular phones at all times.

Leaflets and other materials will be distributed through phone retailers, doctors' offices, libraries, book, music and electronics retailers, post offices and supermarkets, according to UK Health Department officials. (Published news reports)

Thanks to Amateur Radio Newsline™, *Bill Pasternak WA6ITF, editor.*

Donations Wanted

The Pueblo Historical Aircraft Society (PHAS), Manager/Operator of the Pueblo (Colorado) Weisbrod Aircraft Museum, is seeking donations of airborne military radios and communications equipment from WWI, WWII, the Korean War, the Vietnam War, Desert Shield/Desert Storm, and the Cold War era.

The society is seeking these donations to compliment its display of 23 WWII and post-WWII aircraft in its new 30,000 sq. ft. hangar at the Pueblo Memorial Airport (approx. 6 miles east of Pueblo CO, on Highway 50 East).

The Pueblo Historical Aircraft Society is a non-profit organization, devoted to preserving and restoring the 23 vintage military aircraft in the museum. The Society's membership consists of military veterans and non-veterans.

All items donated to PHAS are income tax deductible and become the permanent property of PHAS. Items donated will be used to upgrade older displays and create new displays.

For more details or further information, contact Russ McGee (719) 542-2039, E-mail [wbØgsu@juno.com]; or Bill Pearce (719) 544-0691, E-mail [wØmwo@yahoo.com].

The Museum can be contacted at Pueblo CO, (719) 948-9219; fax (719) 948-2437; or by E-mail at [pwam@iex.net]. *Thanks to William G. Pearce, USNR (ret) WØMWO, Public Relations Director,Pueblo Weisbrod Aircraft Museum.*

Colorado Students Interview Astronaut via Ham Radio

Eight students from several schools in the Boulder CO area used ham radio to ask US astronaut Jim Voss about his experiences and activities aboard the International Space Station. The June 21 contact was arranged through the Amateur Radio on the International Space Station (ARISS) program.

Participants ranged from elementary school age through college, including one questioner who attends the University of Colorado in Boulder, Voss' alma mater. The students gathered at the home station of Bill McCaa KØRZ, in Boulder for the linkup, which lasted just over 10 minutes.

Students' curiosity ran the gamut from scientific to spiritual. One high schooler asked about how the lack of gravity affected Voss' sensation of balance.

"Actually, the fluids of your inner ear do change a little bit, but after a day or so, you're used to it — your eyes take over and you don't really feel like you're off balance or anything like that," Voss replied. Voss said the body adapts very quickly to space, "and you feel like you're right at home, whether you're upside down or right side up."

Another youngster asked Voss if being aboard the International Space Station made him "feel any closer to any heavenly body." Voss pointed out that the ISS was only a couple of hundred miles or so above Earth and that the view of the heavens wasn't that much different than from the ground. "I just feel further away from Earth," he said.

Voss told the students that he and his crewmates still can see the stars and planets, but they don't twinkle as they do on Earth because of the lack of atmosphere. More spectacular, he said, is the view of Earth from the ISS. "It is truly beautiful!" Voss exclaimed. Seeing Earth from space for the first time was "a very emotional experience," he said. He said the crew has been working to get the Canadian-built manipulator arm working properly and would be involved in the installation of a module that will serve as a launch platform for space walks.

Voss used the NA1SS call sign for the contact. Each student got to ask two questions. Questioners included at least two hams, 17-year-old Brian Bowman KCØFSO, and 12-year-old Emily Arthur KCØGIA.

Voss said he hoped to make it back to Boulder for an in-person visit after he returns to Earth.

Thanks to Bandbits, *the newsletter of the Peoria Area ARC, which took this from the* ARRL Letter, *Vol. 20, No. 25.*

The Greatest Generation

Tom Brokaw wrote the book entitled, *"The Greatest Generation."* If you haven't read it yet you should. This is my salute to those Americans who gave unselfishly to our country. It goes without saying that some gave the ultimate sacrifice.

A few issues back, — in *The Communicator* — I believe it was Lew Woodaman W1LEW, who wrote an article about the fantastic story of the *USS LST 325* and its return to the United States from Athens, Greece. I don't remember if Lew included the Web site or not, but I'm suggesting that you look at the site if you can, and read this remarkable story. The site includes the daily log from beginning to end of the journey. It is quite remarkable. Two men died during this ordeal, one before the end of the journey and one shortly after its return.

Bill Hart died after returning to US soil. (He made it to the airport.) Jack Carter died soon after returning with the ship. Jack was the Executive Officer of the *USS LST 325*, during the war and was a ham, KC6WYX. He used his ham experience by setting up a rig on board and used the call sign WW2LST.

These men (I counted 21 in the picture) are what the United States stands for. They are indeed the "Greatest Generation" and it's sad to know we are losing so many without hearing their stories.

One only has to read the daily obituaries to see what I mean. What a shame it is that we often don't know what this generation of men and women gave to us.

I would like to offer my time to anyone who would like to tell their story or knows of someone whose story should be told.

Also, I would like to ask everyone who reads this, to answer the following question: When was the last time you saluted the flag at a parade? I mean taking the time to remove your hat or placing your hand over your heart whenever a flag passes in a parade.

I believe it was a 4th of July parade. I had become lazy like many other people, and didn't bother to salute at parades. This four-year-old little girl asked me why I wasn't saluting like some of the others. I didn't have an answer. From that day on, I have saluted without fail. I now have grandchildren and hope someday to teach them to salute ... without fail. Just like what THEY did ... without fail.

Try it and see if it doesn't bring back that pride we all learned either in the Boy/Girl Scouts or maybe in school. It's the least we can do for those that showed the most they can do.

That Web site is [www.palosverdes.com/1st887/1st325.html].

(I put it all in and I know it's long, but you may need it all to make it work?)

Happy saluting all!

Thanks to Jack Severance KB1GQP, via the July 2001 issue of The Communicator, *monthly newsletter of the Central New Hampshire ARC.*

Emergency Service Honored by Newspaper

The Central Ohio Amateur Radio Emergency Service has won the Community Service Award from *The Columbus Dispatch,* Ohio's second-largest daily newspaper. The award — the newspaper's top public service recognition — includes a plaque and $500. The local ARES group was honored for its participation in more than 60 events annually in Franklin County. Accepting the award was COARES President Bill Carpenter AA8EY, who's also Franklin County Emergency Coordinator. "When they came to the public service groups, I was more than surprised we had won," said Carpenter, "but the honor goes to the 300 ham radio members who make this award and recognition an actuality for COARES." Carpenter says his team logged more than 6,000 hours of events work last year, mostly public service events. "We help area charities raise more than $1,000,000 annually," he said.

TNX NOARS LOG, *newsletter of the Northern Ohio Amateur Radio Society, May, 2001.*

ARES Responds to Jacksonville Fire & Rescue Communications Outage

May 13th was a routine Sunday for the Jacksonville Fire & Rescue Division (JFRD), until a pipe burst near the Central Dispatch Center downtown. Escaping water flooded critical equipment used to handle JFRD radio communications and to process incoming priority calls to JFRD being relayed from the main 911 call center at the Jacksonville Sheriff's Office (JSO).

The Jacksonville Sheriff's Office is located about eight blocks from the JFRD Central Dispatch Center. All 911 calls from those seeking emergency assistance are screened by JSO operators. Calls requiring deployment of JFRD resources then are relayed to the JFRD dispatch center. This JFRD/JSO relay link and the entire JFRD radio system went out of service around 6 p.m. Sunday.

Technicians from the City of Jacksonville Communications Division responded quickly to restore limited communications capability to JFRD dispatchers so that fire engines and fire stations could be linked. Most units countrywide were shifted to a single UHF repeater normally used for medical messages.

But the link between JSO and JFRD was expected to be out of service for several additional hours until repairs were completed. While a citizen's ability to communicate with the main 911 call center never was interrupted, the outage of the JSO/JFRD link could have caused delays in getting fire personnel and equipment underway.

At 8 p.m., JFRD officials contacted the Duval County Amateur Radio Emergency Service through Emergency Coordinator Miller Norton N4RYX. Ten hams were requested to report to the JFRD dispatch center. Miller sent members of the Amateur Radio Quick Response Team (QRT). Most arrived for duty within 30 minutes.

A direct amateur radio link was established between JSO and JFRD. Repeaters used during the response were the W4IZ 146.7/444.4 MHz system and the RANGE 146.76 MHz repeater. With an amateur radio operator serving as control operator on each end, JSO and JFRD dispatchers used the 146.76 MHz repeater to pass messages concerning 911 calls. When the main 911 call center at JSO received a request for emergency assistance involving JFRD, the request was relayed via amateur radio for almost 3 hours.

By 1:30 a.m. Monday, the JFRD/JSO link had been restored and the hams were able to leave. N4RYX reports that 21 hams responded or were involved in the effort. Those participating included General Dailey KD4VVZ, Travis Maclay N4TJM, Al Elmore W4FHP, Bill Sander KA4OBP, Don Ferris W4JSO, Steve Barber WA4B, Stephanie Barrett KF4FDN, Sandy Ingle KG4CQK, Robert Selph W4RCS, Ben Meyer KB3AMT, Lewis Jolly W4LTJ, Menard Norton KE4IOR, Robert Fife W4JFD, Jay Humphrey KF4RGU, and John Reynolds W4IJJ.

Thanks to the North Florida Amateur Radio Society's Balanced Modulator, *July-August 2001.*

Morse Code Test Changes

The National Conference of Volunteer Examiner Coordinators wants to remind you that a new set of Morse code testing standards went into effect July 1st.

The new exams use a system called the Farnsworth character spacing. This means that exams will be at 5-wpm but the spacing of the dits and dahs will be in the 13-wpm range.

The way applicants answer test questions has also changed.

For many years a multiple choice system had been utilized, but on July 1st a fill-in-the-blank arrangement took its place. This means that guessing at an answer will less likely be accurate.

The decision by the NCVEC to change Morse testing procedures came as a result of the December 1999 decision to restructure the United States Amateur Radio Service. At that time the government dropped both the 13- and 20-wpm Morse proficiency exams and ordered that a 5-wpm test be the only CW requirement for licensing in the U.S. and its possessions. (NCVEC)

Thanks to the National Conference of Volunteer Examiner Coordinators, via Newsline, *Bill Pasternak WA6ITF, editor.*

Dedicated to my Father

Back in 1954
I was puzzled about what I'd have in store
For while other girls mixed a cake at the table
I sat there working with wires and cable
While the kids outside played with dolls and toy pistols
We spent our Sunday with tubes and crystals
The soldering iron burned so much!
I was too young to know not to touch
But I'll never forget that day, the way
My Elmer kissed the pain away
He taught me the code and what's a diode
And hoped I'd reap the benefits of what he sowed
My brothers explained a volt and transistor
To their curious but resistant little sister
We'd take the train to Cortland Street
'Cause that's where all the hams would meet
And even though I'd whine and mope
I learned to use an oscilloscope!
For those who have a similar story
And hold the hobby in their glory
Look at your rig, antenna and bug

Continued on page 58

LETTERS

From the Ham Shack

Norm VK5GI. Hi, Wayne!

Phew! OK, second one first. Include in the mag things for (don't hit me!) CBers, shortwave listeners, even for pirate radio operators (no I don't condone it, but it will improve the circulation figures!), and articles on radio and electronics Web pages. I think that the U.S. has a form of broadcasting license for low-power FM stations, so how about an article on putting our expertise to work and setting up small FM stations for isolated areas. Just a thought. Bring in the CBers and those who use radios for 4WDing. You won't lose ham readers, but you will sure gain other readers.

One of the best things I ever bought was an old FRG-7 at a swap-meet, for 50 bucks five years ago — widened my horizons no end. QRP is enjoying a renaissance — get Dave Ingram or Ade Weisse or George Dobbs or Peter Parker or Drew Diamond (see Web pages for these guys!) on-side and show the kids how to make receivers for almost no cost but a lotta fun; and us licensed hams how to make one-transistor transceivers and linear amps from one power transistor. I'd really, REALLY like to know how to make a 10-gig transceiver from the motion detectors (I have two — I only need someone to show me how!). If I had the money, I'd send a subscription of the mag to the science club at the local high school. Oh, Wayne — I could go on all night …

Number two: How to get folks off their butts to start living a healthy life style. Here we are going to be shoveling it uphill I fear. As for me, my wife and I did the drastic and at nearly 60 years young moved to an acre of paradise out in the donga where I can grow my own veggies and raise my chooks as well as run my desktop publishing business. I do work for the local area which is rural, wine and olive growing. Truly I have NEVER in my life felt better, and bear in mind that I was born in a bomb shelter during one of the frequent visits by the Luftwaffe over Liverpool! Your editorials, Wayne, are really inspirational and mean a lot to me. Keep on keeping on!! God bless!

Hal Williams N6TZ. I agree with Roger G3LDI, but the facts are that there will never be a return to the "good ol' days." It is sad, and I must say that my earlier days of ham radio were very much more formal, mysterious, and romantic. Tuning up and down between 14.100 and 14.200 in the "foreign" portion of the band yielded many interesting, intelligent conversations from great countries. Today, a quick exchange of QSL info and S-9+ reports is about it. Maybe it was a characteristic of simpler times, for it appears to me that we do not feel the same warmth and reward in life that we enjoyed 50 years and more ago. Today, the youth does not seem to find lasting feelings and relationships in leisure interests or romantic relationships. Most of these areas seem to be caught up in an attitude of a "Let's do this one and move on" approach. I almost wonder if the whole world has developed symptoms of Attention Deficit Disorder. Maybe I am the one "out to lunch," but in conversations with a few of the people who will take the time to discuss this, I find that I am not alone.

One of the reasons I got so excited about RTTY was that suddenly I was in contact with hams who were interested in discussing ideas instead of a recitation of their rig and antenna. 73, Hal. I've been on the air for over 60 years and, outside of those RTTY contacts, I've had dozens of very interesting QSOs. — out of tens of thousands. — Wayne.

Mike Kuehl, Rhinelander WI. I enjoy your mag!

Yours truly is in the process of getting a re-tread in that I had a ticket in the 60s and let it expire. Stupid move. A thousand lashes with a wet egg noodle please. So here I am playing catch-up on 30-plus years of progress, and I hate what has happened to the art as much as I hate hearing loud rap music blaring from the open windows of four-wheeled boom boxes.

The homoginized/pasturized version of today's typical ham is a far cry from the past as I see it. Get yourself a compact 100-watt transceiver and you're on the air with a bundle of solid-state cum state-of-the-art "stuff." Sure, you need a license to fire it up into something other than a dummy load, but then what? Unless you're some kind of computer geek who doesn't care if he voids the warrantee by tinkering with the guts, that's it. What you see is what you get, and you're stuck with it! Oh, for the good old boat-anchor days when between the transmitter and receiver, a station would weigh in at 200 pounds or more!

OK, I admit it. I'm a closet tube-freak, and far more often than *CQ* or *QST, 73* actually has articles on building tube gear. Cheers, and give me more! Take for example Charles Solomon's Junk Box 10-meter linear as shown in the August 2000 issue, using a pair of my favorite jugs, 807s. I can picture firing that pup up at 29.05 with a 2-state 6L6 CW exciter and modifying it with an AM modulator. Because I'm also a recording engineer / 40-year radio announcer vet, and have my own studio, I'll lash up a few processors in the audio chain and let fly. Bet my sound beats yours, and it will be a lot better than any single-sidewinder transceiver on the market watt for watt!

I'd like to hear from any old-timers out there, espcially those who are into AM (E-mail [mike_kuehl_sr@yahoo.com]). And if you have any transmitter diagrams from the mid 50s to mid 60s from any source, particularly in the under 350 watt class, I'd love to get some copies. Ditto any parts, especially coils and transformers, including mod, power and interstage. I'd give them a loving home.

Once I get that ticket back, it will be goodbye to the new-fangled, solid-state digital crap and go back to my roots. By the way, nobody better have the call sign K9ZSL! Listen for me in the future, I WILL QSL. Then you can ask me how I got an AM station to sound so good.

Len Fazio WA2IHI. I gave the first set of silver wires I got from you to a friend who was always catching every bug going around. Not any more! When I first got the silver wires I cured a simple ear infection. I'd had the same infection with my other ear a few weeks earlier. The doctor prescribed antibiotics ($60!), and it took a week to cure. Using silver colloid ear drops and drinking a few glasses of home-made silver colloid cured the second ear infection in three days! No wonder the FDA finally banned it, even for veterinary use!

This stuff seems to be the DUZ of the medical world — an antibiotic that microbes can't adapt to, and it costs almost nothing to use. — Wayne. 73

LOW NOISE PREAMPS

LNY-( ) ECONOMY PREAMP ONLY $29/w&t

- Miniature MOSFET Preamp.
- Low noise figure.
- *Available* for various bands from 28 to 450 MHz.

LNK-( ) PREAMP

ONLY $59/w&t

Low noise LNY-type preamp in alum case w/ BNC jacks.

LNP-( ) PRESELECTOR ONLY $39/w&t

- Eliminate intermod!
- Sharp 3-section filter
- Low noise preamp
- Available for bands from 137 to 170 MHz.

R121 AVIATION RECEIVER

- Exciting new AM receiver for the 118-137 MHz aircraft band.
- Ideal for monitoring at airports.
- Allows pilot control of runway lighting.
- ELT monitor to detect and locate downed aircraft.
- Dip switch frequency selection.
- Superior sensitivity and selectivity.

R121 Receiver module wired/tested **$209**
R121 Receiver in cabinet (see website)..... **$299**

WEATHER FAX RECEIVER

Join the fun. Get striking Images directly from the weather satellites!

A very sensitive wideband fm receiver **optimized for NOAA** APT & Russian Meteor **weather fax** on the 137MHz band.

Covers all 5 satellite channels. Scanner circuit & recorder control allow you to automatically capture signals as satellites pass overhead, even while away from home.

- **R139 Receiver Kit** less case **$159**
- **R139 Receiver Kit** with case and ac power adapter. **$189**
- **R139 Receiver w/t** in case with ac power adapter.... **$239**
- Internal PC demodulator board & imaging software.. **$289**
- Turnstile Antenna **$135**

WEATHER ALERT RECEIVER

A sensitive and selective professional grade receiver to monitor critical NOAA weather broadcasts. Good reception even at distances of 70 miles or more with suitable antenna. No comparison with ordinary consumer radios!

Automatic mode provides storm watch, alerting you by unmuting receiver and providing an output to trip remote equipment when an alert tone is broadcast. Crystal controlled for accuracy; **all 7 channels** (162.40 to 162.55).

RWX Rcvr kit, PCB only **$79**
RWX Rcvr kit with cabinet, speaker, & AC adapter **$99**
RWX Rcvr wired/tested in cabinet with speaker & adapter **$139**

WWV RECEIVER

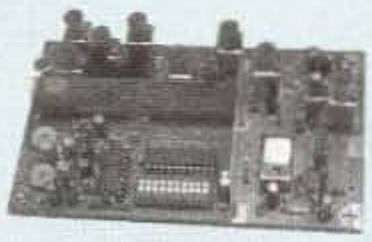
Get time & frequency checks without buying multiband hf rcvr. Hear solar activity reports affecting radio propagation. **Very sensitive and selective** crystal controlled superhet, dedicated to listening to WWV on 10 MHz. Performance rivals the most expensive rcvrs.

- **RWWV Rcvr** kit, PCB only **$59**
- **RWWV Rcvr** kit with cabt, spkr, & 12Vdc adapter **$89**
- **RWWV Rcvr** w/t in cabt with spkr & adapter **$129**

HIGH QUALITY VHF & UHF EXCITER & RECEIVER MODULES

FM EXCITERS:

Rated for continuous duty, 2W continuous duty output.



T301 Synthesized VHF Exciter: for various bands 139-174MHz, 216-226 MHz. Dip switch freq. setting.

- Kit (ham bands only) (TCXO option $40)..... **$109**
- Wired/tested, incl TCXO..... **$189**

T304 Synthesized UHF Exciter: for various bands 400-470 MHz.

- Kit (440-450 ham band only) incl TCXO **$149**
- Wired/tested **$189**

CRYSTAL CONTROLLED:

- **TA51:** for 6M, 2M, 220 MHz ..... **kit $99, w/t $169**
- **TA451:** for 420-475 MHz. ..... **kit $99, w/t $169**
- **TA901:** for 902-928 MHz, (0.5W out)..... **w/t $169**

VHF & UHF POWER AMPLIFIERS:

Output levels from 10W to 100W..... **Starting at $99**

FM RECEIVERS:

Very sensitive *– 0.2µV.*
Superb selectivity, *>100 dB down at ±12 kHz, best available anywhere, flutter-proof squelch.*

R301 Synthesized VHF Receiver: various bands 139-174MHz, 216-226 MHz.

- Kit (ham bands only) (TCXO option $40) ..... **only $139**
- Wired/tested (incl TCXO) **$209**

R304 Synthesized UHF Receiver: various bands 400-470MHz.

- Kit (440-450 ham band only) (incl TCXO) **$179**
- Wired/tested **$209**

CRYSTAL CONTROLLED:

- **R100** for 46-54, 72-76, 140-175, or 216-225 MHz. . ..... **kit $129, w/t $189**
- **R144** Like R100, for 2M, with helical resonator in front end ..... **kit $159, w/t $219**
- **R451** for 420-475 MHz. ..... **kit $129, w/t $189**
- **R901** for 902-928MHz ..... **kit $159, w/t $219**

CTCSS TONE ENCODER/DECODER

Access all your favorite closed repeaters!

- **Encodes** all standard subaudible tones with crystal accuracy and convenient DIP switch selection.
- **Decoder** can be used to mute receive audio and is optimized for installation in repeaters to provide closed access. High pass filter gets rid of annoying rcvr buzz.

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

TRANSMITTING & RECEIVING CONVERTERS

No need to spend thousands on new transceivers for each band!

- **Convert vhf and uhf signals to & from 10M.**
- Even if you don't have a 10M rig, you can pick up very good used xmtrs & rcvrs for next to nothing.
- **Receiving converters** (shown above) available for various segments of 6M, 2M, 220, and 432 MHz.
- Rcvg Conv Kits from $49, wired/tested units only $99.

- **Transmitting converters for 2M, 432 MHz.**
- Kits only $89 vhf or $99 uhf.
- Power amplifiers up to 50W.

Get more features for your dollar with our REP-200 REPEATER

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

- ***kit still only $1095***
- ***factory assembled still only $1295***

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

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

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

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

You'll KICK Yourself If You Build a Repeater Without Checking Out Our Website First!

Hamtronics has the most complete line of modules for making repeaters. In addition to exciters, pa's, and receivers, we offer the following controllers.

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

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

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

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

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

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

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

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

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

HANDY FREQUENCY COUNTERS

Pocket sized, but lab quality! 3GHz bandwidth, 1ppm accuracy, very affordable. NiCd battery, ac adapter/charger, rugged black anodized aluminum case. Telescoping whip antenna and great sensitivity allow measurements even from a distance.

Three models with prices from $99 to $219. All go up to 3 GHz. Some go as low as 10 Hz with noise filters and other advanced features.
See our website for details.

Hamtronics, Inc.

65 Moul Rd; Hilton NY 14468-9535

Ph: 716-392-9430; Email: sales@hamtronics.com

See special offers and view or download complete catalog on our web site

hamtronics.com

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

The Cheapest Supplies Ever

Why not put a surplus computer PS to work in your shack?

Reader Bill Brown W4OUK requested an article about computer power supplies for ham use. He is currently using a computer supply to operate his equipment, and feels that others may benefit from the suggestion.

He also commented about the increasing availability of power supplies as computers are being scrapped out. Being ingenious people, hams will most likely find applications for computer power supplies, not to mention maybe even use one as an automobile battery charger.

Thanks for the idea, Bill — let's share a little know-how.

Hams have been building and using power supplies since the beginning of time, or so it seems. All have been of the heavy iron linear type providing the well-filtered and clean DC power for radio equipment that hams have become dependent upon for powering their ham gear. Weak signal operations in ham radio communications require the lowest possible noise level that you can achieve.

Along came computers with inexpensive and lightweight power supplies. To obtain the light weight, the power supply was redesigned from a heavy iron type to that of a high power switcher. Switching power supplies are really high power oscillators operating at frequencies in the 2–50 kHz band. Because of the high power switching mode, noisy switching transients are generated that can cause a lot of radio frequency interference problems.

Having worked with switching power supplies over the years, I felt that some investigation was in order before suggesting that computer power supplies are suitable for "all" ham applications. I worked up a list of concerns as topics to investigate as indicated by the following:

- Available power output at 12 volts
- Load curve vs. voltage output
- Heat rise vs. load
- Sustained vs. intermittent power output
- EMI/RFI noise
- Voltage regulation
- Minimum supply load requirements
- Variable vs. fixed load characteristics
- Raising the 12 V output to 13.5 V

Although some of the concerns overlap, spelling them out provides "food for thought" and opens the door for an investigation. But by no means is the list complete, and it behooves any ham using a switching power supply

Power rating	+3.3 V	+5 VSB	+5 V	+12 V	–5 V	–12 V	+24 V
110 W		0.5 A	4 A	2 A	0.3 A	0.3 A	2.3 A
150 W			4 A	2 A	0.3 A	0.25 A	
165 W			15 A	6.3 A	0.8 A	0.8 A	
185 W	12 A		18 A	6 A	0.15 A	0.15 A	
200 W ATX	11 A	0.75 A	13 A	8 A	0.5 A	0.5 A	
230 W			23 A	9 A	0.5 A	0.5 A	
230 W ATX	12 A	0.75 A	16 A	9 A	0.5 A	0.5 A	
250 W	14 A	0.8 A	18 A	9 A	0.5 A	0.5 A	
250 W ATX	14 A	0.75 A	18 A	9 A	0.5 A	0.5 A	

Table 1. *Chart showing the output voltages and currents for several typical computer power supplies.*

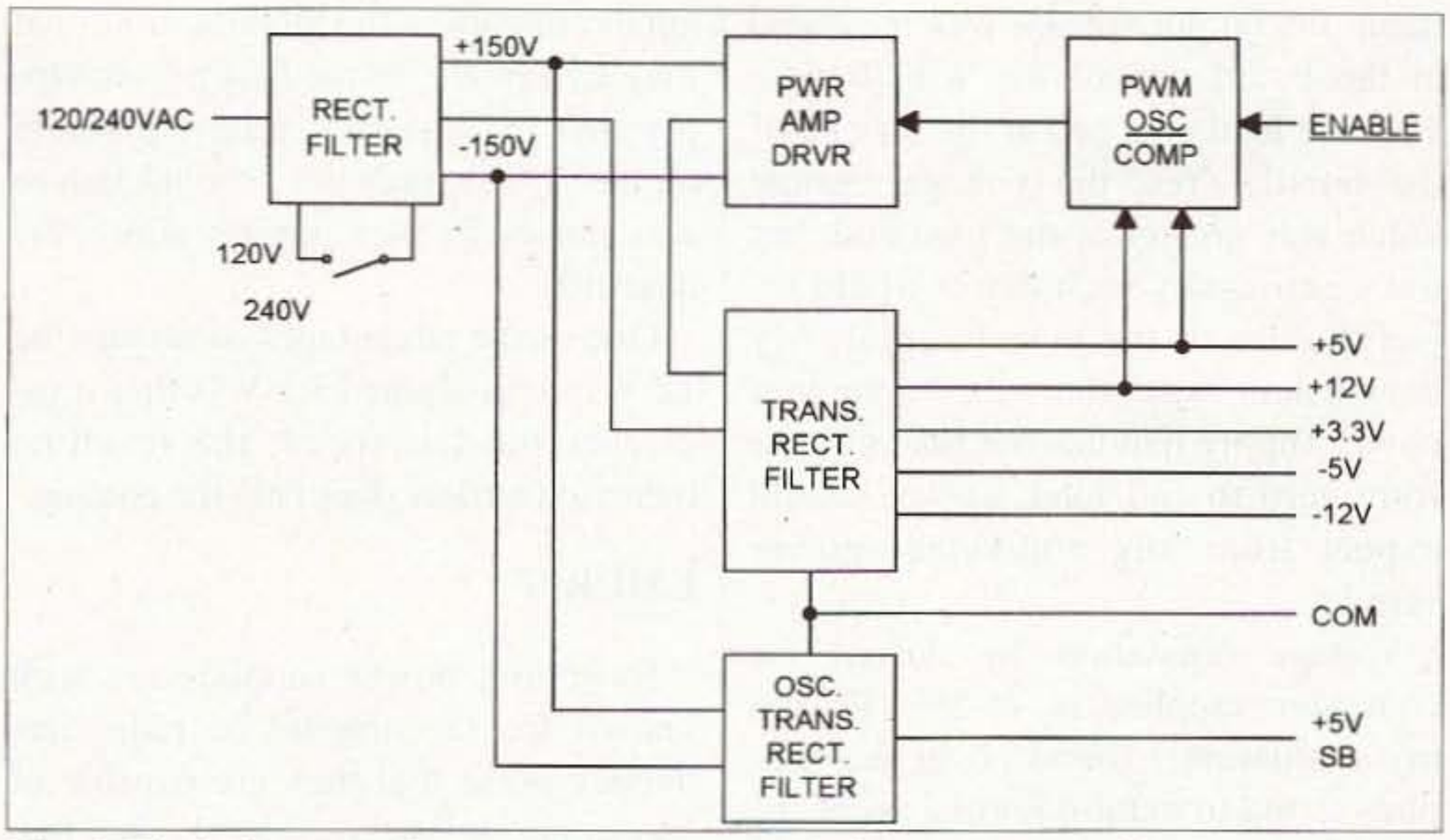


Fig. 1. Block diagram of a type ATX computer switching power supply.

to perform some experimentation to ascertain the suitability for the intended application.

It is my intention to address each of the above concerns as objectively as possible so that you, as a user, can make a judgment as to the suitability of the power supply for your application. My focus will be primarily on the 12 V output as it is the most logical source for powering ham gear.

Labeled power marking

With the wide variety of power supplies available, a ham has to choose one that will provide the desired output power. Most of the later-model power supplies are rated in the 180–300 W range, but since most ham radio equipment requires 12 VDC, only the 12 V output from the computer supply will typically be used. The label on the power supply provides a clue as to the total amount of power that the supply is capable of providing, but the 12 V output power is less. The average supply will provide 6 A at 12 V, which is 72 W out of the total of perhaps 200 W. Therefore, the usable 12 V output from the supply is 72 W regardless of the total power value marked on the label. The limiting factors involve the wire in the power transformer and the rectifiers used for the 12 V circuit. The chart shown in **Table 1** lists the voltage and current for several typical power supplies.

A block diagram of a typical switching power supply is shown in **Fig. 1** along with the wire color convention (**Table 2**) used on the later power supplies.

When using the power supply to power any piece of equipment outside of the computer, the connectors should be removed so that the wires of like color can be bundled for maximum current handling. Of primary concern are the yellow 12 V wires and the black ground wires. Voltage regulation is done on the board, not at the ends of the wires where it would be preferred. The objective of bundling the wires is to reduce the voltage drop between

Continued on page 12

+3.3 V	Orange	High current
+5 V	Red	High current
+12 V	Yellow	High current
+5 VSB	Purple	Standby — low current
–5 V	White	Low current
–12 V	Blue	Low current
COM	Black	Common — ground
PS-ON	Green	PS enable — ground to turn on PS*
PS-OK	Gray	Goes high when PS is "ready"
+3.3 V	Brown	3.3 V sense

*Table 2. Chart of typical wire colors and functions for computer power supplies. *When used, the green wire must be switched to ground to enable the power supply.*

	(A)	(B)	(C)
	Normal ATX	Voltage Raised	
I load	Eo	Eo	Eo
0 Amps	12.31	13.94	13.89
0.5	12.23		
1.0	12.20	13.76	13.51
1.5	12.16		
2.0	12.13	13.60	
2.5	12.10		
3.0	12.08	13.45	
3.5	12.06		
4.0	12.04	13.30	13.36
4.5	12.00		
5.0	11.98	13.15	
5.5	11.96		
6.0	11.93	13.04	13.30
6.5	11.91		
7.0	11.88	12.92	13.25
7.5			
8.0		12.85	
8.5			13.18
9.0		12.85	

Table 3. Regulation response of three different power supplies as a function of a varying load. Supplies B and C had the 12 V output raised to nearly 14 V.

The Cheapest Supplies Ever

continued from page 11

the power supply board and the using circuit.

Load curve

NOTE: ATX and some later-model power supplies have a stand-by mode. The green wire must be switched to ground to enable the supply.

Table 3 shows data for a load test that I performed on one ATX power supply before the voltage was raised to 13.5 V, and for two other supplies after raising the output voltage.

Since most ham equipment operates in the 12.6-14.7 V range, I chose to raise the supply voltage to something close to 13.5 V to evaluate the load voltage vs. load current conditions in a manner similar to how the supply might be used by a ham.

To obtain a more consistent measurement, the output voltage was measured at the board end of the wire bundle with the load attached at the far end of the bundle. Yes, the voltage change value was greater at the load end, but not significantly such that it would reject the use of the power supply. My conclusion was that the computer power supply handles the load change from zero to full load, as one would expect from any equivalent power supply.

Voltage regulation by design for computer supplies is +/–5%. During my evaluation I found all of the supplies tested to exhibit regulation of the 12 V output to something closer to 1% (one volt out of 12) or better over a zero to full load variation.

Heat rise and sustained load

One of my early concerns about a computer power supply was the heat rise within the switching transistors as function of load. To monitor the temperature, I mounted a thermocouple onto the metal heatsink and watched the temperature variations as the power supply load was varied. A fairly long fully loaded heat rise test was performed on three power supplies, each with the 12 V output loaded to maximum indicated current. The results were interesting to say the least.

One power supply had previously been repaired and the switching transistors had been replaced with some that worked OK, but weren't designed for switching applications. As a result, the transistor Vsat (voltage across the transistor at saturation) was a little too high, allowing the transistors to develop a lot of heat. During the heat rise test, the heatsink hit about 150°F and thermal runaway began. It hit 200°+ before I could shut down the power. Replacing the transistors with the proper devices solved the heating problem.

Once the first supply was repaired, all three supplies used in the load test held a heatsink temperature of 75-80F° regardless of the load imposed on the 12 V output.

But let me point out an important thing that I observed during the load and heat rise test phase. The cooling fans used in computer power supplies appear to vary in the amount of air that they will move. In the first power supply that had the switching transistors replaced, I suspect the original failure was caused by poor airflow across the heatsink.

One of the advantages of raising the 12 V line to about 13.5 V is that it increases the fan speed; the resulting increased airflow does help the cooling.

EMI/RFI

Switching power supplies are well known for the amount of radio frequency noise that they are capable of producing. If you consider the fact that a 250 W switching power supply is in reality the equivalent of a 250 W transmitter in a small box, then the amount of noise emitted might be acceptable. But when you want "clean" power out of the power supply, your desire is to have the least amount of noise possible from the power supply. In other words, you want pure DC power, not DC power with a high AC ripple riding on the DC.

Computer power supplies were designed to meet Part 15 of the FCC regs and they most likely do. Unfortunately, I am not equipped to make an objective evaluation as to whether they meet Part 15, but did perform some subjective tests to see what I could determine.

My tests were made using two techniques involving a "voltage probe" and a "multiturn pickup loop." The loop is equivalent to a magnetic pickup probe. The voltage probe was an oscilloscope probe with the tip insulated. Each probe was connected to a spectrum analyzer with a sensitivity of 0.5 µV and capable of "looking" at signals from 30 kHz to 2 GHz.

The voltage probe technique worked OK as long as the probe was down near the switching transistors. But it failed to show up any switching noise when in the vicinity of the wire bundle or load.

The loop, on the other hand, was most sensitive to EMI, and I could change the sensitivity by changing the number of turns in the loop. I started the tests with one turn and finally ended up with five turns at a diameter of about 3/4-inch.

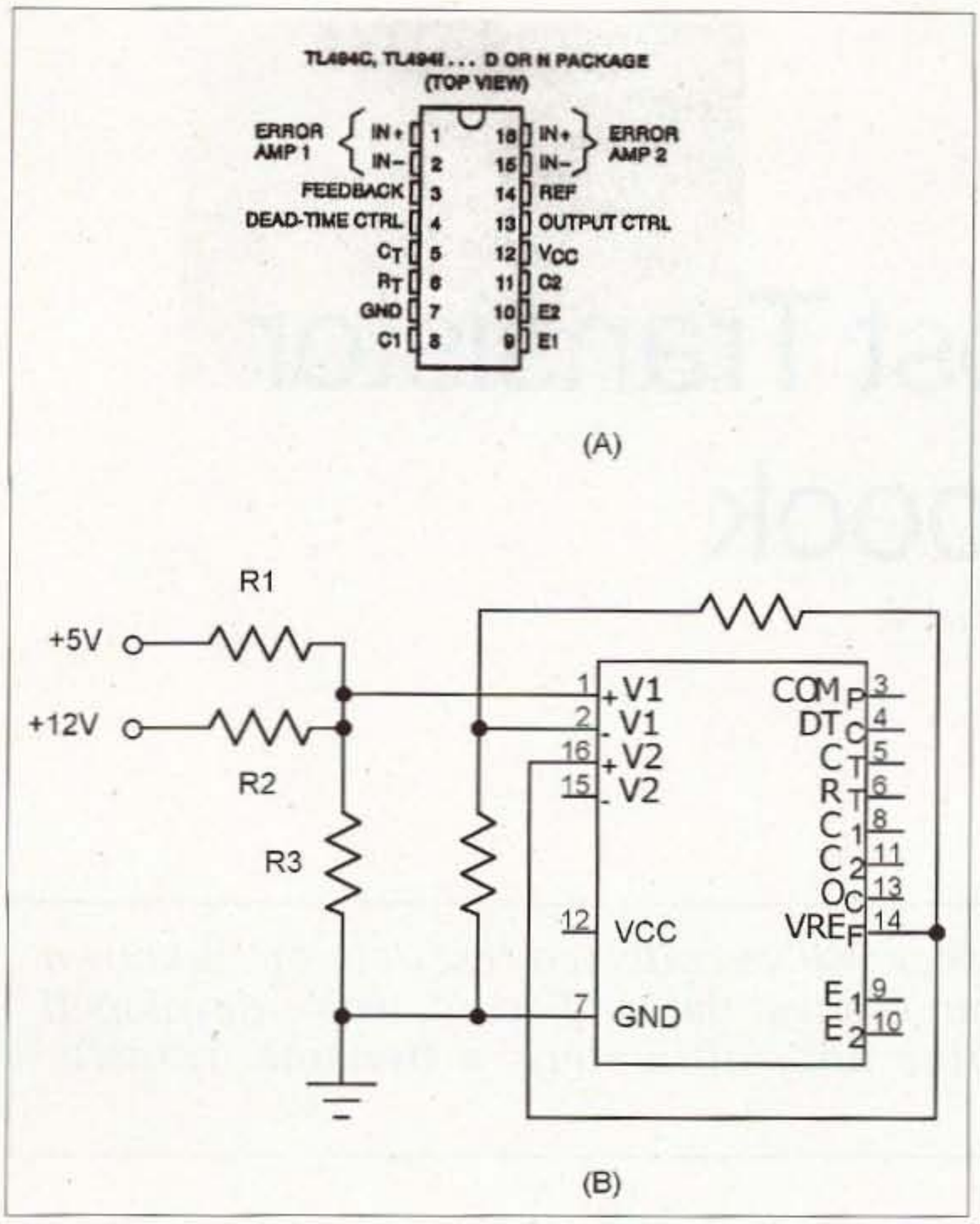


Fig. 2. Pulsewidth modulator/oscillator IC. (A) Top view of the TL494/LM494/NTE 2729 IC. (B) Typical output voltage sampling circuit for voltage regulation.

Photo A. A stack of typical computer power supplies.

Probing next to the switching transformer, a strong carrier appeared at approximately 38 kHz and at equally spaced increments up the band. Amplitude attenuation did occur as a function of increasing frequency. Most all detectable signal levels ceased to be observable above about 100 MHz. One power supply did exhibit some "noise" up to about 200 MHz.

One thing that I did notice when placing the loop tightly into the wire bundle was that RFI was detectable with the supply cover tightly in place. Switching noise appeared to raise the analyzer's noise floor at various spots within the spectrum. I have no idea at the moment why the noise floor didn't remain consistent across the bands. Audibly, the noise sounded something like a skill saw cutting wood, with the highest level appearing in the 24-50 MHz region and nearly disappearing above 100 MHz.

My conclusion is that each power supply being considered for use in a ham radio environment would have to be evaluated as an individual. Each supply that I tested had differing characteristics, with some being extremely quiet just like a heavy iron-type supply.

Minimum load requirement

A computer power supply does require a minimum load for it to "turn on and operate." By design, the intended output to be loaded is the +5 V line (red wires). After trying various loads such as "active" as well as resistive loads, I determined that the desired load is a resistor. For each of the supplies that I checked for a minimum load requirement, I managed to get away with 0.5 A being drawn from the 5 V supply. But for reliability of starting, I found 1 A to be a better load. Choosing a resistor is pretty much dependent upon what might be available from the ham junk box. A 5 ohm 10 W (minimum wattage) resistor is desirable, but a number of 6-volt automotive light bulbs will also work, if light output is desired.

Operating with a minimum load on the +5 V line is almost "free" because it leaves the 12 V line available for a zero to full load application. Having a minimum load on the +5 V line appeared to not increase the heatsink temperature. In addition, the higher load current on the +5 V line helps when raising the 12 V output to 13.5 V.

Raising the 12 V output to 13.5 V

The output voltage does not have to be increased, as there are a lot of applications where the "normal" output in the 11–12 V range will suffice. But most ham gear designed for 12 V operation is designed to operate off a supply voltage source from 12.6-14.7 V, which is what a typical automotive electrical system will provide.

Some power supplies are easier than others for manipulating the output voltage. There is one caveat that must be considered before actually changing the output voltage. Since computer power supplies are designed to be inexpensive, there is very little margin built into them unless it is cost effective. Of primary concern is the voltage rating of all the output filter capacitors. Each should be checked by observing the voltage marking. As an example, when the 12 V output is raised, the 5 V output will also rise proportionally. If the 5 V filter caps are 6 V or higher, then the margin is OK as the 5 V line may increase to 5.5 V. The capacitors on the 12 V line hopefully are 16 V or higher.

Let's step back for a moment and look at the circuit operation and note how the output voltage is controlled/regulated.

The later model switching power

Continued on page 55

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

Your Long-Lost Transistor Notebook

Part 3 of 4.

At this point in our tour of how transistors work, we've collected test data on unknown transistors found in a ham's "junk box." From the test data collected, we've developed characteristic curves, established a load line and, ultimately, a dynamic transfer characteristic curve.

The transfer curve provides us with the tool that's needed to develop a quiescent operating point, determine response linearity, a signal amplitude limit, stage gain, and the resistor values in support of Class-A amplifier design. We will treat each of these items as stops in our tour as we proceed forward in our design journey.

Power dissipation

All electronic devices, when used, dissipate heat at some level. In the case of transistors, the amount of heat dissipated must be kept within a safe operating region. One of the first steps in doing a transistor design application, is to assess the amount of power that will be dissipated and choose the appropriate transistor for the application.

As shown in **Fig. 1**, a power dissipation (Pd) curve is drawn across the set of characteristic curves, and all transistor operations must be restricted to the left side of the Pd curve. In most Class-A design applications, the load line is typically placed well to the left of the Pd curve.

But in digital applications where the transistor is used in a switching mode, the load line may pass through the right side of the Pd curve. Even though the load line passes through the Pd curve, the ends of the load line are to the left of the Pd curve and those are typically the switch mode operating points. What this means is that the transistor is either conducting in saturation (maximum current) or cut off (minimum current).

As an example, a 2N2222 is a 310 mW device with a rated maximum current of 500 mA, but it isn't normally operated at that current because it would get very hot and possibly burn up when used in a Class-A mode. Yet, the transistor will operate well at 500 mA in a switching mode, where the Vce value may be as low as 0.4 V.

Small-signal transistors in a TO-92 plastic package typically fall into the 300 mW dissipation category. If we use the dissipation value for a given transistor and divide it by the Ic current values on the graph, we find the corresponding voltage points. These points allow us to plot a curve that represents the maximum power dissipation for that transistor as shown in the example of **Fig. 1**.

After a set of characteristic curves has been developed for a transistor, a single point assessment on the graph for power dissipation will determine if the set of curves is appropriate for a

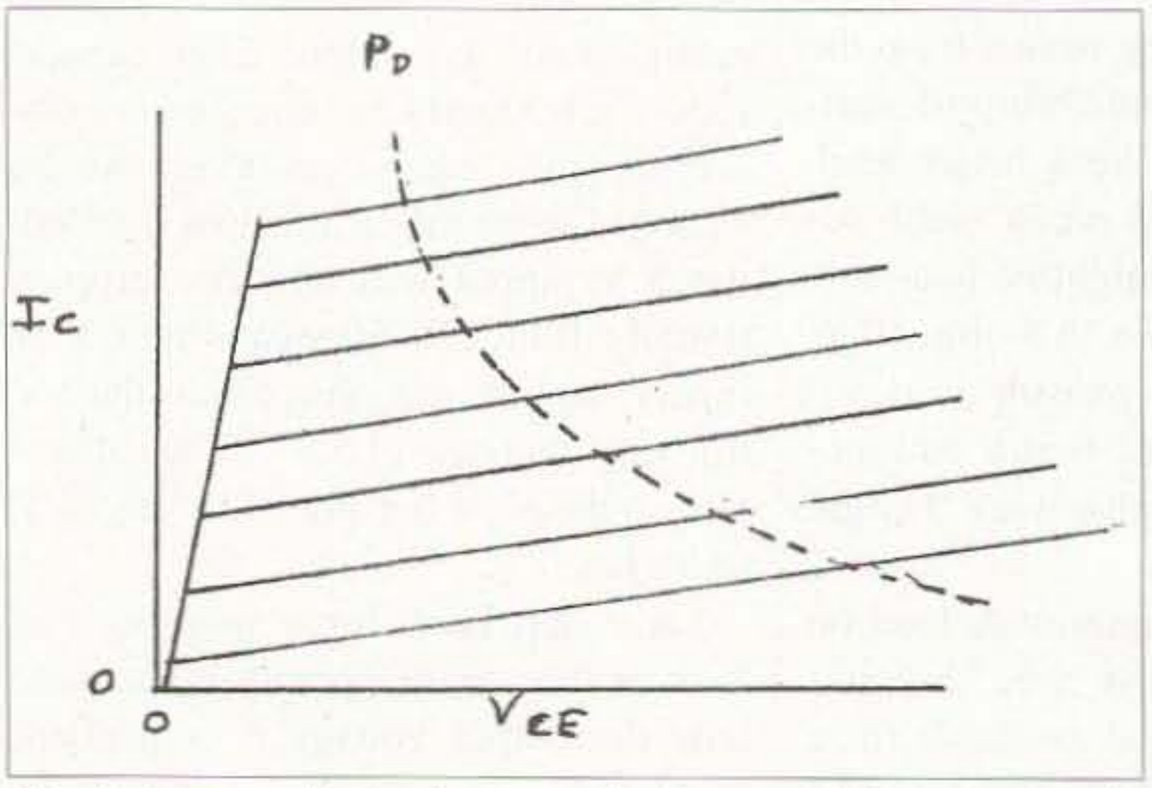


Fig. 1. *A power dissipation curve is shown, which represents the maximum power a transistor can safely dissipate at any point within its operating range. The "safe" operating region is to the left of the Pd curve.*

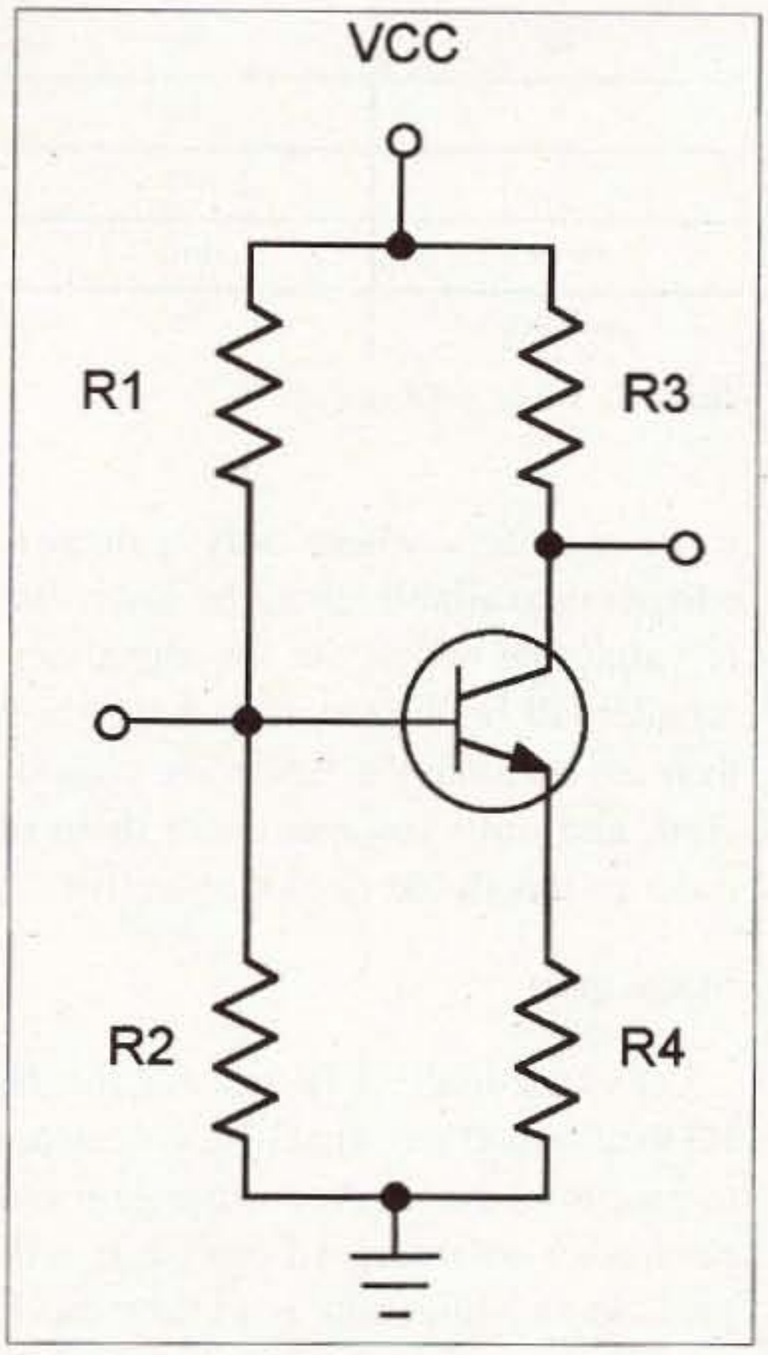


Fig. 2. *Typical Class-A transistor amplifier stage that will be used as our design model.*

Class-A application. To perform the assessment, select a single point near the center of the characteristic curve set and locate the corresponding Vce voltage and Ic current values from the axes. Multiply together the two values to obtain the power dissipation at that point in the set of curves. Let's say that your calculation has indicated a power of 100 mW dissipation at the point selected. Compare 100 mW to the transistor rating (if known) of perhaps 310 mW. The selected point is then 210 mW into the safe operating region for that transistor. With that information known, then drawing a Pd curve for that set of characteristic curves is probably not necessary.

Establishing a load line

Beginning our circuit design with the circuit shown in **Fig. 2**, we'll be able to work out all of the circuit details using characteristic curves. For this example, we'll be using the 2N3904 set of characteristic curves shown in **Fig. 3**.

The first step is to decide what power supply voltage (Vcc) level is to be used; let's use 12 V and see where it takes us. A pencil mark is made at the 12 V point on the Vce axis of the graph.

The next step will be to determine an available resistor value suitable for R3. OK, let's stop for a moment and see what it is that we're attempting to do with this step. It's desirable to use common resistor values in the design, and that means some compromises will be made along the way. Supposing that we choose three resistors, 10k, 4.7k, and a 3k to see how they'll work in the circuit when placed in the R3 location.

The next step is to make an assumption that if the transistor were shorted out, how much current would flow through the selected resistor with 12 V applied? Using the 3k resistor, a current of 4 mA would flow,

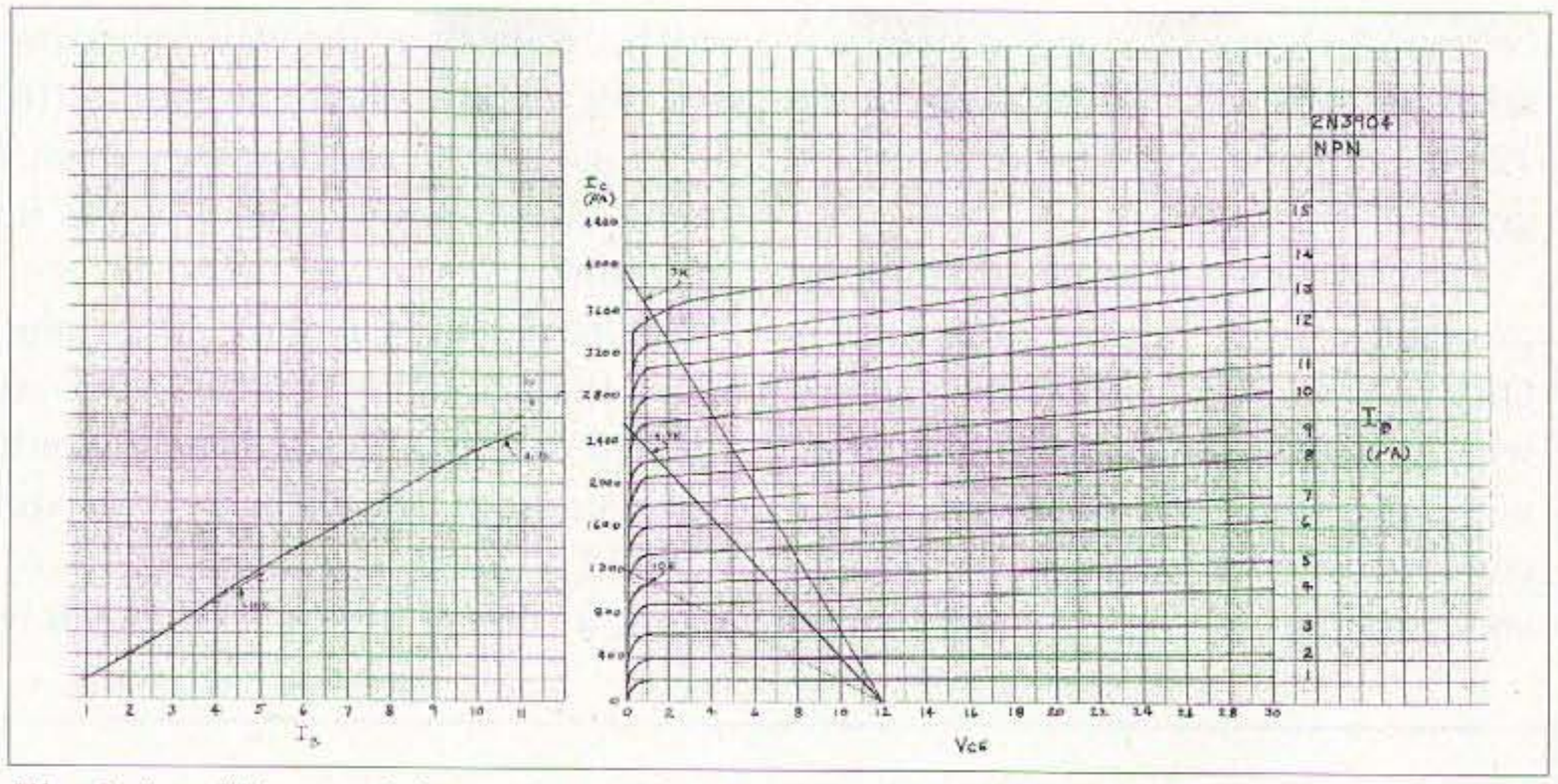


Fig. 3. *Load lines and dynamic transfer characteristic curves for a 2N3904 transistor.*

almost 2.6 mA for the 4.7k and 1.2 mA for the 10k.

Having those current values, then place a pencil mark at those values on the axis and draw a straight line between the Ic point and the 12 V point. The three lines now represent three different load lines from which you may select one for a final design.

Using each of the load lines, a corresponding dynamic transfer characteristic curve is drawn to assess the appropriateness of each resistor selection. **Fig. 3** shows the overlay of the three transfer curves; by my eye evaluation, they all appear to be reasonably straight except that the 4.7k tends to curve downward slightly toward the high current end. To use the resistors, we'd have to limit the operation to the linear portion below the curved section. With the exception of the curved section, then any one of the resistors may be used in the design.

So, which resistor should be used? It's a matter of choice, and the choice can be made using some insight into what the transfer curve information provides. Take note of the length of the transfer curve for each resistor, and also take note of the base current (Ib) values. The range of Ib values for each determines the input signal swing amplitude that the circuit will accommodate. Another consideration is the amount of collector current that the stage will draw from the power supply. If the power supply is to be a battery where only a meager current is available, then the lower the Ic value, the better, but the signal amplitude will be limited accordingly. See, there are trade-offs that have to be considered, and only you can make them in order to meet your design objective.

Ib	Ic
8	1820
4	910
delta = 4	910
gain = 910/4	227

Table 1. *Stage gain values.*

Stage gain

Let's choose the 4.7k resistor for the R3 location and see what else we can determine from the selection. Stage gain is a parameter of interest because it will provide an indication as to how much the stage can be expected to amplify a signal. Stage gain is an AC parameter and is typically referred to as a DELTA function, meaning that it is a variable characteristic. To find the gain, start by selecting a point near the center of the load line or the transfer curve, then select a base current value about two

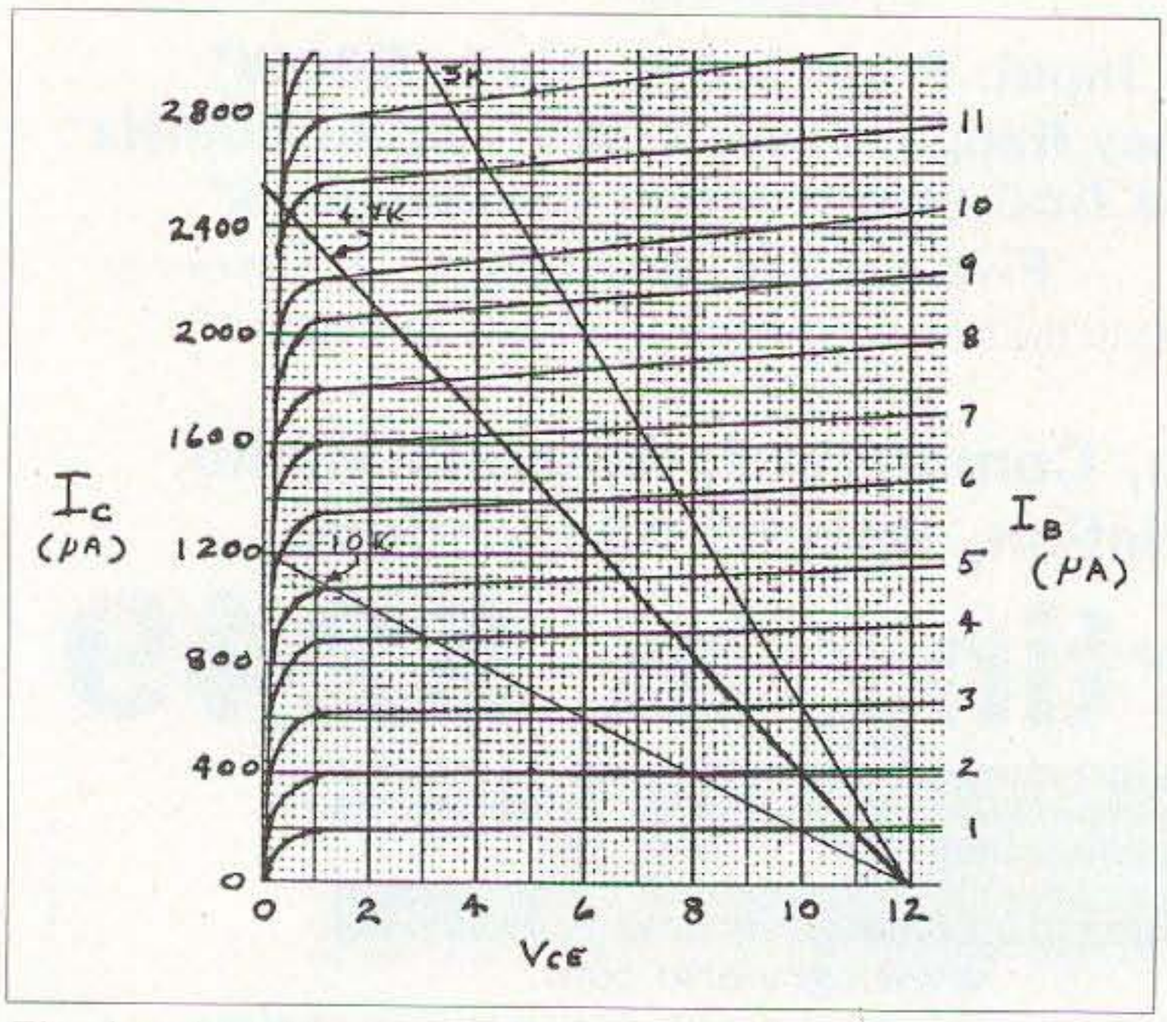


Fig. 4. *Calculating stage gain near the midpoint of the load line (see text for details).*

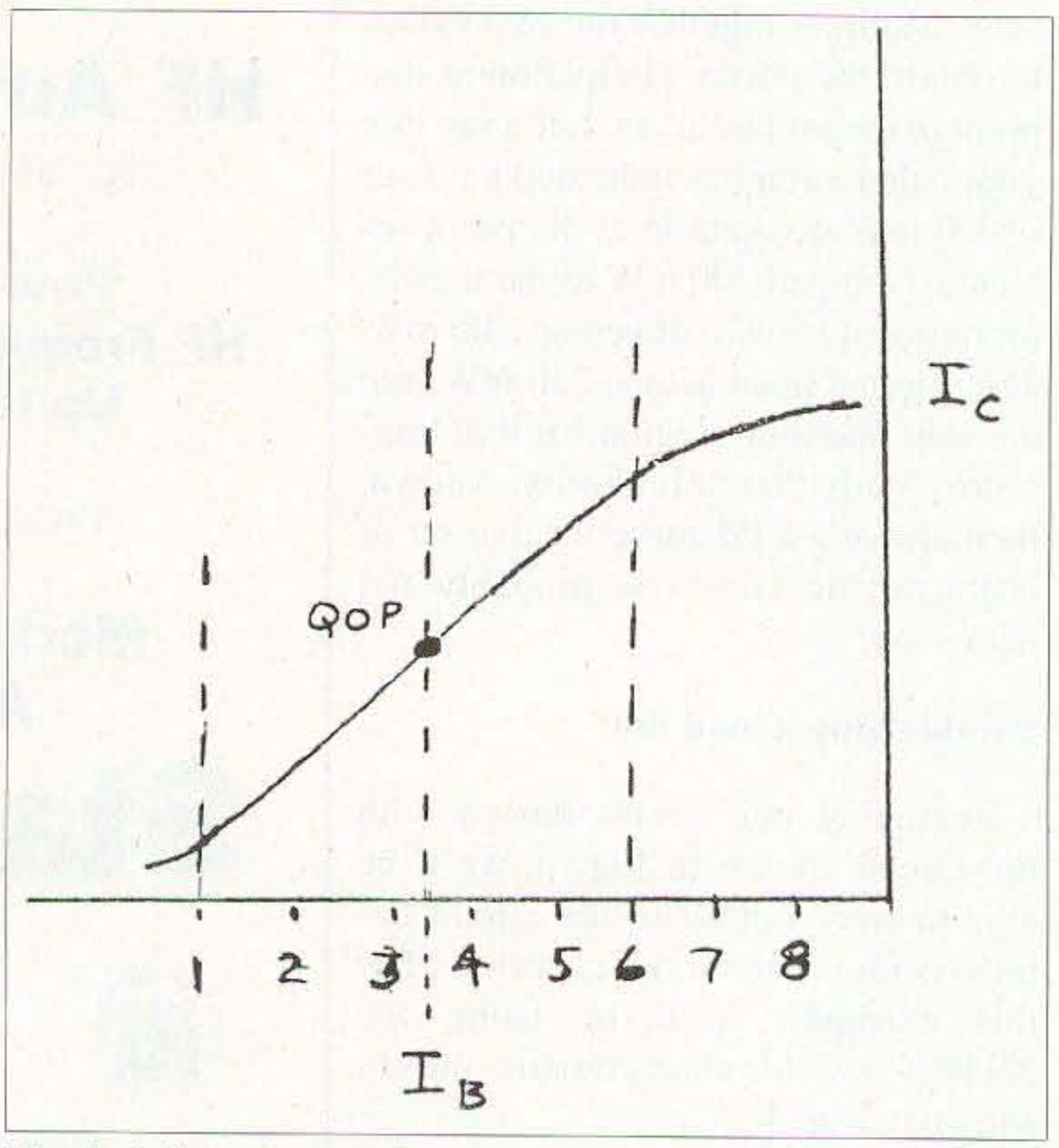


Fig. 5. *A dynamic transfer characteristic curve with exaggerated distortion.*

steps to either side of the center point. Using the graph shown in **Fig. 4**, I've chosen the values in **Table 1**.

With both currents in microamps, the calculation is straight division, and the resulting gain is called CURRENT GAIN. The actual stage gain, if viewed as a voltage amplitude, will most likely be reduced some from the current gain figure.

Changing the load line slope will also affect the stage gain. As in the same example, the 10k resistor having a lower slope will realize a slightly higher gain, while the steeper slope of the 3k will be slightly lower.

Linearity and QOP

We've been talking all along about the linearity of the transfer curve and now it's time to consider how it applies to the operation of the amplifier. **Fig. 5** shows an example of a distorted transfer curve having a straight section between an Ib of 1 to 6. For a linear response expected from the amplifier it is necessary to limit the base current excursion between the two max limits of 1 and 6. Any amplitude swing beyond those limits will create distortion in the transferred signal.

To keep the signal peaks centered within the linear response region, a suitable bias point must be established. This bias point is called QOP (quiescent operating point) and is located at the midpoint of the linear operating region of the transfer curve. Referring to **Fig. 5**, QOP could be placed at an Ib of 3.5.

With those examples in mind, let's return to **Fig. 3**'s transfer curve and find a suitable QOP. Again, using the 4.7k resistor for R3 and taking into account the distortion that's observed, perhaps the suitable operating range is between Ib values 3 and 9 microamps, placing QOP at the midpoint of 6 µA. The value of 6 µA is the resting base current that we'll need to know for setting up the base bias resisters R1 and R2 as shown in **Fig. 2**.

What's next?

At this point in our tour, we've developed the tools that we now need to work

Continued on page 55

73 Review

Doug Person W4DXV
10306 Yandem Court
Charlotte NC 28269
[w4dxv@attglobal.net]

Build the PSK-20 QRP Kit

This transceiver is a Small Wonder.

In the past few years, kit building has once again become very popular. There was a time decades ago when kit building was not only very popular, but a way for many hams to save money. Companies such as Heath, Allied Radio, and Eico are legends today among the older generation of hams — myself among them. Today, the number of options available to the prospective kit builder gets greater all the time. And kits still provide an inexpensive and rewarding way to become active on the airwaves.

Small Wonder Labs has been selling easy-to-build and highly functional kits since 1994. The PSK-20 is one of the more recent additions to their lineup. As kits go, the PSK-20 is in a class by itself. It's a crystal-controlled QRP transceiver designed expressly for use with a computer for operating PSK31. It can also be used for other digital modes that use a computer's sound system to decode and generate the audio.

Technical details

The complete PSK-20 transceiver is built on one double-sided circuit board. This single board contains all that's required, in addition to your computer, to operate PSK31 on 20 meters. A fixed-frequency, crystal-controlled, superhet receiver with a slightly broader than normal passband covers the unofficial PSK31 subband of 14.069 to 14.073 MHz. Being fixed-frequency means that there is no tuning control on the PSK-20; the software (such as DigiPan) handles all the tuning within the PSK31 subband.

A 3-watt PEP transmitter provides enough power to make worldwide contacts when fed into any reasonable antenna. The PSK-20 also contains T-R switching circuitry that allows the computer to handle the switching chore automatically through the computer's serial port.

The building experience

Extensive building experience is not required to successfully assemble the PSK-20. However, some experience with a soldering iron and working with printed circuit boards would be very helpful. No special tools are required — only the usual assortment of wire strippers, cutters, pliers, and screwdrivers.

The manual is nicely organized into nine assembly groups. Each group focuses on a particular section of the circuit board. The manual provides a clear color diagram for each group's parts location. Each individual step includes a good description of the part to be installed, limiting your chances of mixing up parts. I found the amount of time to assemble each group to be just about right for an evening's or morning's work before moving on to other necessary chores. Those who have more time available might do two or three groups in a sitting.

Receiver alignment is a snap if you use the DigiPan software and have a "big rig" available to provide a calibration signal. The transmitter alignment is done most easily with a wattmeter and a DVM (digital voltmeter). If you don't

Photo A. *The PSK-20 front panel.*

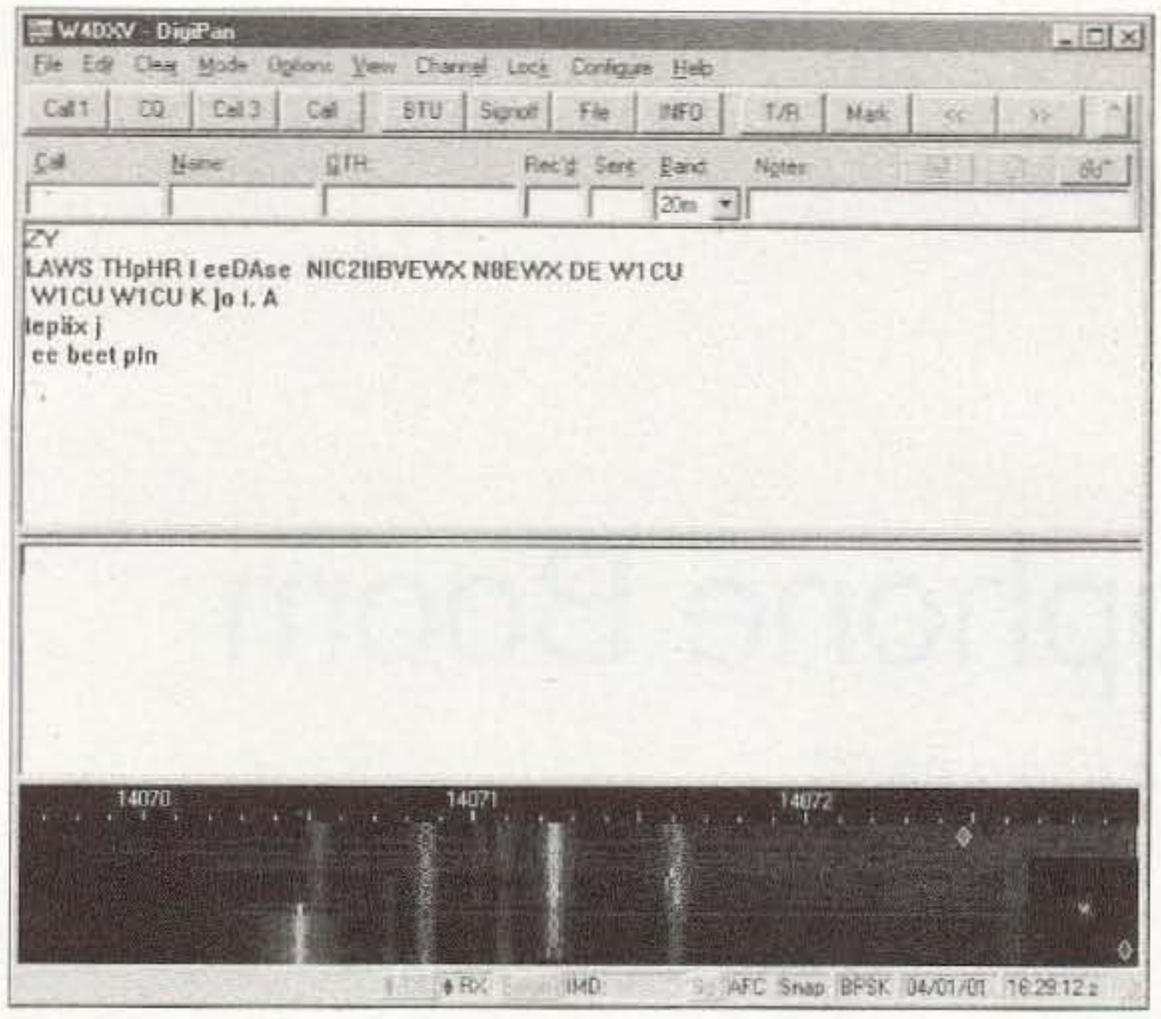


Fig. 1. *Screenshot of DigiPan.*

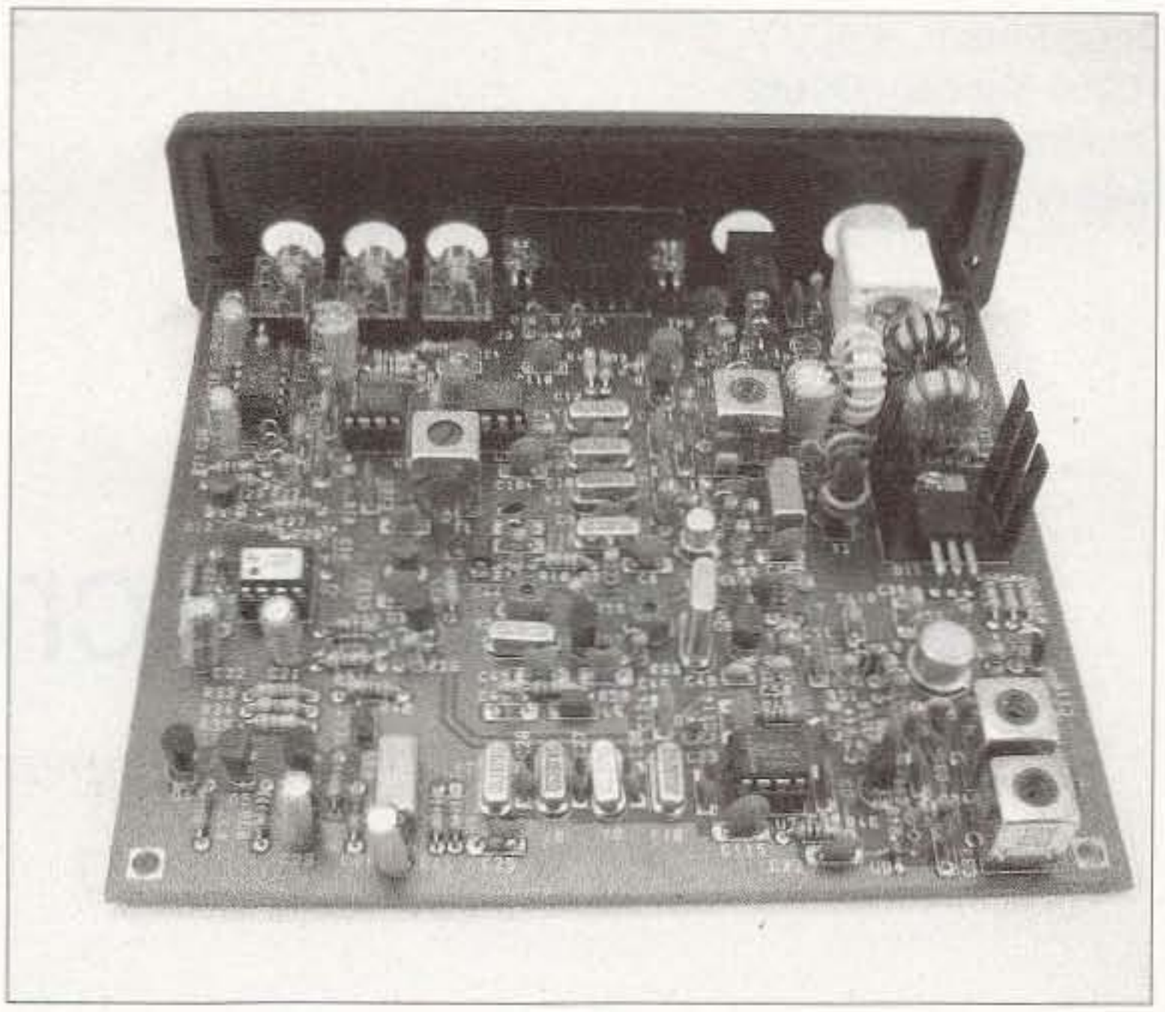


Photo B. *The PSK-20 circuit board.*

have these, an alternative is provided. There is a location on the circuit board where you can install a common LED that will then serve as a power output indicator.

Should something go wrong, the manual contains a section on troubleshooting, and additional troubleshooting information can be found on the Small Wonder Labs Web site.

Setting up for operation

The PSK-20 is very straightforward to set up. All that you need in addition to the transceiver is a few cables. You can either make these yourself or purchase them at your local Radio Shack. A serial cable 9-pin on one end, and either 9-pin or 22-pin on the other end, depending on the requirements of your computer, provides transmit-receive switching. Two 3-conductor cables (2 conductors and a shield) with 1/8-inch stereo miniplugs provides the transmit and receive audio interfacing between your computer's sound system and the PSK-20. One cable goes from the PSK-20 "AF-OUT" jack to either the microphone or line-in jack on your computer. The other cable connects the audio output from your computer, taken from the speaker-out jack, to the PSK-20 "LINE" jack. There is an additional jack (AUX) on the front panel of the PSK-20 that you can use to feed your existing computer speakers.

I opted to make my own serial cable. I had a couple of 9-pin female plugs in the junk box. Adding some 2-conductor shielded cable, I wired 3 pins — Ground, DTR, and RTS. This is all that's required to allow your computer to control the PSK-20. In fact, only DTR or RTS is required, but I implemented both for redundancy.

DigiPan with the PSK-20

Once your computer is properly connected to the PSK-20, you will need one of the many available programs that support PSK31. The most popular, and the one recommend by Dave Benson, designer of the PSK-20, is DigiPan. This is an excellent program for PSK31 and works great with the PSK-20. It's also free, which is quite remarkable considering how well it works. You can obtain your free copy of DigiPan by browsing to the following Web site: [http://members.home.com/hteller/digipan].

The bottom line

As soon as I completed the PSK-20, I was anxious to see how well it worked. After firing it up, I picked out a signal on DigiPan's waterfall display and, sure enough, it was a CQ. After we established a QSO, the other station turned out to be running 5 watts from a hotel room in Long Island with an indoor antenna. The capabilities of PSK31 are truly amazing. Since this contact I have made dozens more and continue to be impressed with the simplicity of the PSK-20 and ease with which I can make contacts.

The PSK-20 represents a great way to combine kit building, QRP, and PSK31 operation. It's an extremely compact, yet highly capable single-function transceiver that's fun to build and relatively inexpensive to own. Whether you're a first-time kit builder or an old hand with the soldering iron looking for a convenient way to get into digital modes, the PSK-20 is a great kit.

For more information on the PSK-20, visit the Small Wonder Labs Web site at [http://www.smallwonderlabs.com] or drop Dave Benson an E-mail at [dave@smallwonderlabs.com].

Pricing

(Prices include shipping within U.S.)
PSK-20 kit: $100.
Optional enclosure: $30.
PSK-20 with enclosure, wired and tested: $195. 73

Doug Person W4DXV
10306 Yandem Court
Charlotte NC 28269
[w4dxv@attglobal.net]

Movable Microphone Boom

Why not operate like a pro?!

The classic architect's lamp is a simple, inexpensive, and effective way to suspend a light source over a desk or workbench. By making some minor changes, it becomes equally effective at holding your microphone right where you want it.

Have you ever been to a commercial radio station? Or perhaps seen one on television? If you have, you may have noticed the convenient way in which the announcer's microphone is suspended. It provides far greater freedom of movement then the typical fixed desktop microphone most of us use.

In this article I'll describe how you can obtain the same level of convenience for your station without spending a whole lot of your hard-earned money. The ingredients required are readily available from your local home supply or office supply store. You will need a few additional parts, either from your junk box or from your local Radio Shack.

The idea for this project came from my nearly lifelong friend Mike WB2IVN, who could never seem to find a comfortable position during our frequent marathon QSOs. (Though Mike and I have known each other for well over 25 years, we have yet to run out of topics to fill out a multihour QSO almost any evening the propagation gods are cooperating.) His problem stemmed from being forced to assume a hunched-over position to remain close enough to the microphone to achieve proper audio. After an hour or so of this, his neck and shoulders began to complain. Having worked the occasional contest sitting in a similar position, I was very sympathetic.

A light comes on

I love finding a problem to solve. And the solution, oddly enough, was suspended right before my eyes! In my

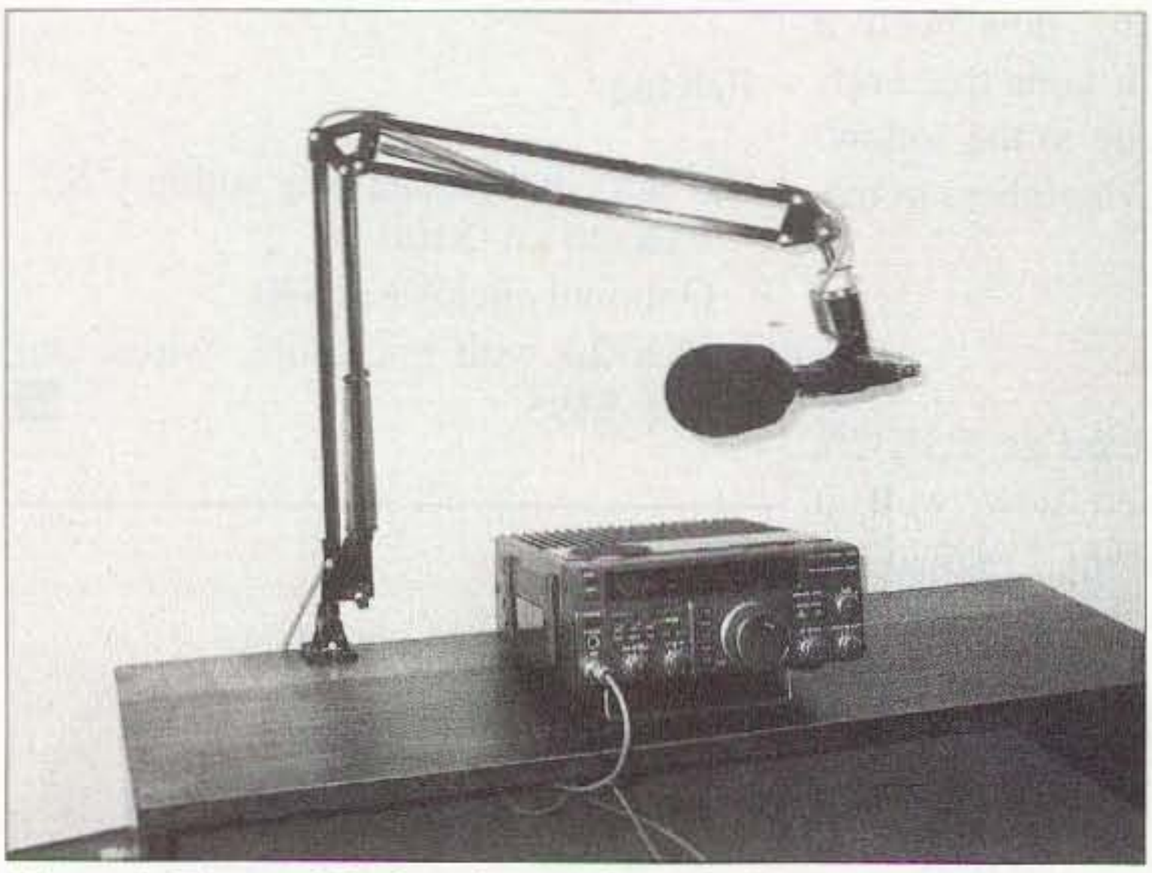


Photo A. *The modified architect's lamp holding a Yaesu MD-1.*

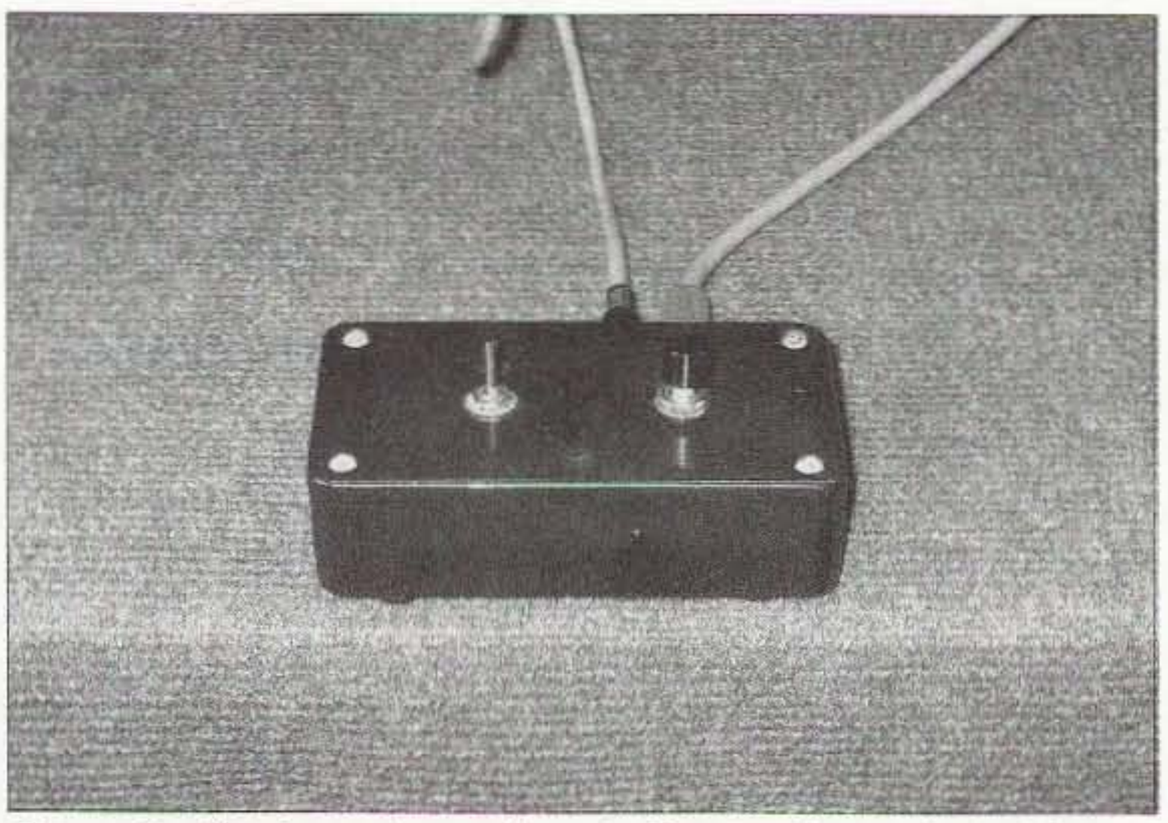


Photo B. *Simple push-to-talk switchbox with toggle switch and push-button.*

Qty.	Description
1	Architect's lamp
1	SO-239 (RS #278-201)
1	Plastic microphone holder (RS #33-4005)
1/2 in.	Schedule 40 1/2 in. PVC
2	4-40 x 3/4-in. machine screws
2	#4 lockwashers
2	4-40 nuts

***Table 1.** Parts list.*

shack, I have a number of the ubiquitous and inexpensive architect's lamps. There's one by my computer desk, another suspended over my workbench, and yet another lighting my operating desk.

All I needed to do, I reasoned, was to find a simple way to adapt a common architect's lamp to hold a microphone, and *voilà!* Problem solved. As it turned out, it was even easier then I had expected. Picking through my junk box, I pulled out a common SO-239 chassis-mount UHF connector. Looking it over, it occurred to me that it might be exactly the item to make this project work.

Luck was with me. A simple, garden-variety SO-239 turned this project into a virtual no-brainer. The threads on a standard plastic microphone holder just happen to match the threads on an SO-239. With a few common additional parts and a little assembly work, your project can be complete before that first cup of morning coffee gets cold. Here's how to construct your own spring-loaded, professional-looking, "holds it in any position" microphone boom.

A plan comes together

The heart of this project is, obviously, the architect's lamp. These are available almost anywhere desk lamps are sold. When you're out shopping for yours, you will notice that there are two distinct varieties to choose from. The first type, which is what I recommend you obtain, uses a metal flange to attach the socket assembly to the arm. The second type uses plastic components. The metal type is more

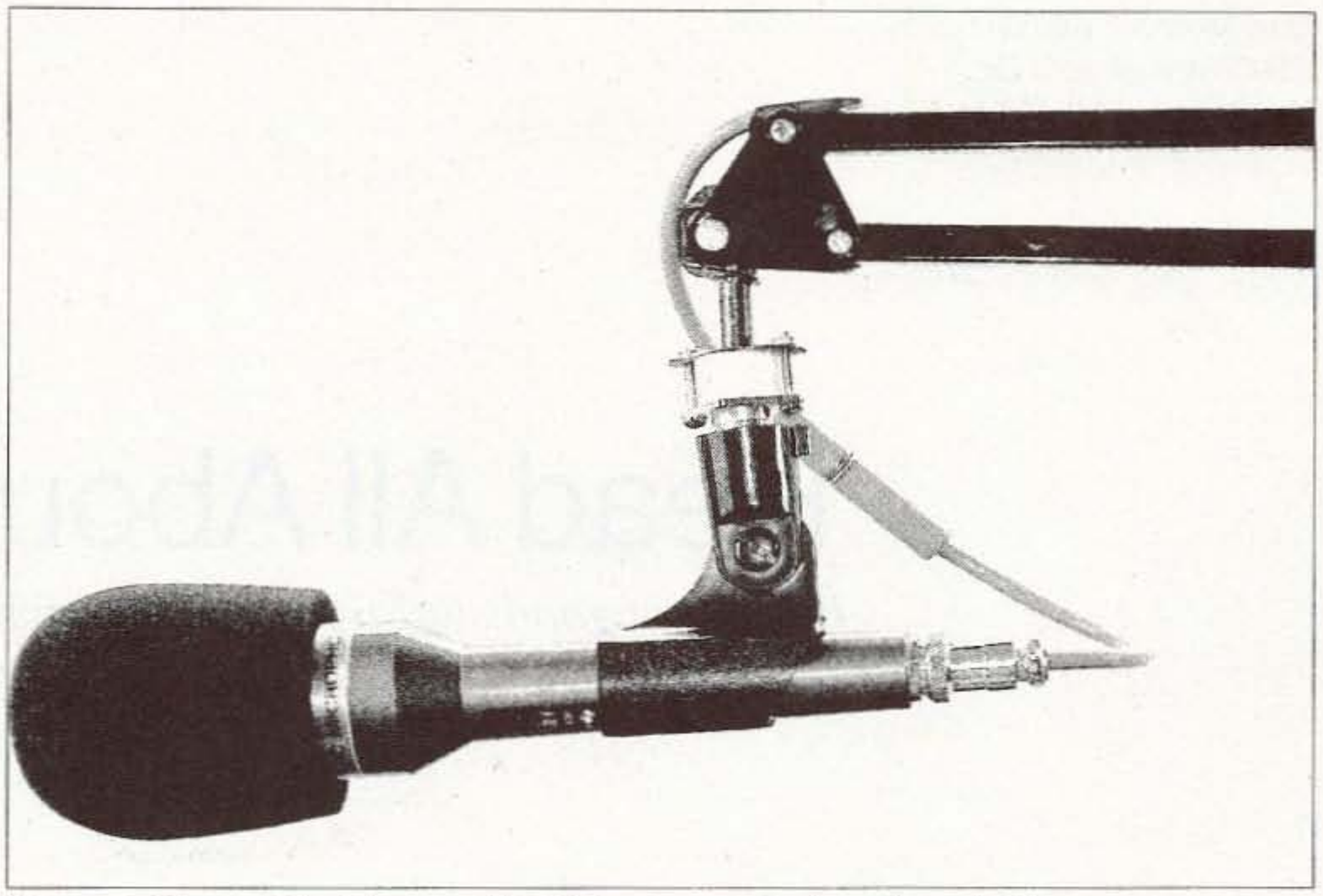


***Photo C.** The modified flange with PVC spacer and microphone holder.*

suitable. However, you may find that the plastic type is more common. The few plastic types I've examined look like they will lend themselves to this project adequately with a little extra ingenuity.

To build your microphone boom, you will need to create one custom component. This part will be used as a spacer and is made from a 1/2" length of common 1/2" schedule 40 PVC pipe. (I always keep some PVC pipe around because I find it a useful ingredient in many different types of projects.) This spacer can also be made from any other type of tubing with a proper diameter. After creating your spacer, you can prepare the lamp for modification by removing the reflector, socket, and line cord. Then drill out the rivets holding the socket housing to the arm. Note that the mounting flange is slightly curved to fit the surface of the lamp housing. Carefully flatten out the flange with a pair of pliers.

Notice that, amazingly, the distance between the two rivet holes (approximately

Continued on page 56

Dan Metzger K8JWR
6960 Streamview Dr.
Lambertville MI 48144-9758

Read All About It!

Part 10 of good stuff from The Hertzian Herald.

More about Please QSL! and Cat Goes on the Air

The walk out to the mailbox this afternoon wasn't even worth the effort. The catch was totally disappointing: a missing-children card, two political flyers, the gas bill, a catalog from a local discount store, and a sheaf of pizza coupons.

You know, yesterday there was a QSL card sandwiched in between the junk mail, and it "saved some part of a day I rued," as Robert Frost would put it. It had been a rather ordinary QSO, and I hadn't asked for a QSL. But we were both teachers, and we had commiserated about the joys and frustrations of the job. He wrote on the card how much he had enjoyed talking about it. For a twenty-cent stamp he put a much-needed bright spot in my day.

Hey, for twenty cents I can put a bright spot in someone else's day. The group I chat with on two meters nearly every day on the way to work — we've had a hundred QSOs, but we've never exchanged QSLs. Why, I'd not only appreciate a card from some of those guys — I'd post it on my bulletin board. I'll send out a few cards, and I bet some of them end up posted on the walls of my buddies' shacks around town.

And while I'm at it, I'm going to send out a few cards as thank-you notes to some of the hams who have been especially helpful — whether we've QSO'd or not. Let's see, there's the radio club president, the newsletter editor, the trustee of the repeater, the VE who gave me my license exam, and the control op for the net I check into once in a while.

And let me not forget to send a QSL as a thank-you to my Elmer who helped me get on the air all those years ago. I haven't even seen the guy for over three years, but I bet it will make his day if I look up his address on the Net and send him a card. I'll date it back to April 1958, when he was my first QSO, and remark on the DX of two city blocks.

And the next time I have just an ordinary good QSO, I think I'll send the ham a card. And I won't just put down a signal report and my rig and antenna dope. Heck, one rig is pretty much the same as another these days, and nobody's interested anyway. Instead, I'll put down a little note to remind him of what we talked about, and how I enjoyed chatting with him. Or I'll tell him that he has a good, easy-to-copy fist. Or I'll say that I learned something from him. Maybe I'll put down my E-mail address and invite him to E-mail me for a sked, or just to continue the ragchew.

When you think about it, where else but in ham radio can you do anything at all for twenty cents? But with a QSL, you can put a big smile on somebody's face for just two thin dimes and a few strokes of a pen.

Cat Goes on the Air

"Dan, come down for supper. Now! I've been calling you for fifteen minutes."

"Right away, Mom," I yelled down the stairs. It was my turn to transmit, so I tapped a quick "QRT FR CHOW — 73" to Doug and Al on my hand key, and ran downstairs. I left the rig on, thinking I'd be back in half an hour.

It was 1958, and I had just started my sophomore year in high school. I'd

Reprinted with permission from *The Hertzian Herald*, newsletter of the Monroe County (MI) Radio Communications Association (MCRCA).

gotten my Novice license six months before, and for the past six weeks had been meeting Doug and Al on 3718 kc nearly every day after school. We were from three different high schools, although our houses were each little more than a mile from the others. We had been arguing the merits of straight dipoles vs. folded dipoles, and I left the *Handbook* standing propped up behind the key, where I had been sending quotes from it to prove a point.

Now I must tell you that we had an alley cat named Mr. Thompson who had a serious problem with cold weather. He would climb under the bedcovers with you if you let him. He always sat on top of the hot-air register in the kitchen floor. He sometimes came up from the basement smelling of singed hair, and we knew he had been sitting on the main hot-air duct from the furnace again. He had a crooked tail from getting it caught in the fan belt of the car one winter day; he had been sitting on the engine block to keep warm, and got a big surprise when Dad started the car.

Well, it was a chilly fall day, and Mr. Thompson had been chased off of every source of heat in the house — until he found my DX-35 transmitter, still power-on. Of course, he attached himself to the top of it like a barnacle, blocking the vent holes. And on his way up he managed to knock over the *Handbook*, which fell on the key knob, putting a steady 65-watt howl on 3718.

Why hadn't I switched the rig to Stand-by? Good question. Why, oh, why, hadn't I switched the rig to Stand-by?

Doug and Al had been carrying on the QSO, naturally — having moms, perhaps, who were not so serious about family dinner time. Since our houses were as close as they were, our signals were mutually obliterating, so when the cat turned the carrier on they knew it could only be me.

They tried getting me on the phone, but as luck would have it, my younger sister had been home sick that day, and being excused from the dinner table, was using the opportunity to do some extended chatting with her best friend, with whom she chatted endlessly every day anyway.

Photo A. *Here is the DX-35 that survived the transformer blow-up in 1958. No, that's not Mr. Thompson on top; it's K8JWR's cat, Morgan, keeping warm.*

Consulting with one another by phone, Doug and Al reached the conclusion that I must have taken the rig out of the cabinet to mess with it again, hit the 600 volts, and was slumped over the key dying of electric shock. They agreed to hop on their bikes and pedal to the rescue.

Meanwhile, Mr. Thompson was growing more and more comfortable as the rig overheated. The plates of the 6146 final glowed orange, then red, and Mr. Thompson began to notice a peculiar odor. Now Mr. Thompson was fatally curious, as his breed is said to be, and in his case this was especially true in matters olfactory. So we can imagine that, at about the time the transmitter was approaching the limit of the thermal abuse it would tolerate, Mr.

Continued on page 56

John Pivnichny N2DCH
3824 Pembrooke Ln.
Vestal NY 13850

Build This Narrowband Tunable Filter for Receiving PSK31 Signals

— or at least think about it.

In an earlier article (see the list of references) on the tunable frequency crystal filter, it was pointed out that the design equations for a ladder filter permit you to develop a tunable frequency crystal filter. A schematic is shown in ***Fig. 1****. You may select a 3dB bandwidth (BW3) and a shape factor (1/rov3). Different shape factors produce differing levels of asymmetry in the filter skirts. However, the filter's center frequency also shifts as the shape factor is changed.*

From the design equations you can pick a particular shape factor for any desired shift (within rather narrow limits). From there you can calculate the values of coupling and parallel capacitors and a termination resistance for the filter.

Unfortunately, the calculated termination resistance changes as the center frequency of the filter is shifted. Normally the circuits in a receiver which connect to the filter expect a constant termination resistance. You therefore need to introduce an adjustable impedance transforming network at each end of the filter. A controlled-Q L-network as included in **Fig. 1** can be used.

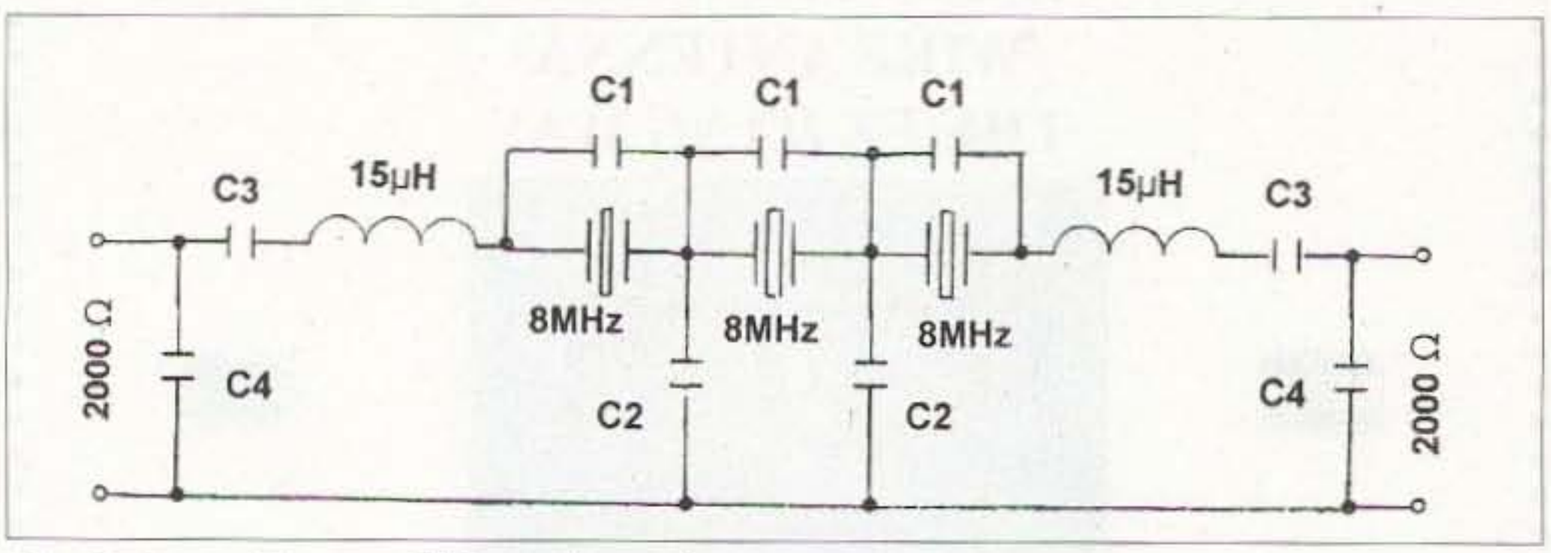


Fig. 1. *A tunable crystal filter schematic.*

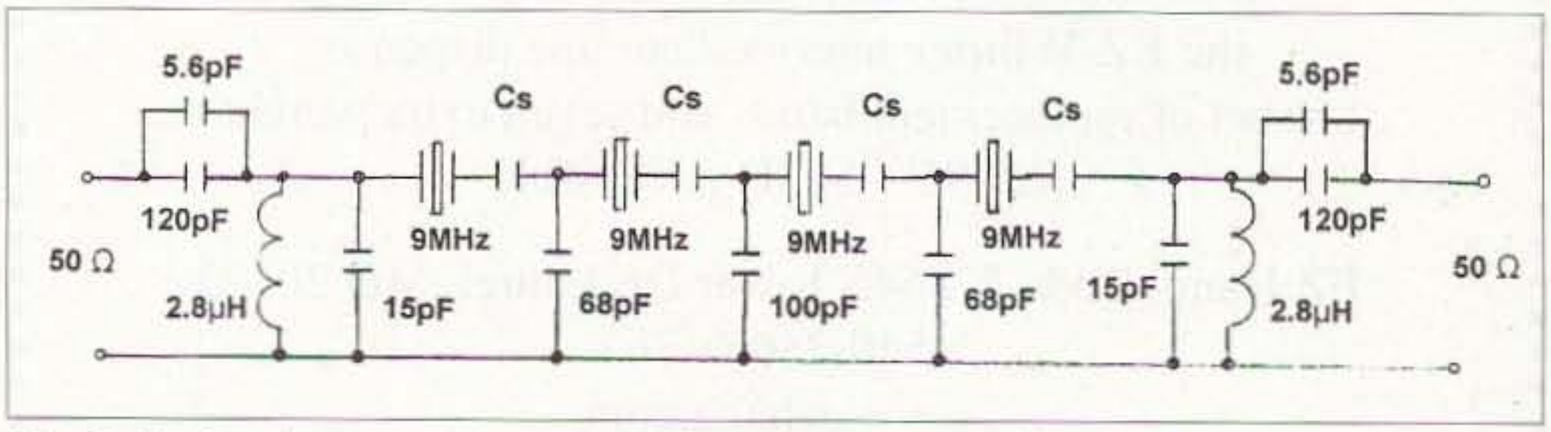


Fig. 2. *Tuning the center frequency with series capacitors by G3SBI.*

By adjusting the capacitors in a controlled-Q L-network you can maintain a constant overall end impedance as the internal termination resistance varies. This is the method used in the earlier paper. A fairly large number of capacitors (those labeled C1 through C4 in **Fig. 1**) therefore need to be adjusted simultaneously as the center frequency of the filter is varied.

A similar approach could be used with the upper sideband ladder filter, yielding even a greater shift as noted in the book listed in the references.

Another method of shifting the center frequency of a crystal filter was reported in a paper by Hawker. A capacitor Cs is placed in series with each crystal. See **Fig. 2**. This shifts the center frequency higher without introducing too much distortion into the overall filter shape.

The fixed capacitors Cs could be replaced with variable capacitors — however, both ends of all capacitors must be isolated above ground. Floating voltage

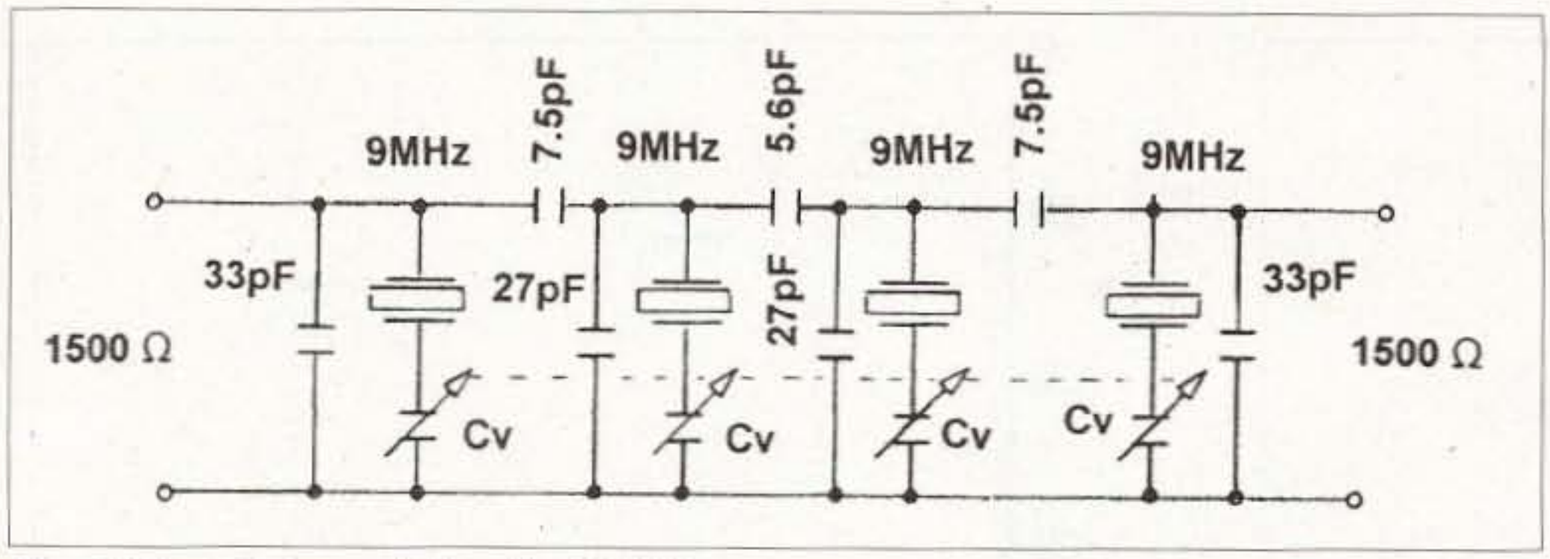


Fig. 3. *Tunable crystal filter for PSK31.*

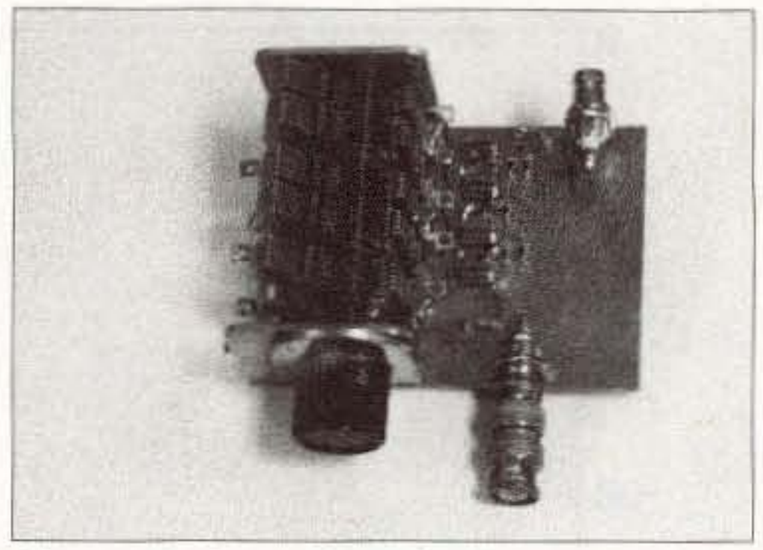


Photo A. *Photo of PSK31 filter prototype.*

variable capacitors may also be used as explained in the first paper.

A Narrowband Tunable Filter

The upper sideband ladder filter offers a unique opportunity for series-tuning because with this type of filter one side of all the crystals is normally connected to ground. A variable capacitor inserted in this connection for tuning can therefore have one side connected to ground. This is a common arrangement for ganged variable capacitors. See **Fig. 3**.

Some preliminary calculations using the information in the reference book indicated that it might be possible to shift a 4-pole 9 MHz filter with a 500 Hz bandwidth, up to 2.5 kHz to the right. This makes a nice filter for the PSK31 mode, where panoramic reception using a wide — e.g., 2.5 kHz — filter is the norm.

A screen capture of the DigiPan PSK31 software (see the March 2001 issue of 73) running on my laptop computer is shown in **Fig. 4**. From the bottom half of the waterfall display we see several signals within a 2.5 kHz passband (from 500 Hz to 3 kHz). There is a very strong PSK31 signal at 875 Hz and a strong RTTY-like signal centered at 1550 Hz. These two strong signals are activating the receiver's AGC action. Note especially the two weak PSK31 signals at 2700 and 2800 Hz. The one at 2800 is almost invisible in the display because of the AGC action of the receiver.

Halfway up the waterfall display, a 500 Hz bandwidth crystal filter was switched in to replace the wider filter. The filter is tuned so that signals with an audio tone of 2600 are centered in the filter. Note that the two strong signals are completely eliminated and the weak PSK31 signals at 2700 and 2800 are now quite visible. Either one can now be decoded with no interference from the stronger signals. It seems that for the PSK31 mode you want to have both a wide bandwidth filter for the panoramic display to first locate some potential stations to work, and also a tunable narrowband filter to switch in to eliminate interference and bring the desired signal up out of the noise.

The tunable filter with 9 MHz crystals of **Fig. 3** was designed to present a 1500-ohm termination resistance. It can therefore be switched in place of the wider 9 MHz filter commonly used in the IF of fixed tuned PSK31 receivers such as the one described in the last reference at the end of this paper. **Photo A** shows the actual construction of the prototype filter of **Fig. 3**. A variable capacitor with 5 identical sections (only 4 are used in this filter) is mounted on a circuit board, foil side up, along with the crystals and fixed capacitors. Each section of the variable capacitor has its rotor grounded through the common tuning shaft. A 180-degree rotation shifts the capacitance of each section from 168 pF with the plates fully meshed down to 10 pF with the plates completely opened.

The crystals used are 9 MHz series units from Digi-Key, part number

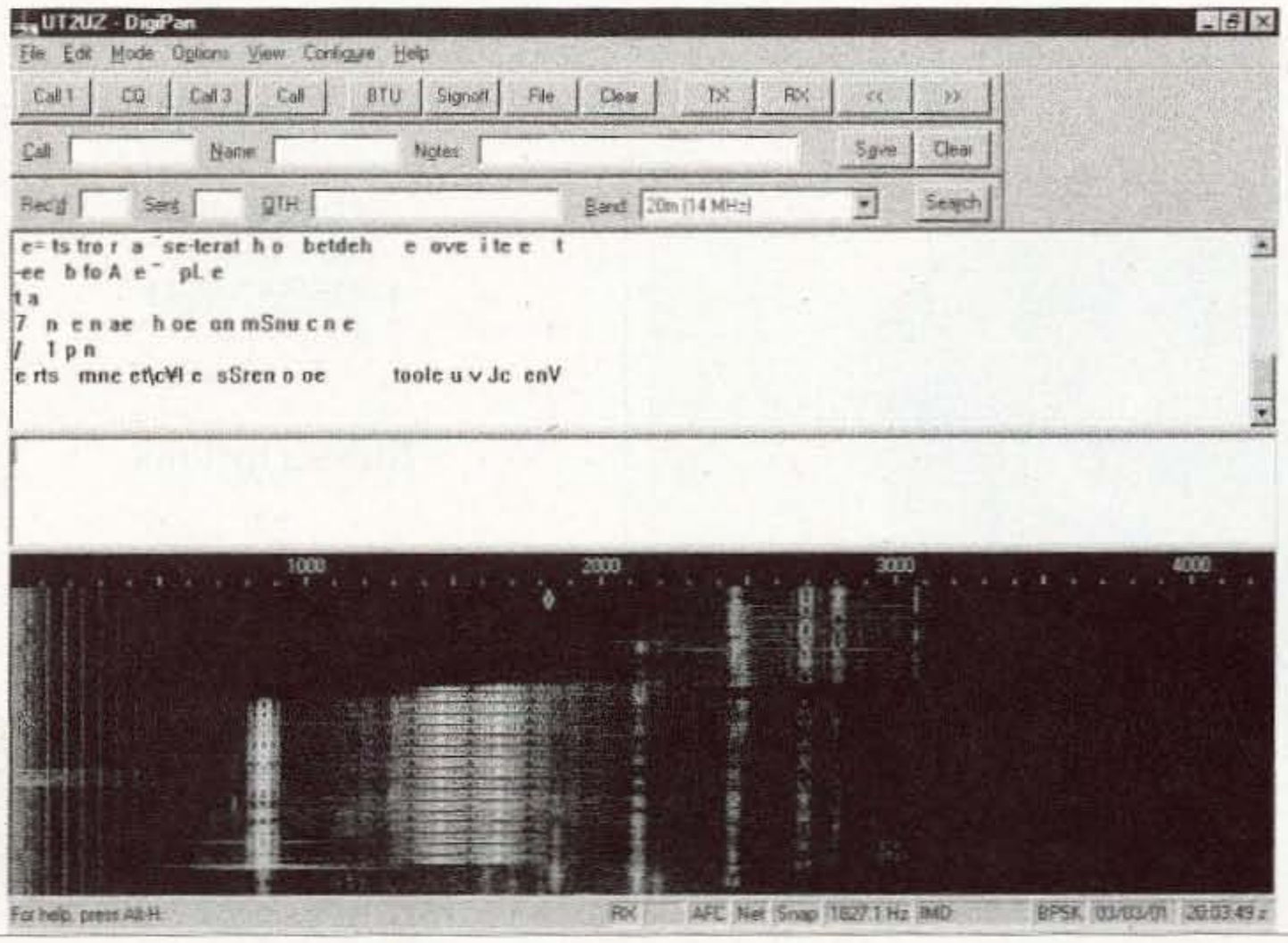


Fig. 4. *Screen capture of DigiPan software.*

	fs	fp
crystal #1	9,000,027	9,000,770
crystal #2	9,000,076	9,000,809
crystal #3	9,000,136	9,000,841
crystal #4	8,999,958	9,000,739

Table 1. *Frequency measurements of the four crystals used in the filter.*

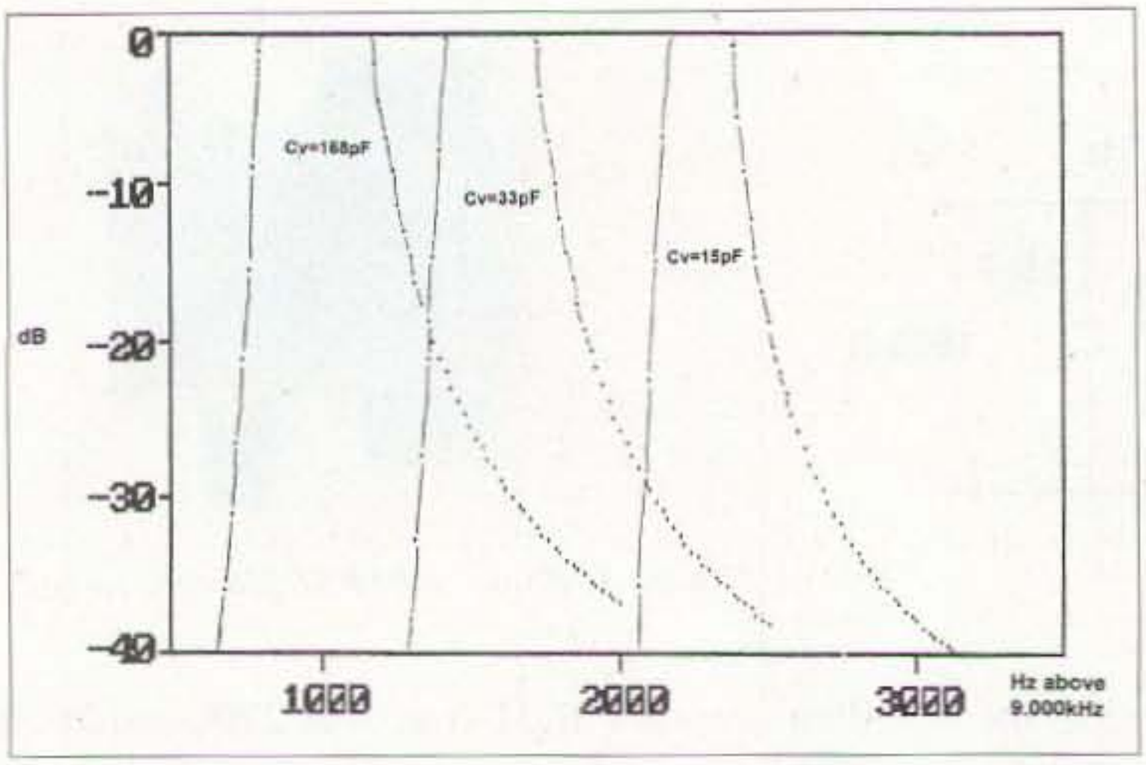


Fig. 5. Calculated frequency response of PSK31 filter for three different values of Cv.

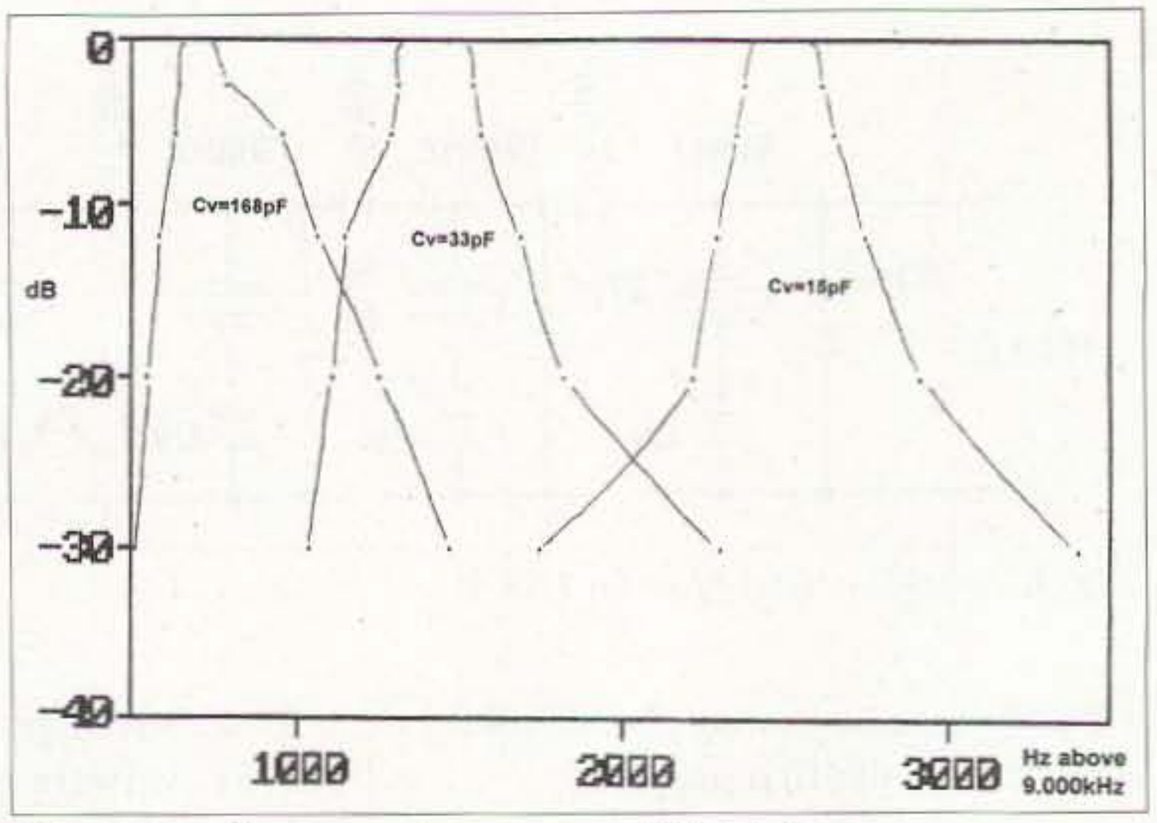


Fig. 6. Actual measured response of PSK31 filter.

X419. See **Table 1** for the actual measured frequencies of the four crystals used in the filter.

For this narrowband filter the crystals should be matched to within ±100 Hz if possible (±50 Hz is even better).

Fig. 5 shows the calculated frequency response of the filter for three different values of series capacitance, 168pF, 33pF, and 15pF. Calculations were made for frequency steps of 20 Hz. In **Fig. 6** the actual measured response for the variable capacitor set for these same 3 values is plotted. The measured points are indicated by dots on the plot. The center frequency of the filter can be tuned to any point in the 2.5 kHz range by adjusting the variable capacitor.

In order to take these measurements, a 9 MHz signal source with vernier (very fine) tuning is needed. A special generator was constructed using a string driven tuning disk. **Photo B** shows the measurement setup. A sensitive RF dBm voltmeter and step attenuator such as the Black Forest units shown in the photo will be needed. These units are available in kit form from Unicorn Electronics, [http://www.unicornelex.com], 1-800-221-9454.

For even better performance, you could also design a tunable filter using 14070 MHz crystals and place it between the antenna and RF input of any radio. Use the design equations in the *Ladder Crystal Filters* book. Placement at this point would also help to prevent intermodulation generation between two or more strong signals within a wide panoramic passband but rejected by the narrow filter. Again, tuning is essential to allow you to emphasize the desired (weak) signal and reject the others.

References

1. "The Frequency Tunable Crystal Filter," *Communications Quarterly,* Summer 1993, pp. 29-35.

2. "G3SBI's H-Mode Receiver Design," Pat Hawker, *Communications Quarterly,* Fall 1994, pp. 81-94.

3. *Ladder Crystal Filters,* John Pivnichny, MFJ Enterprises, 1999. Available from Barnes and Noble.

4. "The Digital Port," *73 Amateur Radio Today,* March 2001, pp. 50–52.

5. "A Panoramic Transceiving System for PSK31," *QST,* June 2000, pp. 31–37.

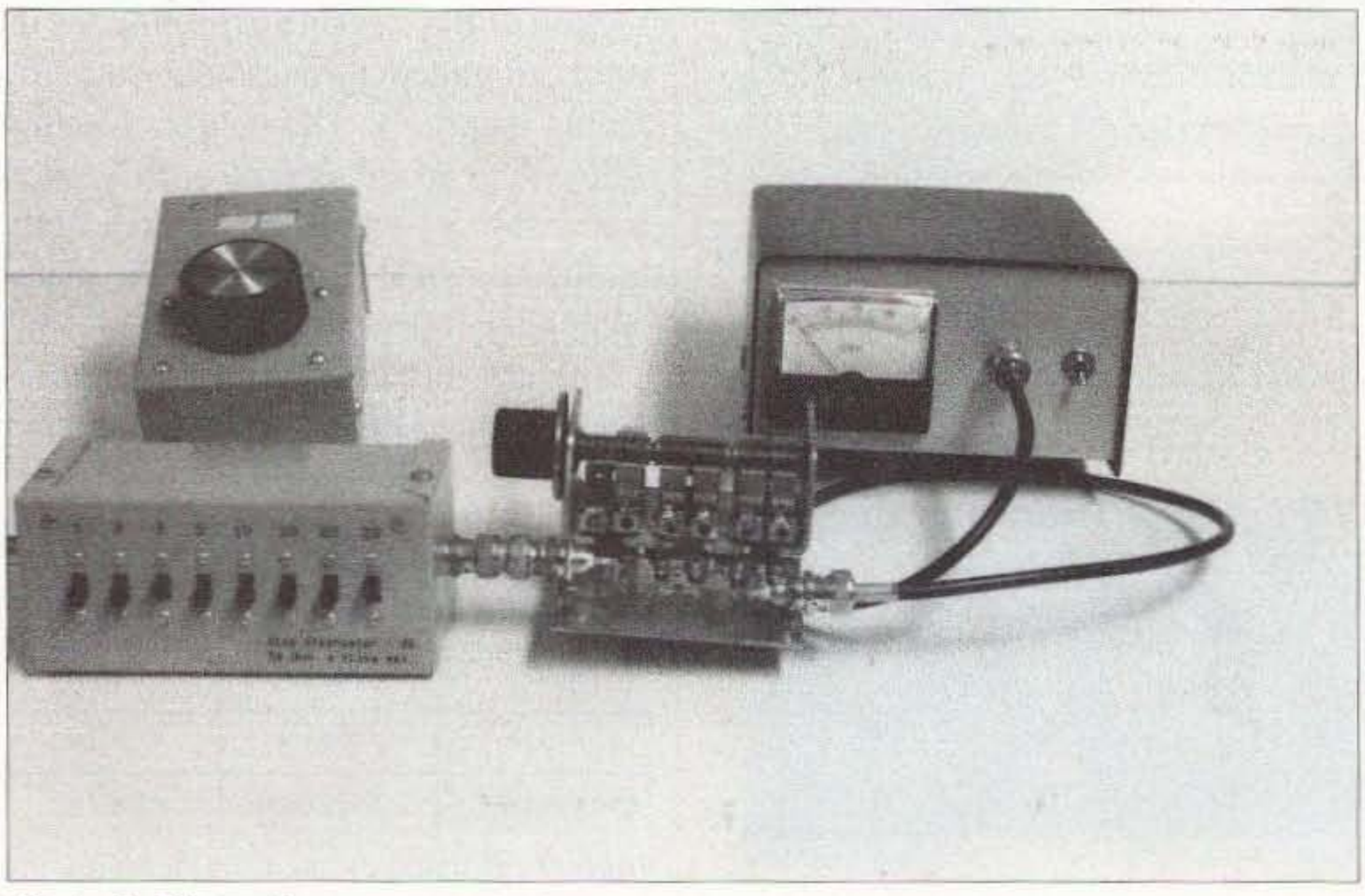


Photo B. Photo of measurement setup.

Jon Seaver RN, BSN, N8SUA
P.O. Box 278
Rapid City MI 49676
[n8sua@yahoo.com]

One More Hospital Test

This time, you play doctor.

With Y2K safely behind us, this may be an opportunity to review the lessons learned in the course of the preparations we all made. In the amateur radio press over the past couple of years, there have been several mentions of the potential for RFI between ham emissions and the other electronic devices in the area. These might include medical monitoring or patient care devices in the hospitals we might have served this past New Year's Eve.

My full-time employment is as a Registered Nurse in the Emergency Room and the Intensive Care Unit of a rural hospital. I use an Alinco DJ-S11 2-meter handheld to monitor the local ambulance dispatch, so that when the paramedics are sent out, I have an idea of what is likely to come in to our small ER. I also use a pair of Audiovox FRS-130 Family Radio Service handheld radios to be able to contact one of the doctors who may not be present in the department, without the need for paging him overhead. My supervisor had some concern that there might be some interference between these 460 MHz radios and the wireless cardiac monitoring equipment the hospital uses, so I conducted a test.

Family Radio Service (FRS) radios operate on 14 frequencies allocated to simplex two-way unlicensed operation by the FCC. They have an output power of 1/2 watt FM-modulated signals on interstitial frequencies in the spectrum otherwise occupied by the General Mobile Radio Service (GMRS), lying between 462 and 463 MHz. The telemetry units used in this hospital are manufactured by Spacelabs, and operate on 2 mW on channelized frequencies between 460.6625 and 469.9625 MHz. They encode the cardiac signal in an FSK scheme, with ±6 kHz deviation. The signal is received on pairs of antennas located throughout the patient care areas of the hospital, for a diversified antenna scheme. The signal is then decoded and processed before a computer analyzes it and displays the EKG trace on a CRT for the nurses to monitor and assess.

I took one of the FRS handhelds (s/n 903120621), verified that it was functioning, and obtained two telemetry units not being used to monitor patients (telemetry unit #497, s/n 341004065, manufacture date 9/92, and telemetry unit #492, s/n 341004060x, no manufacture date identified on the unit). Sitting in our ER, I connected one to myself (to provide a signal to be tested for interference), and connected the other to a nursing student taking his rotation in our ER. With the antenna of the radio at a distance of 3 inches to 24 inches from the wires of the telemetry unit, I keyed the transmitter, simultaneously speaking on the telephone with the ICU nurse on duty regarding the presence or absence of interference to the signals she was observing. I rotated the antenna with regard to the patient monitoring cables of the telemetry units, and intermittently keyed and unkeyed the transmitter. The ICU nurse reported no change in the signal received from the telemetry units I was testing, and no interference to the telemetry unit on a patient one floor above us on the patient care unit, on telemetry. This was repeated with changes to the orientation of the antenna with respect to the telemetry monitor wires, and again no change in the signal was reported.

Subsequently, I repeated these explorations with the handheld located in the ICU nursing station, and beneath two telemetry antennas installed in the ceiling of the station. I ensured that there were fresh batteries in the radio, and stood beneath the antennas. With the ICU nurse observing the monitor, I keyed and unkeyed the radio on all 14 of the FRS channels. We failed to observe any indication of my transmissions on the cardiac monitor. Both patient-monitoring telemetries and

Continued on page 56

Eric Falkof K1NUN
2 Hickory Hill Rd.
Wayland MA 01778

When Computers Were Only Dreams ...

You read about them in 73.

While searching through boxes of old magazines, intent on completing my full collection of 73 Magazine *(before it included "Amateur Radio Today"), I found the last three issues I needed: January, February, and March, 1961. A few additional issues from that year made up the package. The ten dollars was well worthwhile, especially since two of the issues contain what may be the first two articles that prophesy the marriage of amateur radio and computers.*

Naturally enough, these articles were not among the missing issues from my collection, but were from the April and September editions. The first dealt with automation, the second with zero-shift keying. The title of each was, respectively, "Automation" and "Zero-Shift Keying" and they were written by the same man. You might think they were written today when personal computers sit on each of our desks, but, no, they were written when computers were still mysterious kludges that occupied climatically controlled rooms of vacuum tube devices and mechanical relays. Let's take a look at the forward thinking of this visionary writer, Jim Kyle K5JKX/6.

The April edition did not feature an April Fool's article. In fact, Wayne's subtitle in the table of contents said, "You didn't think we'd pass up April without *one* feature, did you?" Nineteen articles graced the pages of the 64-page magazine that was based in Brooklyn. Perhaps this was the Fool's article, because so few people had ever heard of a computer that it must have been a joke. But consider this: Jim described in a fictional conversation "a complete circuit for a fully-automated ham station." Although the conversation (and the circuit) were fictitious, the block diagram and description performed the following:

1. Turns itself on and off.
2. Monitors for Conelrad alerts continuously. (Remember, the article was published in 1961, right in the middle of the Cold War!)
3. Takes care of all transmit-receive switching (because hardly anyone had a transceiver; almost everyone used a separate transmitter and receiver).
4. Changes bands automatically.
5. Tells you what's happening at all times.
6. Keeps the log. (Remember logbooks, and the requirement to maintain them?)

The design even called for a simple switch under the chief op's seat cushion that controlled the station's master power switch. Sit down, power on; stand up, power off! Simple. A time-delay circuit controlled the tube bias voltage so transmissions could not begin until the filaments were properly heated. (Vacuum tubes required time to heat up and voltage to stabilize, unlike solid-state devices today.)

A Conelrad receiver controlled a relay which turned off power in case of an air raid alert, but the diagram showed a gate logic device (a symbol for one, actually) which is ORed to the speaker, ORed to the bias supply to disable the transmitter, and ANDed to another receiver and tape recorder to record WWV time signals to time stamp the Civil Defense broadcast. As a fail-safe system, if the tape recorder ran out of tape (this is before the days of tape cassettes), the system similarly would disable the transmitter control.

A flip-flop arrangement is "connected so that when the transmitter is on, no signal can get through to a stepping relay which operates slave relays in each stage of the transmitter." A stepping relay can only change bands when the transmitter is not transmitting and the relay's input gate is ANDed to a push-button on the operator's armchair.

Kyle added additional refinements, such as automatic logging with a WWV time signature recorded along with each word spoken. He recommended stenographic transcription "if the Radio Inspector rules" that such a log would not be acceptable. (In the

Automation

With a Vengeance!!

Jim Kyle, K5JKX/6

As I opened the door to the shack, Joanne put down her well-chewed pencil and turned off the big switch. "Yes, inventor," she said, "I see you're home."

"Rough day at the salt mine," I grumbled, sinking my lanky frame down gingerly on a box of old 304TLs. "Too many computer circuits. . . ."

"You'd think," mused friend wife to no one in particular, "that with all the gray matter this cat's supposed to have, he could figure out a way to make a station do all its own dirty work. After all, they have machines that build more machines. . . ."

"Yeeow!" I cried, leaping to my feet. A 304TL had given way. But even after the surgeon removed the last splinter of glass from my posterior, the memory of Joanne's suggestion stayed with me piercingly.

Three reams of scratch paper, two gross of pencils, half-a-dozen editions of Terman (and two jobs) later, the evil deed was done. A complete circuit for a fully-automated ham station reposed in my mind. It hasn't yet been transposed to reality . . . for reasons which shortly will become clear. But it can be done, and you're welcome to it if you want to try.

Before I send you muttering back to the crystal-set league, though, (and above all don't dare look at the schematics yet!) I guess I'd better outline what this super-duper station will do for you. Like she said, it does all its own dirty work. E.G.:

1. Turns itself on and off.
2. Monitors for Conelrad alerts continuously.
3. Takes care of all transmit-receive switching.
4. Changes bands automatically.
5. Tells you what's happening at all times.

and 6. Keeps the log.

Those were the design specifications, and they were all met. It took a bit of doing, and many of the circuits are not the familiar ones you're used to seeing.

If you're ready for the shock, though, take a peek at Fig. 1. It's a combined block and logic diagram which shows the overall picture (and when one of these is finished, overalls will be the only thing you could afford, but that's ahead of the story . . .) in a more-or-less understandable way.

The big X in the upper left marks the spot where a switch goes. This is no ordinary switch, though. You know these mat-type footswitches that work by pressure? Take one of those and put it under the cushion of the chair in the shack. . . . Now, whenever you sit down, the station turns itself on.

There, that wasn't too painful, was it? Now read on to the right until you come to the box marked "20 *see* TD." This houses a 20-second time-delay relay which delays operation of the transmitter bias supply until all filaments have had a chance to heat.

Skip the box marked "WWV Rcvr" for the moment and concentrate on the one labeled "C. R." In its confines nestles the Conelrad alert monitor. Instead of the ordinary system of buzzer or pilot light, the output of this alarm is just a SPDT relay. When all is well, the "G" output line is connected to —12 volts. When the alert sounds, the —12 voltage is switched to the "R" line.

Now move on to the "Tape Log" box. This houses the much-modified tape recorder. The tape recorder has two inputs, as well as an automatic stop to halt it when it runs out of tape, and a relay in its B+ line which switches —12 volts to either the "On" line if all is working or the "Off" line if something fails.

Back to the bias supply. It, too, has one of these little relays, connected in a voltage-sensing circuit so that —12 volts is on the "On" output line until bias rises to rated value. At that point, the signal switches to the "Off" output line.

We skipped the "WWV Rcvr" before. Go back. This can be any additional receiver (a command set will work but a 51J is recommended) which will pick up WWV. With its own antenna, it is permanently tuned to

An Argument for a New Type of Radio Communication

Zero-Shift Keying

Jim Kyle K5JKX/6

Are you an experimenter, looking for the opportunity to pioneer new fields? Then maybe this article is for you.

Let's admit right off that it's theoretical; although it includes several schematics, none of the equipment has been built or tested—which means that the system may have a number of hidden bugs. However, all the component parts of the system have been used in other branches of electronics with success—and there's no apparent reason why they won't do as well here.

Even if the entire system had been built, it couldn't be tested on the air (except at microwave frequencies, which offer their own problems) under present regulations—which means that if it works for us in our bench test, we'll have to petition the FCC for permission to use this type of modulation on the more-populsr ham bands.

But, if it works, getting permission to use it should pose no problem, because the gadget is a high-speed RTTY system requiring virtually zero bandwidth. It's also almost impervious to interference, noise, or other disturbances, and utilizes present equipment with less modification than is necessary with present-day RTTY gear. Only one attachment is necessary at the transmitter, containing a single stage, and another at the receiver.

The entire system is based on the fact that RTTY is basically a binary pulse-code modulation system, in which groups of five pulses convey each letter. Most RTTY activity today uses frequency-shift keying, in which one frequency is transmitted to indicate the presence of a pulse and another frequency is sent to indicate pulse absence. These are known as the "mark" and "space" frequencies.

Commonly, mark and space frequencies are separated by 850 cycles (the value is a carryover from landline teletype operation) although regulations allow us to use any shift between 0 and 850 cycles.

Now, let's back off a minute and look at the situation from the viewpoint of a digital computer engineer. His hardware operates with strings of binary pulses which are either there or aren't there, too. Instead of mark and space, he calls them "one" and "zero", but it's the same situation. To him, a teletype transmission is simply a chain of 5-bit pulse trains.

One of the larger problems facing computermen today is that of transmitting data from one computer to another cross country, and they've put a lot of study into it. They've analyzed almost every possible form of modulation from the standpoint of easy separation of "ones" and "zeroes", and the system we're describing is based on this study.

Take a flow of direct current. Its polarity may be either positive or negative. This provides a binary representation, which in fact has been used in the trans-Atlantic cable.

However, it's difficult to transmit dc over the air, so let's turn our attention to a sine wave. It, also, may be either positive or negative. That is, the sine wave may be either in phase with a known reference, or 180 degrees out of phase with the reference. This, too, provides a binary representation.

In other words, "mark" can be represented by an rf sine wave of any desired frequency and "space" would then be a sine wave of the same frequency but 180 degrees opposed in phase. Since frequency would remain unchanged, bandwidth of the system would approach zero (actually, in FM terms the signal would have infinite bandwidth every time the phase changed and zero bandwidth in between. However, energy content at any one frequency of a signal of finite power spread over an infinite band is infinitesimal and can be ignored).

To accomplish this in an actual transmitter,

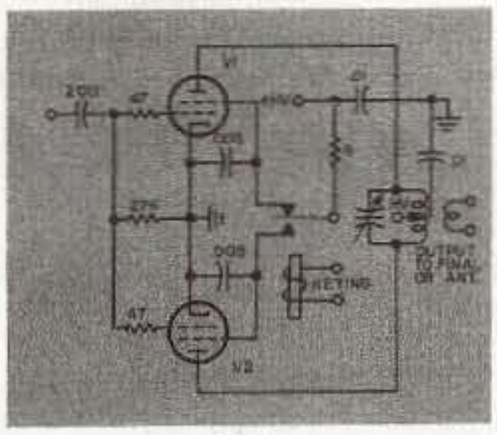


Fig. 1

mid-80s, many repeater trustees tape-recorded *all* conversations to ensure fully accurate logging to meet the then-current logging requirements.) He concluded that "With care, [the system] could be built in a standard six-foot relay-rack cabinet for something less than $1,568." He recommended "judicious selections from surplus." His final statements were more prophetic than he realized: "That's why it's never been built here, and probably won't be in the near future. But if you have a pair of oil wells in the back yard, and don't mind a little tinkering, you too can have a completely automated station. And with a little more engineering, it can be made to operate itself, freeing you from the drudgery of contests and the like and leaving you free to read ..."

Here we are, 40 years later, which still might be considered "near future" for Jim's article, and we have met his criteria for an automated station. Not quite computerized, but his article did develop and explain precise logic paths that could be done with the technology of the time, and it was a portent of things to come. The price for the relays and rack that he quoted were pricey in their day, but the cost of the intelligence to fulfill this dream rose while that of the hardware fell. We can

do the six tasks he mentioned for half the price he quoted, and we do not need that relay rack. We also have the luxury of some extra intelligence in our computer logic today to satisfy the dreams mentioned in his second article, a zero-shift keyed signal and detection system.

By September of that same year, 1961, the Johnson Ranger II was announced, along with the Swan single-band transceivers (for only $275). Lafayette Radio introduced the HE-50 10 meter AM transceiver that ran 12 watts input to the final and had both the 117 VAC and 12 VDC power supplies built-in. It used only eight tubes but required crystals for the transmit frequency, unless you had an external VFO. AM was still king, with its broad signal on the band. Jim Kyle wrote an argument for a new type of radio communication, a data transmission medium: zero-shift keying.

He admitted right off that this was theoretical; none of the equipment had been built or tested. He acknowledged that the then-current FCC rules would only allow such a signal on microwave frequencies (for hams) since it was a different modulation type than allowed on other ham bands. He suggested petitioning the FCC if the concept proved feasible. He called this a "gadget," a high-speed RTTY [Radioteletype™] system "requiring virtually no bandwidth … almost impervious to interference, noise, or other disturbances. Only one attachment is necessary at the transmitter, containing a single stage, and another at the receiver." It almost begins to sound like PSK31.

Beginning with an analysis of the 850 "cycle" shift of a RTTY signal, he moved into a discussion of polarity shifting a DC signal and then to phase modulation of that DC signal. He showed a schematic of such a balanced modulation keying unit that could be inserted just prior to the final amplifier. Keying the SSB signal with a sine wave input, he accomplished phase modulation of a single frequency. One half of the mission accomplished!

Kyle next explored detection, offering a schematic of a phase detector as a comparator of reference and incoming signals. Tapping the final IF's grid and feeding it into the receiving adapter (schematic supplied!) produced a shifting signal similar to rapidly switching sidebands according to the incoming signal. He said, "In addition to the saving in spectrum space … [and in] the absence of a strong interference which might capture the phase-reference generator, the only requirement for a solid copy would be that the incoming signal be somewhere in the receiver passband. … This means that the signal can be 3 dB [sic] lower in the noise level for the same accuracy of copy."

How prophetic! Like most prophets, Kyle adds a clarifying note to his diagram description: "This [style of potentiometer and diode arrangement] probably won't affect you, since the likelihood of your building this circuit is rather remote."

Remote, indeed! It took less than 40 years to make both of Jim Kyle's visions practical. Jim was a prolific writer and had several articles each in different editions as *73 Magazine* became established. He had wide talents: he wrote technical license training manuals, editorials about the hobby, visionary articles such as I have cited here, and more. Some people said a long time ago that there was nothing new to invent. We have proven that wrong many times over. However, perhaps there is room to rediscover old dreams so we can make them happen now that we have the technologies required to make them real. Mankind evolved from tool maker to machine maker. Now, we can become the dream makers. 73

Glenn E. Yingling W2UW
28 Lawrence Ave.
PO Box 62
Newark Valley NY 13811-0062

Gold Is Where You Find It!

My first on-the-air experience.

A lot of jokes have been made about those paragons of industry and virtue, the infamous "brothers-in-law," but after some reflective thought, I now recall that I owe my start and beginning success in amateur radio to not just one but two of those much-maligned persons. Hi!

I am one of many people who almost did not discover amateur radio and, in fact, I did not get my ticket until after I graduated from college in 1951. Up to that time, I had little knowledge of ham radio, and gave little thought to the possibility of getting a license and getting on the air with my own station.

My sister's husband (brother-in-law number 1), who had been a radio operator in the Army Air Corps, came home after attending the Spartan Aeronautical Institute in Tulsa, Oklahoma. As part of his schooling, he had gotten both his amateur radio license (WØKIR) and his commercial radio operator's license. His description of ham radio and what it takes to get on the air made me realize that I, too, could get a license and get on the air. (A special thanks to you, Al.)

Some time after that I was able to get my Novice license by going to Pittsburgh to the FCC office and taking the test. I received the call WN3VXS — which I never made a contact with because I had no transmitter. Three months later, I again went to the FCC office and received my General class ticket, W3VXS — but I was still not on the air because all I had was a home-brew, one-tube regenerative receiver!

An interesting sidelight here is that I have taken all of my exams at FCC offices and, because I have moved around some, I have had six calls (WN3VXS, W3VXS, K2YOJ, K4DCX, W2HFF, and W2UW) in that order.

But back to the story. I was soon on the air, to some extent, with a crystal-controlled 6AG7-1625 kit that I purchased. I made very few contacts due to my inexperience and my poor receiving equipment (the regenerative receiver). However, fortune smiled on me based on that old adage, "Gold is where you find it!"

Enter brother-in-law number 2! While visiting my wife's family, we were all sitting around talking. I opened a conversation with my wife's brother, "Bud."

I said: "Now that I have my amateur radio license, I need to get a better receiver for listening." (Meaning to impress everybody with the idea that I was now a ham radio operator.)

Bud said: "You know, Glenn, I think that I have an old radio that you might be able to use."

I said: "Bud, what I need is a radio with more than one band." (I'm thinking: Oh-oh, he probably doesn't understand ham radio and this is just some old junk BC radio!)

Bud said: "Well, this has more than one band on it. I bought it at a garage sale for 12 bucks to have in the living room to listen to the news. You are welcome to it, if you are interested."

I said: "Well, what I really need is a radio with shortwave bands." (I'm thinking: He is probably talking about a cathedral-type radio with shortwave bands for the shortwave listener.)

Bud said: "Well, this has shortwave bands and I keep it on the end table."

I said: "Well, I need to receive code, and that takes a communications-type receiver with a BFO." (I'm thinking: From his description, it must be a 5-tube AC/DC set with shortwave bands.)

Bud said: "I think this thing receives code, but I haven't tried it much."

(I'm thinking: I better make it clear to him exactly why what he has will be of no use to me!)

I said: "Bud, what I am looking for is a shortwave communications receiver

Continued on page 57

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 December issue, we should receive it by September 30. Provide a clear, concise summary of the essential details about your Calendar Event.

SEP 1

UNIONTOWN, PA The Uniontown ARC will hold its 52nd annual Gabfest at the club grounds located on Old Pittsburgh Rd., just north of the intersection of Rts. 51 and 119. The Gabfest starts at 8 a.m. Free parking and free tailgate space with registration. Talk-in on 147.045(+) and 147.255(+). Table space available. For more info contact Carl *Chuprinko WA3HQK*, or Joyce *Chuprinko KA3CUT*, 84 Heaven Hill Rd., Morgantown WV 26508. *Tel. (304) 594-3779.*

SEP 7, 8

MENA, AR The Queen Wilhelmina Hamfest Association will present their 32nd annual Mena Hamfest on September 7th and 8th at the Queen Wilhelmina State Park near Mena AR. The location is 13 miles west of downtown Mena, on Hwy. 88. Talk-in is on 146.79, 100 Hz tone. For flea market spaces, contact *Charlotte Lee KC5DOR* at *[clee48@ipa.net]*, or *415 Crosstrails Rd., De Queen AR 71832.* The Grand Prize will be a DX70.

SEP 8

BARTONSVILLE, PA The Eastern Pennsylvania ARA and The Pocono ARK will co-sponsor the Pocono Area Hamfest and Electronics Exposition, Saturday, September 8th, at the Monroe County Vo-Tech in Bartonsville. This event will feature new and previously owned equipment, electronics parts, radios, computers, and more. Admission $5, children and spouses free. Gates open at 8 a.m. for the general public. Vendors: $15 inside space 12 ft. x 6 ft. each; $5 outside space 10 ft. x 20 ft. each. Vendor gates open at 6 a.m., with set up *before* 6 a.m. Set up time must be pre-arranged. Talk-in on 147.045(+) PL 131.8, 146.865(-) PL 100, or 146.535 simplex. VE exams will be available. For further details contact *Bill Connelly W3MJ* at *(570) 424-2174;* or *Jerry Truax N3SEI* at *(570) 620-9080.* The theme of this event is "Public Service & Fun for the Whole Family." Various area public service agencies, the National Weather Service, Search and Rescue, Fire Dept., etc., will be on hand, as well as many vendors and exhibitors.

LOUISVILLE, KY The Greater Louisville Hamfest/ARRL Kentucky State Convention will be held at the Bullitt County Fair Grounds, about 15 minutes south of Louisville. Advance tickets $6, $7 at the door. Send an SASE for tickets or info to P.O. Box 34444-N, Louisville KY 40232-4444. Info for commercial spaces is available at (812) 294-4021, or (812) 284-5853. For flea market spaces call *(502) 935-7197* or *(859) 284-9090; fax (859) 284-5296.* The Web site is [http://mx2.confluentasp.com/~glha/].

SPENCER, IN The Owen County ARA and the Bloomington ARC will co-host a hamfest on September 8th. For more info contact Katie Smith K9INU, *tel. (812) 829-2140;* or Millard Qualls K9DIY, tel. (812) 332-0074.

SEP 9

BALLSTON SPA, NY The Saratoga County R.A.C.E.S. Assn. Inc. will hold its 16th Annual Hamfest on Saturday, September 9th, at the Saratoga County Fairgrounds in Ballston Spa. This will be held rain or shine, all under cover. Gates open at 7 a.m., with the hamfest running until 3 p.m. Admission is $5, including 1 tailgate spot and free parking. There will be door prizes, a fox hunt, VE exams, and plenty of food. Talk-in on 146.40/147.00 and 147.84/.24. Reserved tables $5 each, first come, first served. Reservations and pre-pay welcome and encouraged. Early set up for all vendors. For further info and/or reservations, contact *Darlene Lake N2XQG, 314 Louden Rd., Box #84, Saratoga Springs NY 12866;* tel. *(518) 587-2385,* E-mail *[lake@capital.net].*

BETHPAGE, NY The LIMARC Fall 2001 Electronics Hamfair and Flea Market will be held Sunday, September 9th, at Briarcliffe College, 1055 Stewart Ave., Bethpage NY. Gates open at 7 a.m. for vendors, and at 8:30 a.m. for buyers. Outdoor tailgating only, rain or shine. Each space is $15 and includes admission for one person. Additional workers will be $6 each. No advanced registration needed. General admission is $6, children 12 and under accompanied by a paying parent, as well as non-ham sweethearts, are free. For more info visit the LIMARC Web site at *[http://www.limarc.org]*, or call the 24-hour hotline at *(516) 520-9311.* Talk-in is on the 146.850 rptr., PL 136.5. E-mail *[hamfest@limarc.org].*

SOUTH DARTMOUTH, MA The Southeastern Massachusetts ARA, Inc., will hold its annual flea market on the club's grounds at 54 Donald St., South Dartmouth MA. The event will run from 9 a.m.–1 p.m. Talk-in on 147.00/.60. Admission $2, spouse and children free. Food, door prizes, walk-in VE exams (10 a.m.), and more. Free space for vendors! For further info contact *Tim Smith N1TI* at *(508) 758-3680;* or by E-mail at *[rt_smith@yahoo.com].*

SEP 14, 15, 16

PEORIA, IL The Peoria Area ARC will host the Peoria Superfest 2001 Amateur Radio, Computer and Electronics Show at Exposition Gardens, Peoria IL. This has also been designated as the 2001 ARRL State of Illinois Convention. ARRL Illinois Section Manager Bruce Boston KD9UL will attend, and Mike Nowack NA9Q will provide an ARRL DXCC card check. The flea market will be held 3 p.m. until dark on Friday, September 14th. Live music will be presented Saturday night in the South Garden Pavilion. VE exams will take place Sunday, 10 a.m.–1 p.m. Gates open 3 p.m. Friday, 6 a.m. Saturday and Sunday. Commercial buildings will be open Saturday, 8 a.m.–4:30 p.m., and Sunday, 8 a.m.–3 p.m. Advance tickets are $5 with two stubs; $7 at the gate with one stub. All tickets good for the weekend. Outdoor flea market space can be reserved in advance for $5, plus $5 for each admission ticket. Space and admission tickets are good for the entire weekend. Set up for the outdoor flea market will be Friday at 10 a.m.; 6 a.m. Saturday and Sunday. Set up for indoor commercial vendors will be Friday, 2 p.m.-9 p.m.; Saturday, 6:30 a.m.; Sunday, 7:30 a.m. Talk-in on 147.075(+). Visit the Web site for the latest Superfest info *[www.w9uvi.org].* E-mail for tickets and space reservations to *[w9uvi@arrl.net].* The postal mail address is *Peoria Superfest, P.O. Box 3508, Peoria IL 61612-3508.*

SEP 16

NEWTOWN, CT The Western CT Hamfest will be held at the Edmond Town Hall, Rt. 6, 9 a.m.–2 p.m. Set up is at 7 a.m. Exit 10 on I-84.. Talk-in on 146.67/.07, PL 100.00. New equipment dealers, flea market, tailgating, computers, refreshments. Tables are $10 each including admission, tailgating $6 including admission. Admission $4, under 12 free. For reservations and info contact Ken Weith KD1DD, 8a Hoyt Rd., Bethel CT 06801. Tel. (203) 743-9181.

SEP 22

BENTONVILLE, AR The BCRO Hamfest will be held September 22nd from 8 a.m.–1 p.m. at the National Guard Armory in Bentonville AR. Contact Shirley at (501) 451-8626; or Betty at (417) 435-2332.

NEW PORT RICHEY, FL The Suncoast ARC will hold the 11th Pasco County Hamfest 9 a.m.–3 p.m. on September 22nd, at the New Port Richey Rec. Center, 6630 Van Buren Rd., New Port Richey FL. Admission $5, XYLs and under 12 free. Tables $15 each, electric $5. Tailgate spaces $3 each. You must have admission to enter tailgate or exhibit hall. This event will be held inside with air conditioning. For more info, contact *Owen Godwin KI4CT, (813) 909-1336;* E-mail *[KI4CT@ARRL.NET].* Talk-in on 145.35 rptr.

SANTA ROSA, CA The Sonoma County Radio Amateurs, Inc. annual Hamfest and VE session will be held September 22nd at Lewis Adult Education Center, corner of Lewis Rd. and Lomitas Ave. in Santa Rosa CA. Vendors enter at 6:30 a.m., buyers at 7:30 a.m. Double parking spaces for vendors at $10 each; buyers free. Food available. VE exams 9 a.m. –12 Noon. For more info call *Rick K6ZWB* at *(707) 575-4455,* or go to the Web site at *[http://www.cds1.net/scra].* Write to *SCRA, P.O. Box 116, Santa Rosa CA 95404.*

SEP 29

HORSEHEADS, NY The Amateur Radio Association of the Southern Tier presents its 26th Annual Elmira International Hamfest-Computerfest on Saturday, September 29th, at the Chemung County Fairgrounds in Horseheads NY. Talk-in will be on 146.700(-), with an alternate frequency of 147.360(+) (in case the primary frequency is down). There will be dealer displays of new equipment, and a large flea market area. Breakfast and lunch will be served on the premises. Admission is $5 in advance and $6 at the gate. The event will run from 6 a.m.–3 p.m., with VE exams starting at 9 a.m. For info about VE exams, contact John at (607) 565-*4020.* For tickets and dealer info contact Randy at (607) 738-6857. The Web site is at [http://www.arast.org].

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].

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 21

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, Ste*phen 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].

Continued on page 57

Andy MacAllister W5ACM
14714 Knights Way Drive
Houston TX 77083-5640

Field Day 2001

Field Day is one of the most popular on-the-air contests/activities in amateur radio. It is held each year on the fourth weekend in June. The event is sponsored by the American Radio Relay League (ARRL) as an emergency preparedness exercise. During the 24-hour period, U.S. and Canadian participants strive to make as many contacts as possible operating in remote locations from tents, campers, vehicles, or just a simple set up in the middle of a field.

The ARRL Field Day rules consider the amateur satellites as a separate band and provide a 100-point bonus for the first satellite contact. The Radio Amateur Satellite Corporation (AMSAT) version of the event considers each satellite as a separate band, encourages international participation and has additional rules for digital communications. Many Field Day groups have made efforts to put more emphasis on their satellite stations, both for ARRL points, and to simultaneously make contacts in the AMSAT competition.

Field Day 2001 via satellite

Last year AMSAT-OSCAR-10 was surprisingly good. This year however, AO-10 was only a solid performer toward the end of the operating period. This 18-year-old hamsat can be quite unpredictable since the onboard computer gave out over a decade ago. When AO-10 was nearing perigee (the low point of its elliptical orbit) many voice and CW contacts were made. Even with the problems, AO-10 is still a great resource in the sky. It is simply an uncontrolled, but functional Mode "B" (70 cm up and two meters down) transponder in space.

The Fuji satellites, F-O-20 and F-O-29, were both in analog (SSB and CW) mode for Field Day. Contacts were plentiful for those that were prepared for the exceptional Doppler shift associated with these hamsats 70-cm downlink. The signals can drift as much as 20 kHz in the course of an overhead pass. Satellite newcomers had problems keeping up.

The Russian RS-12/13 hamsat did well. The satellite is currently in Mode A using the RS-12 hardware. This means that its analog transponder receives on two meters and downlinks on 10 meters. Last year RS-12/13 was using the RS-13 system and was also receiving on the Mode K, 15-meter receiver, in addition to the two-meter receiver (Mode K + Mode A = Mode KA). Due to the great band conditions on 15 meters, numerous stations that were simply working terrestrial 15-meter Field Day, were heard through the transponder. While this was entertaining, it made it very hard to tell the difference between satellite stations and those that were inadvertently being heard through the satellite. Operation in the 2001 event was easier since the only signals in the 10-meter downlink passband were uplinked intentionally for RS-12 retransmission via the two-meter satellite receiver. Many operators found RS-12 to be less crowded and easier to use than the Fuji hamsats, but without many operators on CW, just voice. There have been no reports of any successful RS-15 contacts during Field Day 2001.

Operation via AMSAT-OSCAR-27 and

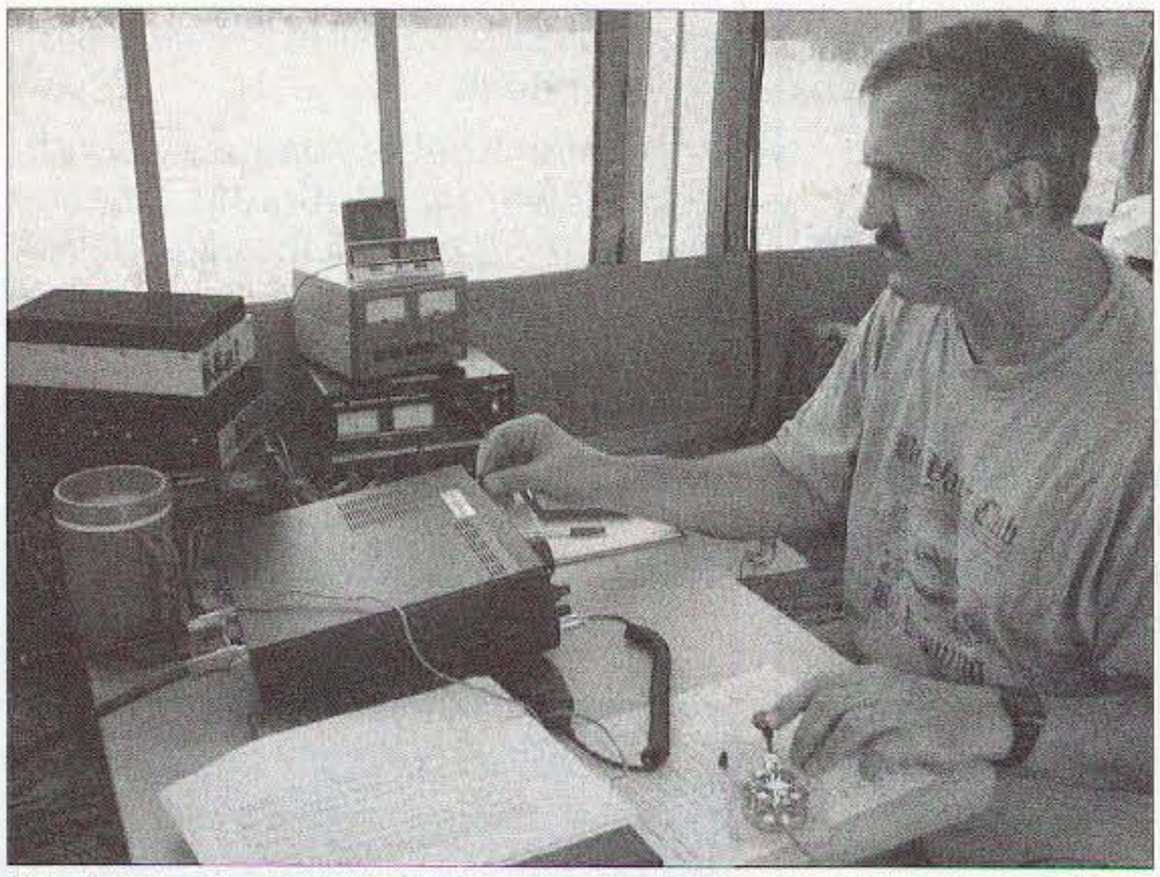


Photo A. *Doug WB5TKI makes another satellite contact from K5ENG in South Texas during Field Day 2001. (WA5TWT photo)*

Photo B. *An air-conditioned camper kept things cool at K5ENG in South Texas. (WA5TWT photo)*

Photo C. *Breck K4CHE and Mike WB3ILM at W3HZW used a home-brew dual-band yagi, an Icom IC-821H and a battery for their contacts via FO-29 during Field Day 2001 from Delaware. (K4CHE photo)*

Photo D. *William PE1RAH and Dirk ON1DLL at ON5LL ran separate digital and analog stations with batteries, solar cells and backpack radios from northeast Belgium. (ON1DLL photo)*

UoSAT-OSCAR-14 was once again, as expected, super crowded! These single-channel FM Mode "J" (2 meters up and 70 cm down) repeaters in the sky were working well even though it sounded like hundreds of stations were trying to access the satellite simultaneously. The result is that only a few contacts are made, usually by the stations with the biggest antennas and the strongest transmitters. It was wild, but at least it was only temporary. Unfortunately there were a number of stations trying to get their 100-point ARRL Field Day bonus using HTs and small beams. Most were disappointed, but changes in the AMSAT rules made it possible for at least a few more stations to make contacts with something less than monster antenna arrays and high-power two-meter amplifiers. The modified rules specify that each station is allowed credit for only one contact per FM satellite during Field Day. Participants were encouraged to make their single contact and move on to other hamsats for the duration. Some exceptions were heard, but the really "big guns" followed the recommended procedure, made their one contact, and left.

The digital hamsats were a disappointment. UoSAT-OSCAR-22 was the only active 9600-baud satellite. For the duration of the event stations did their best to upload a Field Day greeting message and download as many as possible. While KITSAT-OSCAR-23 and KITSAT-OSCAR-25 were available last year, KO-23 is considered out of commission due to battery problems, and KO-25 isn't doing much better. Rule changes put in place for Field Day 2000 also allowed digital contacts that use the amateur-radio satellites as flying digipeaters. UO-22 supports this mode in addition to its BBS-style system.

Photo E. *Checking the antennas at ON5LL for Field Day 2001 — AMSAT rules. (ON1DLL photo)*

Where was AO-40?

Prior to Field Day there was some hope that our newest hamsat would be available for Field Day 2001, but with orientation maneuvers underway, it was not likely. Control stations spent the early weeks of June positioning AMSAT-OSCAR-40 for ammonia arcjet motor firing. During Field Day telemetry was being downloaded and studied to determine the effectiveness of the ATOS (Arcjet Thruster on OSCAR Satellite). This motor was originally designed to expel ammonia gas past an arc created by a spark plug. While the thrust would be low, it would be sufficient for minor long-term orbital modifications. More information about the ATOS system can be found at: [http://www.irs.uni- stuttgart.de/RESEARCH/EL_PROP/PROJ/e_atos.html].

Just before Field Day the ATOS motor was activated for one hour near apogee (the high point of the orbit) without the spark plug. The result was an apparent 2.5 km change in the perigee from 279 km to 282 km. A large number of firings were anticipated to use up the 53 kg of ammonia onboard the satellite and raise the perigee further.

One week after Field Day an announcement from AMSAT-DL President Peter Guelzow DB2OS stated that all of the ammonia had been used and a final perigee height of 851 km had been achieved. While there can be no further modifications to AO-40's orbit, the good news is that AO-40 has a much higher (stable) perigee, and it's time for transponder schedules and more communications experimentation.

An unexpected surprise

Although contacts with the International Space Station were not counted for AMSAT Field Day operations in 2001, that didn't stop a good number of International Space Station (ISS) enthusiasts from plotting orbits and listening on the 145.800 MHz FM downlink frequency. They were not disappointed. Susan Helms was operating Field

Continued on page 58

Joe Moell P.E. KØOV
P. O. Box 2508
Fullerton CA 92837
[Homingin@aol.com]
[http://www.homingin.com]

Texas Teens Track Transmitters and Talk Tech

Wireless! It used to be an antiquated term for communications through the ether, back in the days of spark transmitters and coherer receivers. Nowadays, it's been given an entirely new meaning and importance.

Today's wireless world encompasses a myriad of new techniques and products for connecting individuals and businesses nearly anywhere on earth. Predictions for its future are nothing short of phenomenal. One source estimates 210% growth in cell/PCS phones and 1500% growth in Internet-enabled phones in the next three years. After that, who can guess?

What does this have to do with radio direction finding (RDF) and hams? To answer that, consider another question: Where will the designers of the next generation of wireless devices come from? Schools are churning out computer and networking engineers, but outstanding RF engineers have been much harder to find.

According to Ellen Gaconnier, a manager at Nortel Networks, there are 300,000 job openings in the telecommunications market, and in five years there will be 1.5 million such openings in the USA. She says that the reason for the coming shortfall is that students are not taking the math, science, and technology classes necessary to enter these fields.

Just as young people are needed for the future of ham radio, our hobby can be beneficial to youth, by introducing them to the importance of wireless technology and the opportunities for careers in this wide-open field. Last month, I told you how a pair of California hams are using RDF to bring kids, amateur radio, and wireless technology together. This month we'll meet two Texas hams who are taking a somewhat different, but equally effective, approach.

Foxhunting Fun at Tech Camp

Jeff Fant N5OLF (**Photo A**) of McKinney, Texas, is a Professor of Engineering Technology at Collin County Community College (CCCC). One of his specialties is telecommunications and computer networking. "I started the Cisco academy here," he says. "Now it's the largest in the nation. I looked around and saw a lot of older people coming into our program, but I didn't see many high school graduates. Where were the kids?

"I realized that I had to get to them before high school," he continues, "before they get their hormones going and get cars. I got a Carl Perkins grant to get a bunch of equipment in my hands so I could go into the elementary, middle, and high schools. Now we do a bunch of presentations with ham gear every year."

N5OLF's presentations are part of CCCC's Technology Awareness Program (TAP). "I take a computer and projector with me to show some satellite tracking. We talk about communicating through the satellites. We also make phone patches and send slow-scan video back and forth with those little Kenwoods. The elementary school kids go

***Photo A.** Jeff Fant N5OLF helps Tech Camp students learn to solder. Safety goggles are mandatory. (All photos courtesy of Collin County Community College.)*

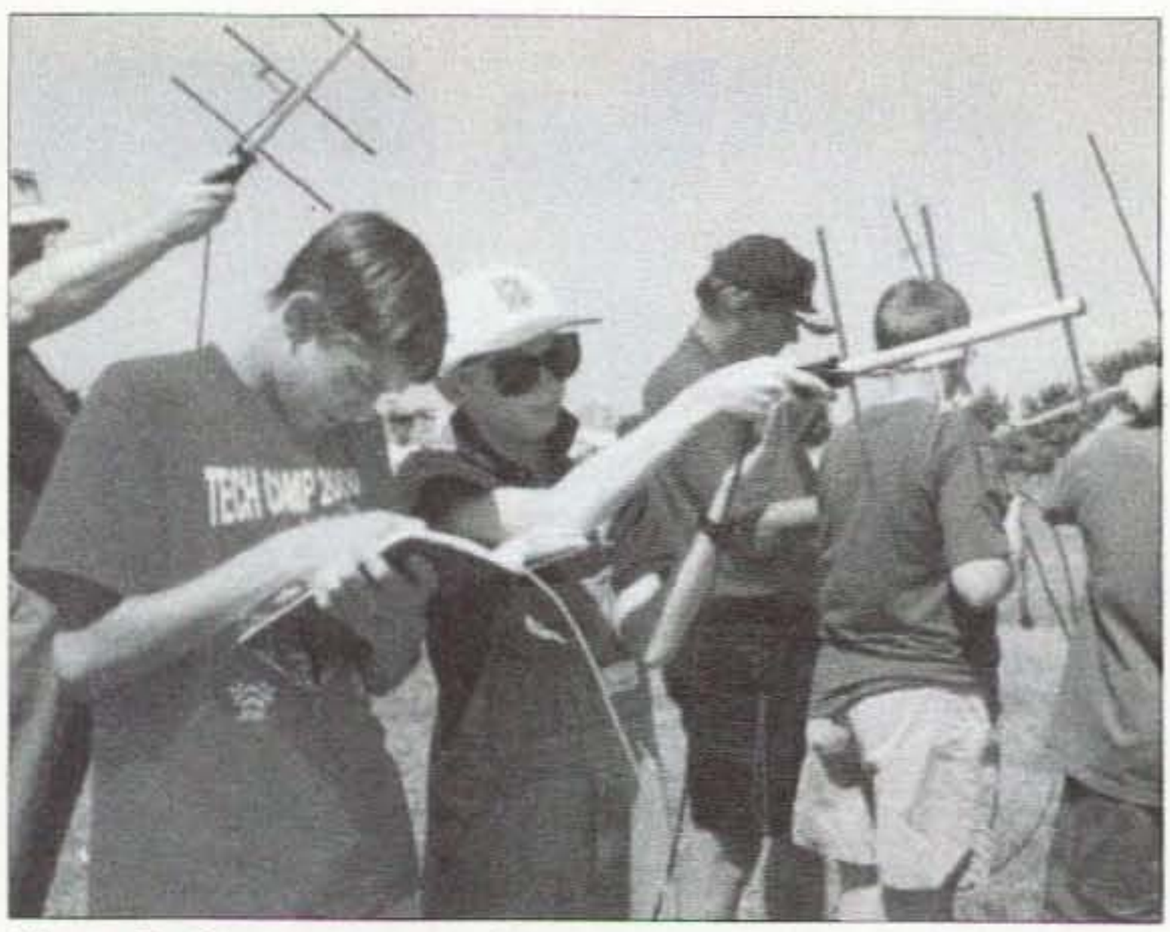


***Photo B.** Campers are getting acquainted with the directivity of their Arrow yagis. At far left is Tom Mobley KD5AC.*

Photo C. *A variation on the foxhunting theme is to have students be the foxes. What a great way to play hide-and-seek!*

Photo D. *KD5AC made miniature UHF fox transmitters for Tech Camp. They could be anywhere in the tall grass behind these youthful foxhunters.*

nuts when I tell them, 'You can do this!' I tell them that the youngest amateur was five years old and there's no age limit."

Jeff's next step was to organize a club for kids called Sigma Gamma Epsilon. Those Greek letters stand for SGE, or Student Game Enthusiasts. As a result of his talks, SGE chapters have since formed at many middle schools throughout the area. At SGE meetings, students learn about ham radio technologies, including packet, PSK31, voice repeaters, and transmitter hunting.

Soon, Jeff discovered that many 6th and 7th graders have an insatiable appetite for technology. He says, "They're the ones asking Mom and Dad, 'What does reciprocity mean?' They want to go further. That led to the first Tech Camp."

"Imagine a camp that takes your children away from isolated Net surfing, and video and computer games, and into team-oriented high-tech games that fit right in with the math and science that they are learning in school. And imagine your children having fun." That's an excerpt from a promotional piece to parents for Tech Camp 2001. It goes on to say that the camp "offers students the best of both worlds: fun activities with high-tech toys and a way to apply math and science skills in meaningful real-life applications."

A key activity at Tech Camp is hidden transmitter hunting, which we hams call foxhunting, foxtailing, radio-orienteering, and ARDF. "Before we start foxhunting, we teach them all about yagis," N5OLF says. "On the second day after they learn about measurements, we make them go outside and lay out on the ground an 80-meter yagi. You need a huge field for that!

"When we come back in, we talk about wavelength and then we flip it around and say, 'What if the frequency is 440 MHz, how big would that be?' They calculate that and then we give them the bags with little Arrow 440 MHz yagi antennas. They get to assemble them and measure them and after that, they go out and see how directional they are (**Photo B**).

"By the end of the week, they're designing their own yagis. They build them with fiberboard that we get from Home Depot and copper tape that you can buy at a tinning place where they make lead windows. The kids get a coaxial cable with BNC connector, a little ferrite bead balun, a couple of tie-wraps and a precut board. They lay down the copper tape to make a yagi, then they hook it to a network analyzer to check it out. We show them how to make their measurements and tune it with a straightedge."

After the Tech Camp students have learned all about directional antennas, it's time for hidden transmitter hunting. The transmitters are very small and put out only a few milliwatts, so extreme attenuation is never needed. "We use the 440 MHz band to keep antenna size down," Jeff explains. "We have a big open area on campus, but they mow it a lot, so we like to be able to put some fox transmitters in the trees and some in the grass.

"The attenuators are passive and do up to about 110 dB. We keep them at the college to use from year to year. We disable the transmitters on the students' hunt radios and we explain attenuators to them, what they're for, how they're used, and why never to transmit through them.

"The first hunts are very simple (**Photo C**), but by the time we get to the end of camp, we have five foxes out there at one

Photo E. *Tech Camp students use an Arrow dual-band beam to try for contacts on a ham satellite.*

time and they're all unattended (**Photo D**). We put different callsigns on each one and make the students identify them as they find them. The first year, some of them were out in real tall grass. The biting bugs were pretty bad because of the recent rain.

"Some kids found the foxes but they couldn't figure out which ones were which because they hadn't learned CW. We don't give points unless they can identify the foxes, and the others thought it was pretty funny. It was hilarious to watch and a real incentive to get them studying.

"At the end of the first Tech Camp was the big ham convention in Arlington, about 90 miles away. We put a 1.2 GHz antenna on our roof and hit an ATV repeater downtown. From there we connected all the way out to Arlington to the Convention Center. We interviewed everybody, including the keynote speaker and ARRL President Jim Haynie. The kids set it all up, by then some were licensed so they were the control operators. Later, the kids went out to shoot some satellites (**Photo E**). We invited the parents in that day and they were just amazed.

"After we showed them how to find foxes with a directional antenna, we talked about the FCC's new E911 requirements, how you need to be able to determine the location of any cell phone. A lot of the cell sites don't have directional beams, they just have omni antennas. How do you do that? I told them to come back next year, because we're going to find a downed astronaut with just omnidirectional antennas. You have to have teamwork and know all about signal strength. We'll draw sensitivity circles and ... well, you'll just have to come back and see."

Not Free, But Worth Every Dollar

Tech Camp is for students entering the 7th through 9th grades. It costs them $250 each. "A teacher must recommend them and they have to write a 50-word essay on why they should come," says Jeff. "Each camp runs ten days in June, with sessions from 0830 to 1630 hours. They bring their own lunches and a lot of them car-pool together."

TAP gets support from the college and the National Science Foundation, but Tech Camp depends on corporate sponsors for money to buy radio gear for successful campers. Upon getting their first ham ticket, registered students get a Kenwood TH-D7A handie-talkie for voice and packet on the 146 and 440 MHz bands. Upon earning a General Class ticket at Phase II camp, each gets a Ten-Tec QRP transceiver kit.

"We're sitting in Telecomm Corridor, with plenty of high-tech companies here," Jeff says. "I go out every year and make presentations to them. I show them that there's a phenomenal shortage of engineers and competent techs. They're usually aware of that, of course, that part isn't anything new. Then I tell them what we're doing with Tech Camp.

"I explain that if we make learning fun at camp, then kids will go back to the classrooms and enjoy what they're learning. Right now they're being overloaded in school, getting told to 'Just do another 50 problems.' They say, 'When are we going to use this?' and there's just no answer. If they can have fun with it, it gives a whole new meaning to them. Our goal is to help the schools, and if we can get kids excited about technology by doing ham radio, there's no doubt in my mind that their math, science and reading comprehension are going to rise.

"We've done real well with corporations," N5OLF continues proudly. "The first year I showed this to the top people at Nortel and they bought it in five minutes. They wanted to do the whole thing and wrote a check for $34,000. They're having layoffs this year and couldn't throw money at the program, but Ericsson came on board and gave $45,000. We also got smaller donations from some other organizations. Next year, it looks like its going to be Alcatel or Cisco.

Walt Evanyk, a business development manager of corporate strategy and solutions at Ericsson, believes that his company's sponsorship of Tech Camp will help develop future employees. "Standard education curricula do not make these children aware of career opportunities in technology that they can really touch and feel," he says. "So often they say, 'What is telecommunication? Why would I want to work for a phone company?' By encountering technology and applying it to problems or needs, students see how the things that they are learning in school, like math and science, apply to careers."

Corporate sponsorship is very important to Tech Camp, because many educational grants will pay for administrative expenses, but not parts and equipment. "I want to seed the community with technology," says Jeff. "It's one thing to have a kid learn all about ham radio and pass the FCC test, and it's another thing to pass the exam and have some equipment to use. I want them to walk away with some very good gear, so we award them a new HT when they pass. It really has made a difference. They get on voice and packet, and become truly active in the hobby.

"After getting his ticket, one of the students joined Skywarn and has already won some awards for his work. The Plano Amateur Radio Klub is giving their 440 MHz repeater over to the students' use. They're getting ready to move it to the campus. For now, the kids use the McKinney repeater. We're also trying to set up some interactive experiments between the SGE chapters on the air."

Knowing the problems of getting the word out to kids and parents, I asked Jeff how Tech Camp is advertised. "We have had problems going through the school district," he replied. "The approval cycle is just horrendous. There's always people in the schools who are delighted to work with you, but then they have to get approvals from these other people and deal with a lot of red tape. You give it to them three months early and then there's layers and layers that have to sign off on it. What worked better was to take our flyers to places like Blockbusters. We ask to put a flyer on the door and leave some at the checkout. Kids and parents pick them up left and right."

No Cast of Thousands

Jeff's main helper is Tom Mobley KD5AC, another CCCC Professor of Engineering Technology. "He's a character," says Jeff. "He recently graduated and is really sharp. I do most of the presentations and he handles the circuitry. He's a detail person. He makes the transmitters work, so we can stick them down in a culvert or in the grass with a couple of inches of antenna."

"The games we've developed are fun in and of themselves," Tom explains. "They appeal to the whole kid, with a mental aspect of learning to be competitive, a physical aspect of being active in competition, and a social aspect of working in teams."

"It's just the two of us right now," says N5OLF. "We've got a few other guys on board who have realized that this is an important thing to do, but it's going to take some time for them to get loose from other things they're doing and get up to speed. It's almost a full time job to keep this rolling. I have a 5-year plan. Every year we'll add a new game or activity."

Some kids don't know anything about radio before they came to Tech Camp, while others have already been active in SGE. They come from public schools, private schools, and home schooling. Tech Camp 2000 had 57 graduates, 37 of whom obtained FCC licenses. Thirty-four students registered for Tech Camp in 2001. For some, this was their second year. At the end, thirty had ham tickets, 12 of them had passed their CW tests and five were Extras. One student attended both Tech Camps and went from zero to Extra during the two sessions.

"We have one ninth grader who heard about Tech Camp, got registered, and immediately started studying," says N5OLF. "He had his Technician by the start of Camp, then got his General during Camp. He convinced the college to let him take some courses and he's at the top of his class. The professor stopped me in the hall and said, 'Jeff, I gotta talk to you. I have one of your Tech Camp kids and my problem is that I can't challenge him enough. If I do, I lose the rest of the class, and the problem is that the rest of the students are all adults!' This kid wasn't heading down the engineering path at all before, and now all he wants to read is engineering and math books.

"Tech Camp is really different from my college classes. In college, I'm usually dealing with grown-ups. Adults know where

Continued on page 58

On the Go

Mobile, Portable and Emergency Operation

Steve Nowak KE8YN/Ø
16717 Hickory St.
Omaha NE 68130-1529
[ke8yn@netzero.net]

The Right Tool

There's an old saying attributed to the Chinese that "If all you have is a hammer, every problem looks like a nail." Sometimes in ham radio we may fall into that same trap. Instead of looking at the tool first, let's examine some parts of the hobby and discuss which tool should be chosen to address the problem. Since this column focuses on portable, mobile, and emergency communications, let's limit our discussion to those three very broad but also important categories.

Portable Communications: What are the problems we face in portable operations and how can we solve them? Portable operations often call for a small radio and a convenient antenna. Often it is necessary to provide power without being able to count on commercial power. Either there may not be a handy 110-volt outlet or carrying a 25-pound power supply might be inconvenient. While there's nothing easier than tossing the two-meter handie-talkie into the suitcase, it may not be the only tool. A VHF transceiver and a current repeater directory will help strike up a conversation when operating away from the home QTH but by its nature you will probably find yourself talking to someone within a twenty- or thirty-mile radius of the repeater. What about trying a little portable DX chasing. There are some very exciting new rigs appearing on the market that provide full coverage of the HF spectrum in an extremely modest package. You may be able to power your rig from a gel cell or even a handful of D cells. On the other hand, you don't necessarily need the latest off-the-shelf equipment to operate portable HF. One of the reasons for the continuing popularity of Morse Code is that it is the best mode for operating a small, inexpensive and low power station. Many CW transmitters have been built in the popular "Altoid®" mint boxes. If you've either lost the interest in code, or never gotten bitten by the bug, here's one reason to maybe give it another chance or learn to use the code. If you decide to operate HF, you may want to concentrate on the 10- through 20-meter bands. These are usually open during the day, with 20 meters having the best evening characteristics. At these frequencies you can throw up a portable dipole antenna easily and roll it back up when you're through.

Mobile Communications

While mobile communications often provide a stable platform for a larger rig, and there is a ready 12-volt power supply, the antenna is often a consideration. A larger more effective antenna may present a problem getting the vehicle into a garage or parking deck. While the trusty two-meter is once again the most common band utilized in most areas there is a fair amount of activity on 440 MHz. Besides the normal FM voice communications, APRS is becoming more popular every day with many mobile stations using GPS to transmit their location. Six meters is gaining popularity with more repeaters appearing and 10-meter FM allows one to access a repeater and work the world. Don't underestimate the ability to work HF from a mobile station. I've worked more exotic locations from the car than from the home QTH. Naturally, when we think "mobile" most of us think of cars, but there are similar prospects if you have the opportunity to work as an aeronautical or maritime mobile. Don't forget that any transmissions from a plane or ship require the approval of the pilot in command or ship's master.

Emergency Communications

Of course emergencies bring out the need to provide a wide range of communications. Here the entire tool kit is necessary. We need portability and reliability and the information we may be called upon to handle is quite varied. Naturally VHF and UHF are among the most common tools. APRS is invaluable for storm tracking since it automatically indicates location. Many APRS stations are equipped with weather stations that report temperature, wind speed and direction, barometric pressure and rainfall. The weather service uses these for additional data when making predictions. In areas affected by hurricanes, it is common to track the hurricane's path right on the APRS screen for all stations to monitor. Packet, PACTOR, AMTOR and RTTY provide a means for passing disaster information that cannot be readily intercepted and decoded. This can prove useful for information that may identify individuals affected by the disaster. Amateur radio is, by regulation, prohibited from using codes or ciphers, but there is nothing to deter using a mode that provides a greater measure of security. These modes also are better for guaranteeing accurate copy of the message since many provide an error correction scheme.

Amateur television, both slow scan and fast scan, is also gaining popularity. If a picture is worth a thousand words, imagine how valuable a TV image is to the officials trying to manage an emergency. While commercial television stations may be on the scene, they are interested in shots of areas that will interest their viewers while public officials might need to see less interesting but more important details.

The trick, in my mind is to objectively evaluate what amateur radio modes can do and how it will support a certain goal or solve a particular problem. CW can get through when almost no other mode can. Digital communications are more secure. Voice communications can provide a lot of information to all stations on the network with a single transmission yet can also accept a reply. Different frequencies are best suited for different times of the day. As hams we have an extensive toolkit from which to

Continued on page 58

Jack Heller KB7NO
P.O. Box 1792
Carson City NV 89702-1792
[KB7NO@worldnet.att.net]

WinLink 2000 and the Airmail Package

If you have suffered the inconvenience of exchanging E-mail while on the road, in your RV or on your boat, this month's reading exercise may show you just what you need. This is not absolutely new stuff. The WinLink 2000 system has been around for a few years, is in a constant state of upgrade and has attracted over 3,000 users.

You will need a computer you can carry with you, an HF rig and a multimode controller. This may be the reason you hung onto that dust collector after the advent of the soundcard programs. The WinLink 2000 network runs on PACTOR and there is as yet, no soundcard software written that will do the job for this application. Hence, the need for the controller. PACTOR is an error-correcting robust mode that suits this service to a "Tee."

One of the really impressive parts of this operation is the great free software available for download to get you started on this project. You can download the latest version of the Airmail package from the listing in The Chart. That's right — here is another freebie put together for the benefit of the ham community.

I think the first thing that surprised me was how easily I was able to set up the software in my laptop and get it to talk to my PK-232MBX. First try, just follow the directions. Also, it doesn't require a superduper high-speed laptop. Mine has only a 120 MHz CPU with 8Mb RAM and it works like a champ.

Airmail will work with Windows95, 98, ME, NT or 2000 Professional. I will have to admit to some difficulty as I progressed with the review and that centered on the PK-232MBX. It took a bit to identify because the 232 functions great in PACTOR for everyday QSOs but I was having problems with file transfers. There is an advisory note that this controller suffers from RFI on occasion. I did what I could to reduce that, but it wasn't enough, then I received some advice from Steve K4CJX.

He explained that the WinLink 2000 files are uploaded and received in compressed binary format and that to do this the PK-232MBX is a bit overtaxed. The solution is provided in the use of the SCS controllers which are equipped with microprocessors to facilitate the process. The system also supports the Kantronics multi-mode controller, but I have no report on that one except I read no negatives on it.

The only concern I had at first was finding a station to connect to so I could see it work. I listened intently for 15 or 20 minutes and found a station that was handling the desired traffic. The software automatically comes up in PListen mode so you can copy the traffic without being connected.

Once I had found and identified a station, I hit the "Send" button on the monitor and the software asked for a callsign to connect to. I entered that and was on my way to a new adventure. There was still plenty to learn, but I was sure this was something I could do that would put me in touch with both hams and nonhams while on the road.

After getting past what I had been sure was the hard part, it was time to settle in on the specifics of how to send and receive E-mail. Being in a little bit of a hurry (spelled over-anxious), I got the cart just a tad ahead of the horse and found the automated system was particular how I addressed my first message to myself.

That wasn't terribly difficult. Where I had gone wrong was I had done too many things at once and didn't understand how the software recognizes the station you are linked to and sends only messages that are designated to be sent through that station. That is unless, as I was later to learn, I put a wild card named "ANY" in the "via" box to designate any station in the system. Sounds simple enough in hind sight, but for me, it is a long road to where I can look over my shoulder at the marvels revealed by hind sight.

The reason for the confusion was I wanted to control the process. Well folks, this software is written with us dummies in mind. It is fully automated. Once you make the link with the station in the network, the rest is out of your hands. You don't have to tell the system a darn thing.

So it is nearly foolproof. Just don't fight it as I did, and it is about as easy as it can get. After you have made the connection, the software checks to see if you have any mail, requests and accepts a download of waiting messages, and looks at your "posted" outgoing messages and uploads them to the network. After that it is simply an automated disconnect. You do get to watch the process on your monitor. There is just no keyboarding. That is you do not actively give any commands to the network.

The network, within a short time, sends your message through a gateway to the Internet mail system and your message is delivered to the E-mail box for your recipient to accept and read. Then he can send a reply to you even if he is a nonham.

Finding that first WinLink 2000 station

You will find the greatest help in finding a station to connect to will come after a little patient listening. The Airmail software comes with a pull-down list of callsigns and frequencies for each station. This seems to go out-of-date frequently so there are callsign/frequency downloads available with weekly updates to keep your list updated.

However, at first you will need to find that first station. My first and most often readily-connected-to stations were about 1,500 miles away in Texas as propagation

Continued on page 42

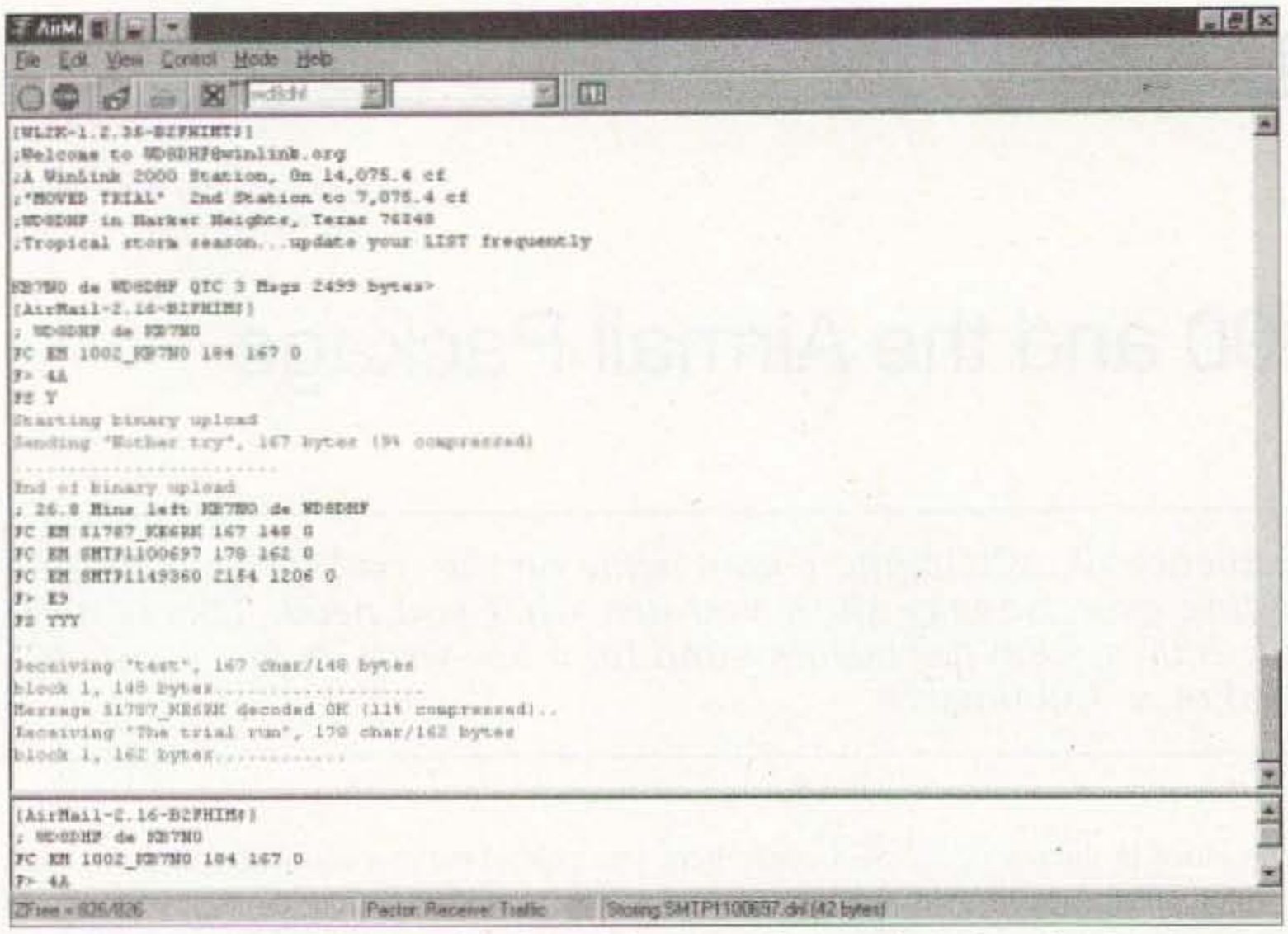


Fig. 1. *Screenshot — This is a live shot of the Airmail terminal window showing an automated session uploading and downloading message files. In the upper left box is the callsign of the network station which is entered before clicking the "connect" icon which is the farthest round object to the left of that window. "The Connected/Welcome" header varies from station to station according to necessity. After the break in the lines the automated process begins. The first line indicates I have 3 messages totaling 2499 bytes. During the next two lines an automatic changeover has taken place and my station sends a message that I have a message to upload that is 167 bytes. Then an exchange of commands and the WinLink 2000 network receives the upload which has been automatically converted to a compressed binary file. After that is completed, downloads are begun to receive my mail from the network. After all this was accomplished, the link was disconnected, again automatically. In viewing the automatically decompressed files I found that not a single error had crept into any of the messages going in either direction. All you have to do is make the connection via PACTOR to a*

The Digital Port

continued from page 41

would have it. There are plenty of stations in California but that is often a bit too close on 20 meters.

As I understand the system, if you follow the procedures to the letter, the frequencies listed in the frequency chart will get you right on the money as long as the list is kept current. In my case, I didn't follow the procedure carefully and still had successes.

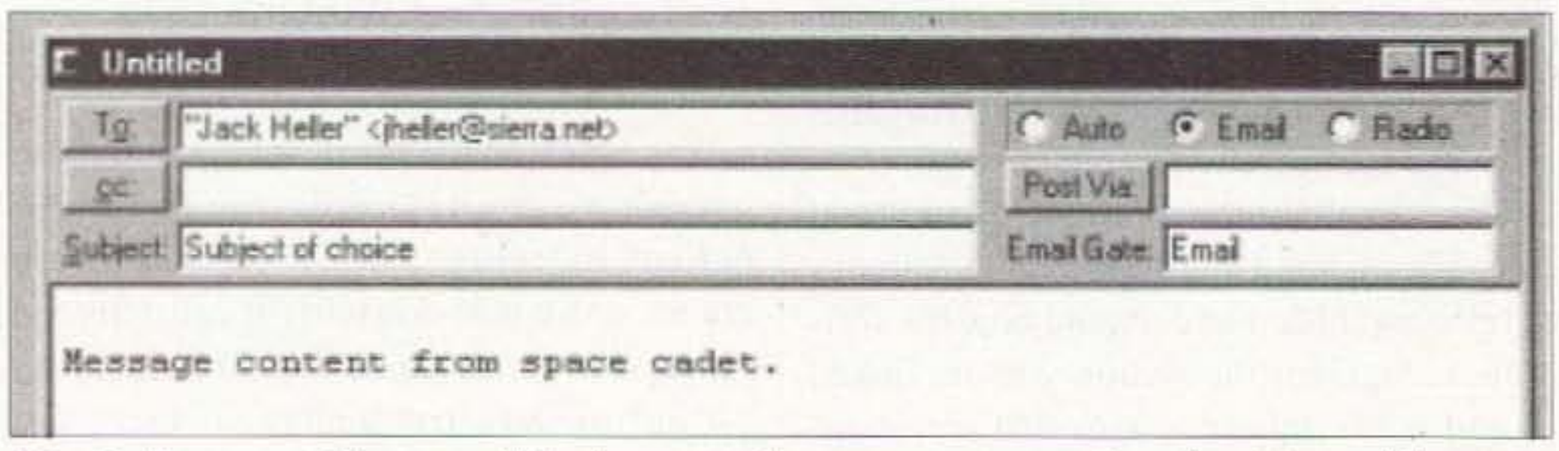


Fig. 2. *Easy to address — This is a pseudo-message to my E-mail address. There are only three elements necessary — (1) The E-mail address at the top. (2) The "Post via" box (I inadvertently left it blank). If you click the button a drop down menu appears for preselected network stations or you can manually enter the callsign of your choice (or, best way, enter "ANY" and the system is not picky). And (3) your subject and message. The buttons to the top right are selected automatically according to the type of address you enter. Below is the message area. When you have finished your message, in the background, outside the message composition window shown here you will find an icon of a mailbox. You click on that and it is posted, ready to upload by the automated system.*

I was able to calculate an "offset" constant to add to the one shown, thereby making the list usable for the purpose of the review. The method I used is described just a bit further down the column. The best method is to get connected, check it out and see if this is for you. Then update the frequency chart.

And before I forget, use LSB. PACTOR really doesn't care which sideband you use for its operation but it is recommended and you will be consistent when you are discussing frequency with other users. I understand this is not wholly true with marine radios but I have no experience there, so must not comment.

How I tuned ... If all else fails ...

What I did was listen during an active time and find the network station being contacted and identifying itself. Then it was a simple matter to go to the frequency chart, read the frequency listed and compare that to the readout on the rig. A quick subtraction and I had the number to add to the chart listing so I could tune the rig. This same magic number works for all the frequencies for me. Mine is 2.2 kHz, just to give you an idea.

I have to admit I think I understand math, but when I follow the instructions and it doesn't work out, I just make up my own rules. Been doing that since I was a kid in school. I used to blame it on poor teaching, but it is still happening, so I probably have a "noisy diode" somewhere between the ears. Never gets any better or worse though.

Anyway, once you have the offset figured for your setup, you are in business. The only variable you contend with after that is propagation. With the participating stations using all the HF ham bands, there should seldom be a time or place where you will not be able to make connection.

You will find that after you have mastered the connection process, the rest is a piece of cake. Once you make the PACTOR connection, the software does all the rest right up to and including the disconnect.

In the live screenshot you can see how this works. This is most of a connected session where the Airmail program automatically sent a test message to my E-mail box and received three messages. The incoming messages are automatically stored for easy access through another window known as the Message Index. Go to the window and double click on a message and read it. Print it if you like.

There is an address book just like you have in your regular E-mail program. You

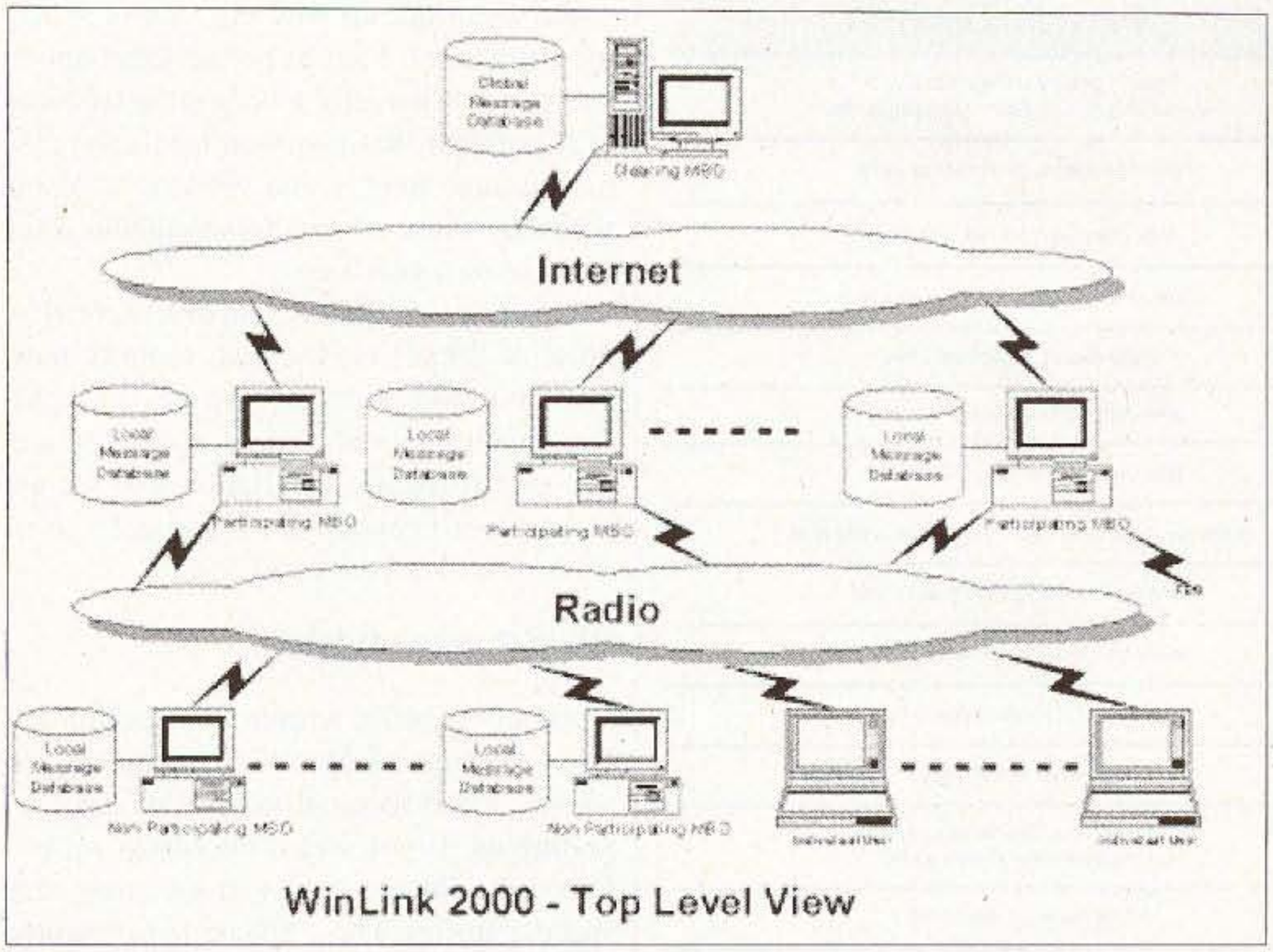


Fig. 3. *System screenshot — This gives an overview of the inner workings of the WinLink 2000 network. Even those of us who are not programmers have to admire how this many computers can work together so flawlessly. That top server, if it is in reality only one, has a lot of work cut out for it. The second tier seems most likely by the casual observer to be the one to get "out of control" as it has to relay so much information to and from end users in such a format that none of the involved subsystems become confused. And, unless I am mistaken, those three computers represent all the network stations around the world and when you check the frequency list, that is a bunch. And this system has to contend with the management of 300 messages each day from over 3,000 users around the world. At any time, any user can connect anywhere in the network and receive mail addressed to him that was entered at any point throughout the world and the system handles all the details. These folks have done an excellent job of putting this together.*

can store E-mail addresses of friends and family to make addressing a snap.

Speaking of family and friends, the service would be hard pressed to receive the volume of mail some of us are accustomed to by use of the Internet. The real purpose of the WinLink system is to provide a means of staying in touch with a select few while away from home.

Another great feature available is that you can send and receive binary attachments just as you would with regular E-mail, but you will want to limit the size, if for no other reason, to be gentlemanly (or ladylike?) and to conserve time and space for other users.

With the above in mind, you will not be

Just a few more interesting notes

I didn't give it a try, but WinLink 2000 also includes an APRS system to allow tracking of users. Can be a very handy feature so your friends can watch your progress and could even be an interesting way to present a geography lesson at the receiving end. (Check out the WinLink 2000 Web site listed in The Chart.)

Plus, hams can communicate using WinLink 2000 in a method very similar to the way the packet network operates. That is, you can address messages to another ham WinLink 2000 user without sending it out to the Internet E-mail path.

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 free download	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 Chart.*

surprised there are graphic and text based weather downloads so you will know what you may encounter in your travels. And these can be invaluable when you are at sea. The weather maps include all the surface of land and sea, so you will know when a storm is coming your way wherever you sail.

And you will learn also that you can use your Web browser to access WinLink 2000 on the Web and manage your account when needed, such as if you are land-locked and cannot get on the air.

You will find the transfer of files is relatively slow unless you have one of the newer SCS controllers. I don't and the transfer that took place in the accompanying screenshot must have taken about 5 minutes of connect time. The claim is the speed increases by about four or five times by use of the newer SCS equipment with the PACTOR II format.

But I can put up with the lack of speed for a time until I get to be "serious" about the mode. It is really a very good solution to a problem that just won't go away. E-mail is here to stay and we have to cope with it by whatever means is available. This looks to be a good one.

Just about everything you ever wanted to do with E-mail via the ham radio is now available and many of you have all the equipment required to do the job. You are just one software installation and set up away from keeping those contacts alive from wherever you travel.

MixW 2 gets updates

As this is being written, the seventh release version of MixW 2 is making its rounds, a real accomplishment in ham programming. If you watch the MixW reflector on the Internet you will see some real success stories. The software has certainly done a lot to attract attention to some little used modes.

Though the novelty is waning, I still see and hear Throb on 20 meters where it was never used until it was included in the MixW 2. Also, Hellschreiber signals can be found in parts of the 20-meter band other than 14.063. I think that is an indicator of new interest.

There have also been a lot of questions posted to arrange schedules for MT63, another fine mode that has taken a back seat for a long time. If Nick UT2UZ, the author of MixW, has made a contribution, it is to make all these modes easy to use and switch between.

Personally, there were many times in the past when I would see a signal in a mode other than the one I was using and I would ignore it because of the time consumed changing software. Now it only takes a few clicks to change modes, the waterfall or spectrum does not disappear and I am ready to make a new friend or to work an old one on a different mode.

It is difficult to say where all this is going with this product, but you can observe folks asking for more refinements and additional features and the programmers are considering them. There seems to be no end to the development of the digital ham software arsenal. And we are getting quality products.

Quick visit to DXLab

Another area I have not visited lately is the one authored by another ham programmer,

Continued on page 58

QRP

Low Power Operation

Mike Bryce WB8VGE
SunLight Energy Systems
955 Manchester Ave. SW
North Lawrence OH 44666
[prosolar@sssnet.com]

Antenna Talk

Last month we talked about running HF in the field or from a campsite. Since the radios have shrunk to the point of pocket size, the only draw back we now have is the HF antenna.

When we speak of QRP operation, most of us usually conjure up images of dipole antennas strung up between two huge oak trees. In reality, that's not usually the case. Even at home, antennas usually have to be sized to fit the property.

Not everyone can install a full-size 80-meter antenna on his or her city lot. Therefore, some sort of compromise antenna must be used. Usually, the antenna is electrically shortened by the use of traps. These traps are nothing more than a tuned circuit that makes the dipole "look" electrically long but are physically shorter than normal. When it comes to working HF in the field, we can use some of the antennas used in locations where no antennas are permitted.

The random wire

I've used this type of antenna many times in the past. It's about as simple to put up as it gets. As the name implies, the random wire is just that: a wire that is a random length. Usually, I've installed this type of antenna with one end higher than the opposite end. There are a few rules you must watch for: (1) the random wire must be at least 20 feet long and normally not any longer than 90 feet. (2) you must use some sort of impedance-matching device to couple the low Z output of your transmitter into the unknown Z of the antenna.

And lastly, there is a good chance that you'll end up with stray RF floating about when you use a random wire. The ol' "hot mic" can sometimes be a problem, especially when running above the usual QRP power level of five watts.

Vertical antennas for portable use

Don't get confused here, I'm not talking about those 34-foot monsters. I'm talking about the small loaded "ham whips" many of us use on the cars. These antennas are wound on a fiberglass shank and are totally weatherproof.

You have several ways of using these in the field. One is to install one on the family Buick and just run some coax from it to the rig. Works great and you don't have to worry about mounting the antenna as it's already on the car.

Or, you can use one whip and then lay out counterpoise wires so the antenna has something to work against. I've seen this done in hotel rooms. You mount the antenna to the railing and then run radials around the room. The antenna is held to the railing via a vise clamp. Usually, you'll need some type of coupler to adjust the SWR to a point at which you can safely operate the radio. Normally, all you need is at least one radial, but the more you have, the better the antenna will work. I've heard of some guys who tie into the plumbing of the hotel room and use that as a counterpoise for the antenna. I guess that would only work in a hotel with metal drain and supply lines!

Taking the above example one more step, you can use two ham whips. Instead of using wire for the radials, use the second ham whip. Connect the coax feed to one whip and the shield from the coax to the other whip. I've used this on 10 meters and it seems to work just fine. I've modified a CB mirror mount to hold the two antennas.

As in any antenna, the higher, the better, especially when using the whip antennas. If nothing else, you must get them up high enough so you don't run into them.

The Isotron antenna

Put this one down in the really strange category. It's odd looking and comes with a

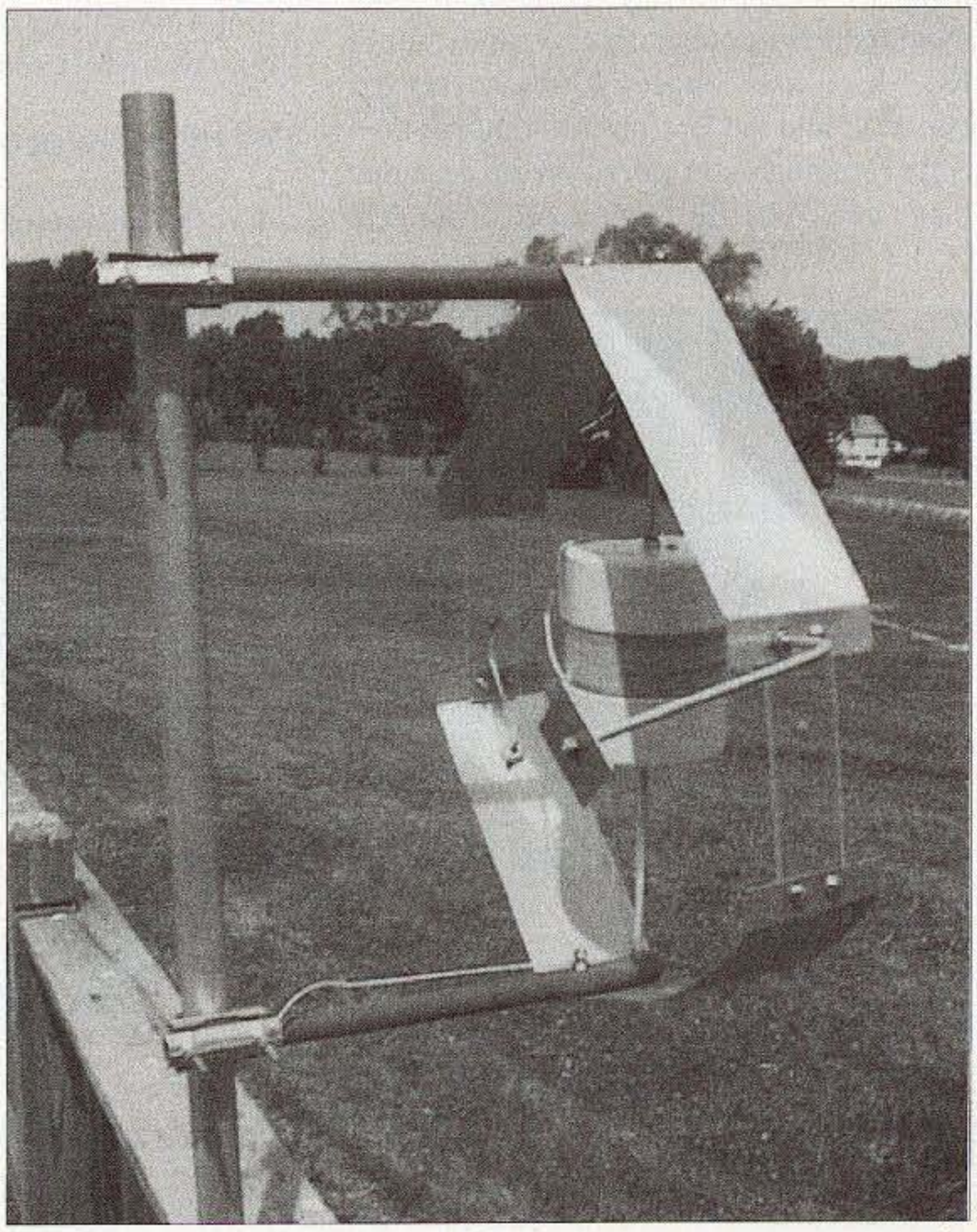


Photo A. *This strange looking thing is really an antenna. It's the Isotron mini antenna for 40 meters.*

Photo B. *A portable antenna tuner is a must for field use. This MFJ 971 is ideal for camping or Field Day use.*

very small footprint. You can mount the Isotron on just about anything. And what's really great about this antenna is that you don't have to worry about grounding it.

I picked up an Isotron for 40 meters. It's bigger than a breadbox but not by much! You feed the antenna with 50-ohm coax. There's no need for an antenna-matching device, but I'll have to admit it, I used one anyway.

I used a hunk of TV mast pipe to hold the Isotron together. The whole shebang is mounted on one side of my outside deck using tie straps. To say the least, it's not mounted very permanently. A short run of RG-8X cable is connected between my Argonaut II and the Isotron. Although not exactly camping out, I can sit on the deck and play radio. When the rains come, I just grab the radio and run inside the house. Now, that's MY idea of roughing it!

The Isotron comes as a monoband antenna, i.e., 40 meters. You can add on a second band if you want. It's possible to have a 40- and 20-meter Isotron antenna. One feedline does double duty. The 80- and 40-meter combo is very popular. You can easily mix different bands if you so desire; contact the Bilar Company for more details.

So, how does the Isotron work? Well, considering its size, it's amazing it works at all. I've been 559 into most of the East Coast with nothing more than the five watts from the Argo II and the Isotron.

The High Sierra antenna

I've been watching this company for some time. They started out making adjustable mobile antennas. Based on the screwdriver design, they are designed for mobile use. The best thing about these antennas is the ability to adjust to different bands by moving the slider inside the antenna. This way you can change bands and not have to stop the car to move taps or change whips.

But what got my attention is the new HS1500MVA for use in restricted lots or in campsites. The HS1500MVA is only seven feet high and, like the other High Sierra antennas, is remotely tuned. I don't have much more info, but it sure looks interesting.

Antenna tuners

Unless you're really lucky, you will need some sort of antenna-tuning device. That's not exactly the correct name, they really don't "tune the antenna." Instead they should be called "impedance-matching networks." You can use one of the new autotuners from LDG or a homebrew random wire tuner. Using less than perfect antennas in the field will almost always require some sort of tuner.

One of the slickest antenna tuners about is the Z-11 QRP autotuner from LDG Electronics. One of the nice features of this autotuner is the zero current requirements once the antenna is tuned. This tuner uses latching relays to reduce standby current to about nil. And, the Z-11 has just about the same footprint as the new Yaesu FT-817.

I use one of the MFJ portable tuners. It's small, has a built-in SWR and wattmeter, and is not overly expensive. The only downside I find is that you can't bypass the tuner.

A portable antenna holder

Yup! It's the strangest thing you will ever come across. A telescoping mast made of fiberglass. It will expand up to 30 feet and collapse down to only four feet. You can get one from Kanga US. They're about $100, but if you do a lot of portable HP, they are well worth the money.

Some final thoughts

No matter if you're set up at a state park or handing out counties for the county hunters, you're going to be in the public's eye. CW blasting from a speaker in a campsite might be music to your ears but noise to someone else. You must respect the right of the other guy who is camping next to you. Maybe all he and his family wanted was to

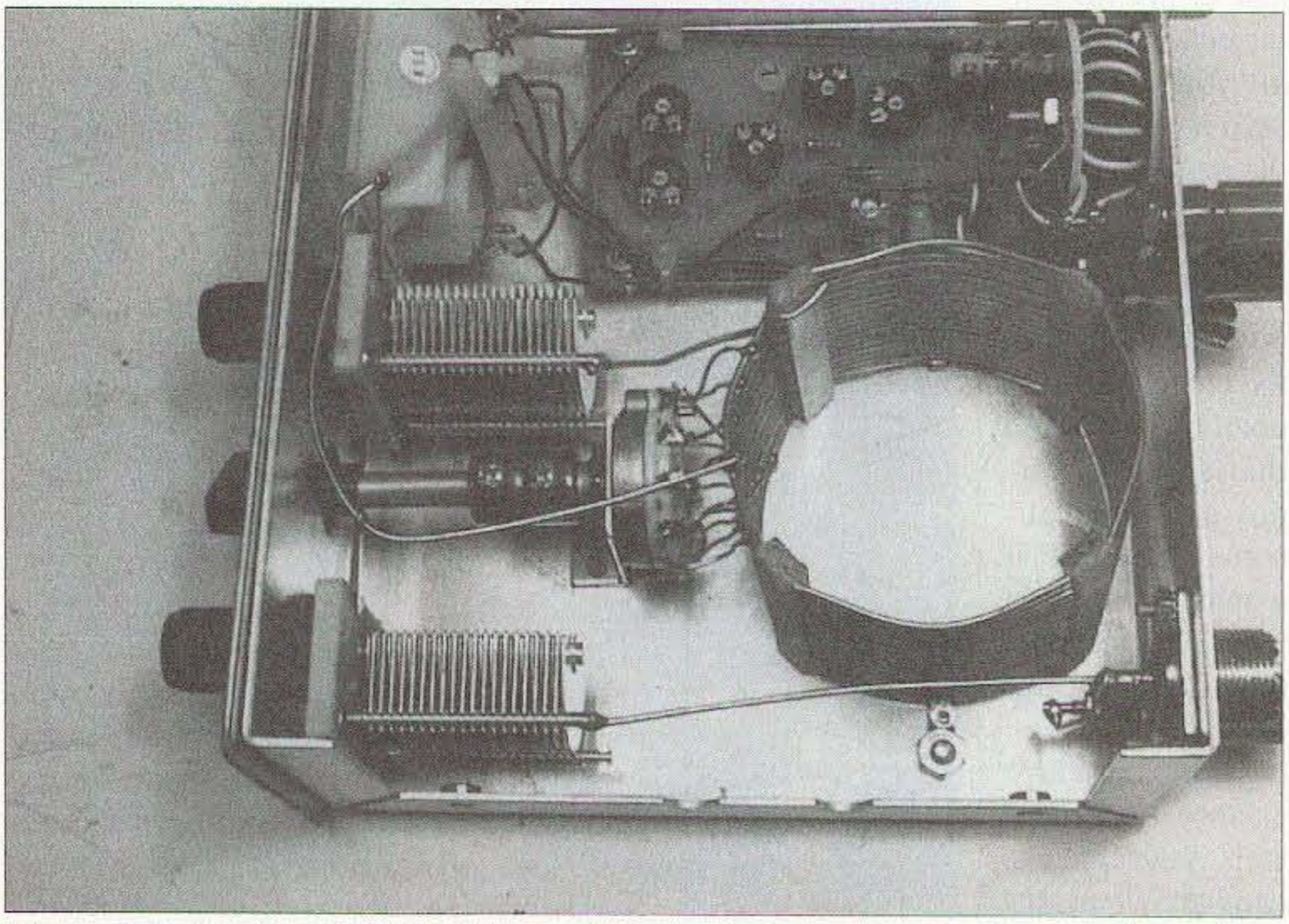


Photo C. *Inside the MFJ 971. Not much there. Antenna tuners make great home-brew projects.*

"get away from it all" and not be blasted by your radio. Use headphones!

Keep any antenna you install up and out of the way. The last thing you want to do is have someone run into or trip over your antenna or coax.

In some locations, you may not be allowed to install an antenna. Respect those rules. If you can't erect an antenna, use the mobile mount on your car instead.

Even at five watts, using less than perfect antennas can cause havoc with entertainment devices. Talk about TVI! Can you just imagine two campers set up in the KOA campsite near Dayton during Hamvention?

All they want to do is watch a little TV before hitting the sheets. Little do they know they are camping with a zillion hams all set up for portable HF.

No matter what you do, a good dose of common sense will go far. Take care when operating HF portable and you'll have a lot of fun.

Looking for HW-7, HW-8, and HW-9 modifications

Do you have a modification to any of the Heathkit QRP radios? If so, I would be interested in seeing what you have. I've been kicking the idea of a third edition of the *HW-8 Handbook*.

Send your mods, no matter how simple or how complex, to the address shown at the top of this page. Or you can E-mail them to me at [prosolar@sssnet.com].

And speaking of Heathkits, check out my Web site. Point your browser to: [http://www.theheathkitshop.com]. Here you will find all sorts of schematics, PC board layouts and repair tips for many of the Heathkit radios. There's the alignment data and PC board layouts for the HW-8 up there now. I am constantly adding more stuff. Check it out!

Next time we meet, I'll show you some troubleshooting tips to get that broken QRP rig back on the air.

People and places

Isotron Antennas
Bilar Company
(719) 687-0650
[www.rayfield.net/isotron]

High Sierra Antenna
(530) 273-3415
[www.cw73.com]

LDG Electronics

Many dealers, including Ten-Tec, sell the LDG autotuners
[www.ldgelectronics.com]

Lakeview Company
HamSticks
(864) 226-6990
[www.hamstick.com]

Kanga US
(419) 423-4604
[www.bright.net/~kanga/kanga]
[Kanga@bright.net] 73

If you're a No-Code Tech, and you are having fun operating, tell us about it! Other No-Code Techs will enjoy reading about your adventures in ham radio—and we'll pay you for your articles. Yes, lots of nice clear photos, please. Call Joyce Sawtelle at 800-274-7373 to get a copy of "How to Write for *73* Magazine."

New Products

New Motorized Tuners

Bliss Z MatchMaster, a division of Air & Water King, Inc., has introduced two new HF tuners to their product line. These tuners are motorized versions of the balanced-balanced tuners. They are designed primarily for balanced feed antenna systems but will also match unbalanced feedlines.

They are built for high power operation: One model is for local use at the operating position and the other for remote operation, in or out of the operating room.

Both models feature two large variable inductors (3" diameter by 5" long), made of silver, which were manufactured by Collins Radio. The vacuum variable capacitor was made by Jennings Radio, and two vacuum relays by Eimac. They also feature a VSW and power meter. These high-quality tuners are a "Limited Edition."

For more information, visit their Web site at [www.airwaterkinginc.purification.com], E-mail [angelie@bliss.org], or call (970) 882-3922.

SafeTenna Now Available

Creative Services Software and AB4MT-Designs have announced that the SafeTenna is now available for 2m. Invented by Michael Thigpen AB4MT, the SafeTenna was designed for use in emergency, travel, or portable operation. The solid design of the antenna allows for RF use, as well as double duty as a walking stick when you might be operating portable.

AB4MT notes: "The SafeTenna was designed to be an emergency antenna. I designed it to be used for bad locations and situations, such as when you have car trouble and your cell phone is out of range. You can keep the antenna in the trunk or behind the truck seat with coax and string to put up in time of need. That is where I got the idea for the name. It's a portable antenna that can help you make a contact that is needed when other attempts fail."

The SafeTenna comes in two sizes, full and compact, and is encased in a solid PVC shell. It retails for $39.95 and comes with a 1-year warranty.

For further information, contact Creative Services Software at 503 West State Street, Suite 4, Muscle Shoals AL 35661; (256)-381-6100; [sales@cssincorp.com].

Ham Radio Market Web Site from WIA

The Wireless Industry Association, founded in 1986 by longtime ham and amateur radio enthusiast Bob Hutchinson N5CNN, has announced its continuing support of the ham radio community with the opening of a new Web board, [http://hamradiomarket.com].

Hutchinson says, "Ham Radio Market is a fast-moving Web board where hams can seek, find, buy, and sell anything in ham radio. The ability of serious purchasers to network at hamradiomarket.com is certainly new and innovative in the ham radio industry."

Information and details of prizes to be given away to sweepstakes winners for each week can be viewed at [http://hamradiomarket.com/sweepstakes%20prizes.htm].

Each ad or message is related to Ham Radio Market purposes. Hutchinson further notes: "Networking at the market on a dealer-to-ham basis with URLs to Web pages and pictures is especially encouraged. We invite all those in the ham radio community to post ads and messages about promos, specials, and new and used items, with details, prices, and URLs of their facility or Web pages. Buyers are encouraged to post "seeking new equipment" messages on a ham-to-dealer basis for dealers' or manufacturers' response. New or used — search, find, buy or sell it at the Wireless Dealer Market."

Browsers or users can go directly to Ham Radio Market at [http://hamradiomarket.com]. Users should click "Post Ad or Message" to quickly create their ads or message (good instructions are there, too).

The WIA was formed as a grassroots affiliation of cellular agents and dealers. Today, association members operate over 25,000 wireless outlets, and sell and activate over half of all wireless devices. The Association's Web site, [http://wirelessindustry.com], is the most popular one worldwide for buying and selling equipment in the wholesale wireless industry.

Am-Com Frequent Buyer's Club

Am-Com, Inc., amateur radio dealer and manufacturer of the ClearSpeech speaker, has introduced a Frequent Buyer's Club. With your first purchase worth $150 or more, you receive free membership.

Along with membership comes a 2% credit on all future purchases, which can then be redeemed for future Am-Com acquisitions. Members also receive double the manufacturer warranty on all Am-Com equipment.

For further information, contact Am-Com at 1-(800)-803-5823, or visit their Web site at [www.amcominc.com].

Advertisers' Index

When you buy products from these advertisers, please tell them that you saw their ads in 73.

By Eric Shalkhausser W9CI, SK

The History of Ham Radio

Parts 11 and 12: More 1920s, two-way trans-Atlantic, the IARU and The Hoover Conference.

The post-WWI years from 1920 to 1927 found the mushrooming radio industry still in its infancy, but struggling to find a foothold — very much in need of direction. It was a new technology still in relative obscurity awaiting a Midas touch!

Radio did not have a definite pattern by which to gauge its destiny. From the very beginning it was partially inundated with revolutionary inventions and new developments, many of a questionable nature. There existed no guidelines to follow in this new field.

The introduction of numerous bills in Congress to update the 1912 Wireless Act merely aggravated the situation. The end of hostilities, the conversion from a war to a peace climate, resulted in the creation of many new companies, large and small, seeking to take advantage of this developing, growing industry. Here existed a "made-to-order" opportunity for questionable financial interests to inundate a lucrative market with investment stock schemes. An unwary public remained confused, except for the wide-awake radio amateur, to whom these conflicts meant very little. His interests were directed toward testing all the new gadgets flooding the radio market and experimenting with the numerous circuit arrangements that were perpetually introduced through dealer folders and pamphlets. In general, this game of wireless had him spending many hours at the Morse key, exchanging messages via the established relay routes and frequently exchanging radio signals with neighboring and foreign countries.

Outstanding researchers and inventors, personalities of the stature of Major Howard Armstrong, for one, and men on the technical staff of the ARRL — John Reinartz and S. Kruse, among others — introduced circuit designs under such names as "re-generative," "heterodyne," "neutrodyne," "superheterodyne," and "reflex," all of which provided the amateur with endless hours of experimental activity.

The 1923 challenge across the Atlantic

During the winter of 1922, our radio amateur had succeeded in spanning the Atlantic Ocean with his wireless signal operative on 200 meters, but only in one direction — from the United States to the British Isles. He did not have to be encouraged to tackle the two-way spanning. Active steps were taken by the ARRL to accomplish this feat, this time giving all amateur radio stations an opportunity to participate in the effort. The results which the experimenter was having with the wavelengths below 200 meters, going down to 150 and even down to 100 meters, provided renewed activity and a desire for some real DX. All the planning and the cooperation soon produced astonishing results.

On November 17, 1923, there was a headline banner across the amateur radio horizon. For the first time in history, the Atlantic Ocean was bridged by amateur radio in two-way contact with an exchange of messages. Distance records were quickly attained via two-way phone contacts with stations in Hawaii and Alaska, Japan and Australia, and the American continent. This was a year of jubilation.

The language problem

With the crossing of the Atlantic and the contacts now possible with foreign countries, there arose a request on the part of many to solve, in some way, the language problem for better exchange of messages. The question was how to

Reprinted from *73 Amateur Radio,* March 1980 & 1981 where this was originally reprinted from *QCC News,* a publication of the Chicago Area Chapter of the QCWA.

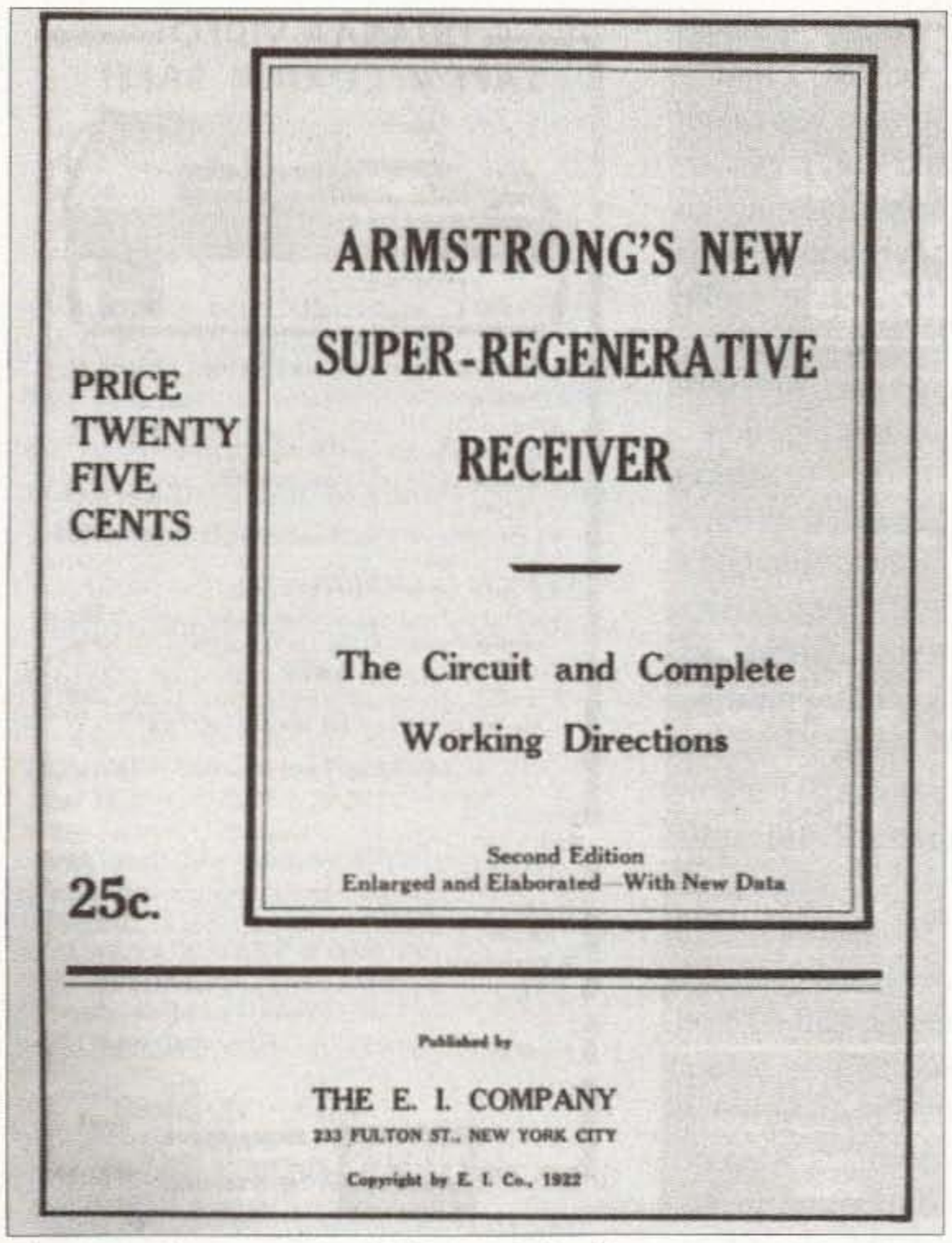


***Photo A.** What a caption!!! Most original!*

do it. There was immediately suggested an International Language, an IL, for short, to facilitate common understanding. At the beginning, such a proposal was regarded as indispensable. A well-established Esperanto system of word and sentence construction was in use in many countries and was extensively used at conventions and other gatherings with considerable success. Esperanto was considered to be valuable as a rapid means of common understanding. However, the use of the synthetic language proved too "burdensome" and "uncommon" to the majority of amateurs and, through neglect, was soon forgotten.

Solving the call letter identity problem

The early assignment of call letters among United States amateurs was simple. The district number was followed by either two or three letters of the alphabet. But, as Canadian and foreign stations with similar and often identical call letters were contacted, confusion arose unless an additional first character was added. To correct this problem, the ARRL initially suggested that the United States amateur simply use "de" and the Canadians the letter "v" before giving their call. This soon proved inadequate and gave way to an assigned alphabetical letter as follows to which all agreed and used.

A — Australia
C — Canada
F — France
S — Spain
U — United States
G — Great Britain
I — Italy
M — Mexico
R — Argentina
Z — New Zealand
N — Netherlands
O — South Africa
P — Portugal
C — Cuba

These letters, however, did not conform to those assigned by the countries' respective governments. This plan was first adopted as of December 15, 1922. Additional letters were required from time to time and assignments were made by the ARRL Operating Department. Several two-letter prefixes were needed toward the termination of this method of call-letter designation, i.e., FN — Finland and CH — Chile. The letters were used for a time by all amateurs except in Britain, where such permission was not granted.

Continued on page 52

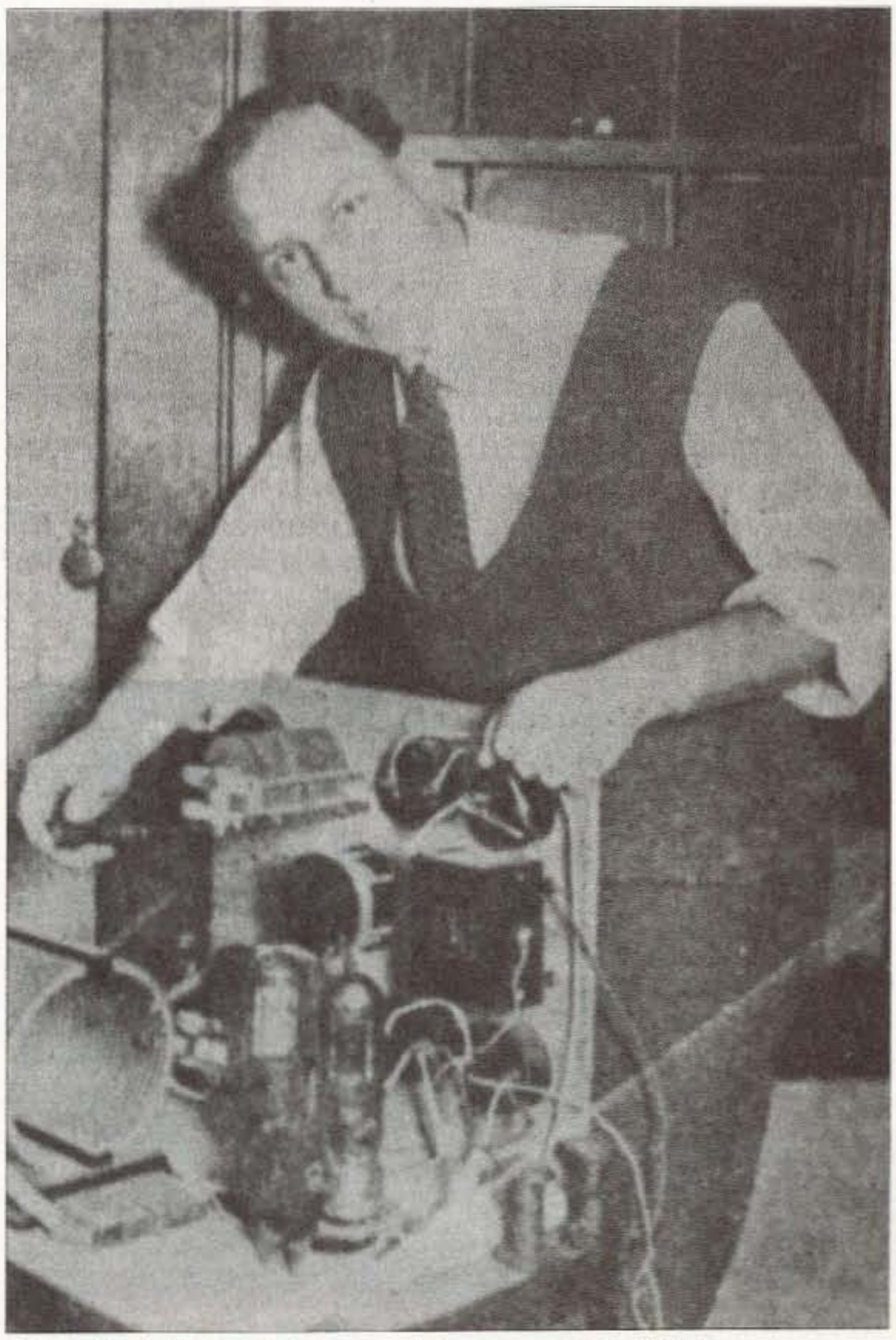


***Photo B.** John L. Reinartz and the set at 1QP-1XAM.*

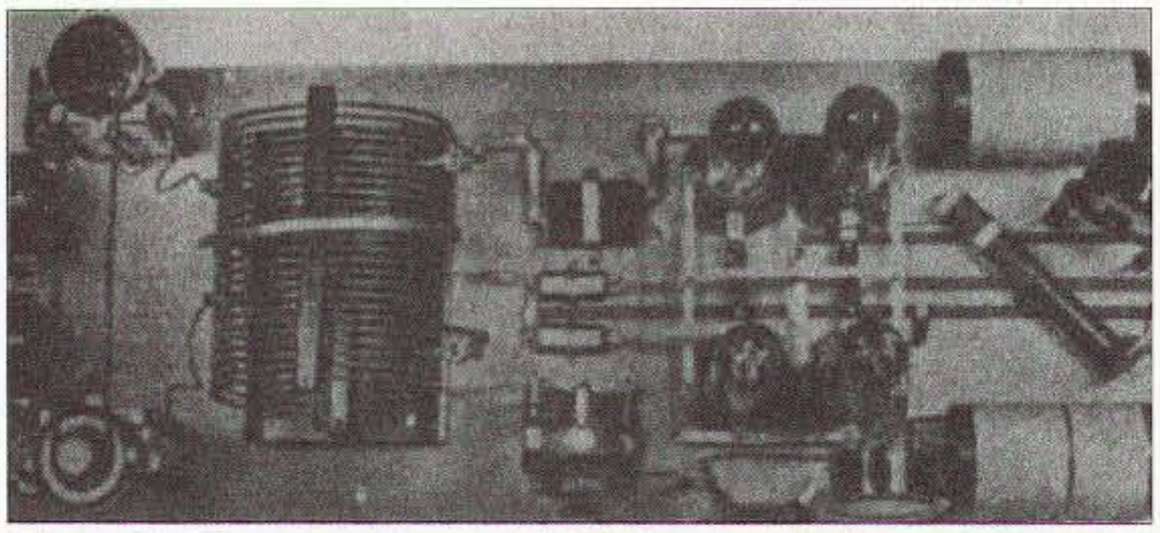


Photo C. *The transmitter at 1MO-1BHW which, under the call 1MO and on a wavelength of 110 meters, was the first American amateur station to connect with an European amateur. This set was built in accordance with the scheme outlined by John L. Reinartz of 1QP-1XAM.*

The History of Ham Radio

continued from page 51

Worldwide amateur radio — a reality in fact

As more and more international amateur radio contacts were consistently and regularly logged, serious consideration was given to an international radio amateur organization, eventually to be affiliated with the American Radio Relay League. In the making was a relay circling the globe, thus involving amateurs worldwide linking all continents! This was the ultimate challenging thought for amateur radio. No sooner was this idea proposed than the ARRL board of directors commissioned its president, Hiram Maxim, to call together all interested foreign amateurs for an early meeting. The United States and Canadian amateurs, with years of experience and with an established organization nearing 20,000 members, were expected to provide leadership and guidance toward making an international amateur radio relay league a challenging asset for world communication.

So, on March 12, 1924, in Paris, France, the amateur representatives of nine different countries — France, Great Britain, Belgium, Switzerland, Italy, Spain, Luxembourg, Canada, Denmark (absent), and the United States — sat down together, deliberated for several days, and formulated the beginning of the International Amateur Radio Union. Appointed at the meeting was a temporary Committee of Organization to select and approve a permanent name, a constitution, and operating procedures. During Easter 1925, the IARU was officially declared a permanent organization, with Hiram Maxim as its first president.

The wavelength breakthrough for amateur radio

For a number of years, and especially during 1923, desire and hope were on the minds of the amateurs for expanded operation on the lower wavelengths. Many experiments conducted in trials and contacts proved convincingly that the higher frequencies could be depended on to provide consistent DX. Again through the efforts of the ARRL, the Department of Commerce, during the summer of 1924, issued the following letter directed to all supervisors of radio:

Department of Commerce
Bureau of Navigation
Washington
July 24, 1924
To: All Supervisors of Radio

Sirs:

Effective this date you are authorized to issue general and restricted amateur radio station licenses to permit the use of any one or all of the following bands of short wavelengths: 75 to 80 meters, 40 to 42 meters, 4 to 5 meters, in addition to the band 150 to 200 meters, provided application is made by the owner of the station, which station must be prepared to use the wavelength, or wavelengths, requested.

The use of continuous wave telegraphy only will be permitted on wavelengths other than 150 to 200 meters, and the antenna circuit must not be directly coupled to the transmitting circuit.

Silent hours will not be required of amateurs while using the wavelengths within the above bands below 80 meters except where the transmitting station is so situated as to produce objectionable interference with other services.

Hereafter, special amateur stations will not use wavelengths above 200 meters. They may be authorized to use the bands of wavelengths from 105 to 110 meters in addition to the wavelengths within the bands authorized for general and restricted amateur use, where the special amateurs are engaged in conducting tests with government or commercial stations.

General, restricted, and special amateur stations will be permitted to use the entire band of wavelengths from 150 to 200 meters employing pure CW, spark, and modulated forms of transmission.

It should be made clear to the amateurs that the authority granted above is necessarily tentative because of the rapid development taking place in radio communication, and the bands of wavelengths authorized may be changed whenever in the opinion of the Secretary of Commerce such change is necessary.

With the assignment of the five new wave bands, amateurs enthusiastically

Photo D. *1MO and his "hay-wire" receiver with which he worked F6AB.*

entered a new radio communications era. Regular licenses had to be modified by district supervisors. No longer was the amateur confined to the selection of one or maybe two frequencies as specified on his former license permit. From now on, the operator had greater flexibility in choosing desired operating frequencies.

Amateurs were requested by the department to make immediate use of these broadened privileges so that the bureau could gather vital information and determine practical usage in this spectrum. The new bands were made available on an "until further notice" basis. To assist in reducing broadcast listener interference, specific types of carrier modulation and types of power supplies at the transmitter were prohibited, i.e., spark, phone, and ICW modulation were declared out. The "silent hours," stipulated at lower wavelengths, were canceled for the higher frequencies. The 150- to 200-meter band was opened up for any and all uses.

These newly assigned wave bands materially broadened the operating range for the amateurs. They had been clamoring for either space and were anxious to readjust their experimental circuits and antennas for a go at these higher frequencies. A calibrated wave meter became vital. Still required by all radio amateurs was an operator's as well as a station license. A code speed requirement of 10 words per minute prevailed.

The 1924 White Bill, HR 7357 — and others

On February 28, 1924, Congressman White, Chairman of the Subcommittee on Radio, introduced a new bill to abrogate the old Wireless Act of 1912, declaring that the original law had outgrown its usefulness.

The White bill was aimed at vesting all administrative powers pertaining to radio in the hands of the Secretary of Commerce. He was to classify all radio stations as to wavelength, licensing, hours of operation, type of equipment, and power. In short, the secretary would have complete jurisdiction over all radio activities and facilities. As the general hearings on the bill proceeded, it became evident that the radio amateur, especially the ARRL, would be negative about the overall stipulations in the bill. They felt that such broad discretionary powers in the hands of one individual would be too dangerous. Other interested parties at the hearing expressed similar negative views on the bill.

By May, 1924, the structure of the White bill, as it had initially been presented, had gone thorough a series of changes and maneuvers. Provisions were combined with a similar bill, the Howell bill, S 2930; it was considerably modified again, but in the end remained the White HR 7357 document, as an acceptable paper in line for ultimate passage. In its final form, it incorporated appeals against unfavorable decisions in the issuance of licenses and other activities. Throughout the hearings, amateurs received favorable consideration.

At this stage in time, however, the conditions surrounding all radio communication in the United States required extensive exploration and far more research and legislation. Secretary of Commerce Hoover stated that eventually radio broadcasting would of necessity have to be considered within the field of public service and divorced from private enterprise altogether. Hoover proposed sending a bill to Congress outlining his views. The evidence was clear — a National Radio Conference was in the offing.

***

The assignment to radio amateurs of the shortwaves below 100 meters brought about a general awakening to the value of this spectrum. In 1924, the broadcasting industry exerted great effort toward the adaptation of short wavelengths to give their programs added coverage to distant listeners by interconnecting stations across the country.

The Hoover Conference was scheduled to meet in the fall of 1924. Invitations were directed to all radio groups interested in the hearings, in which existing technical radio problems were to be explored. The assembly was to make recommendations to the Department of Commerce for important revisions of then-existing wavelength assignments, allocations, limitation of power, division of time, and such problems which relate to general reduction of station interference.

Of major importance, however, was the subject of shortwave usage by broadcasters and commercial stations. The amateurs, supported by the Department, with their constant experimenting with the higher frequencies, had been providing the industry with interest in these higher-frequency ranges, demonstrating their effective capabilities. The radio law of 1912 had given the amateurs, through assignment, the use of all waves below 200 meters.

The Hoover Conference was called on to revise and to somehow "make amends" to a region in the spectrum which proved to be not only large but of great future value.

The conference sessions continued from October 6 to 10, 1924. Although radio broadcasting held the center of the stage as far as the broadcasters and listeners were concerned, the radio amateur had by all odds top interest in the outcome of the deliberations. The situation, with about 600 broadcasting stations on the air, with foreign stations all over the world striving to be heard, with a wavelength revolution having set in, and with practically no worldwide rules and regulations to give direction, loomed chaotic in the radio broadcast world.

All the higher frequencies below 200 meters, formerly regarded as unsuitable for commercial purposes, were now eagerly sought as of major importance for DX transmissions. The Hoover Conference was set to scrutinize these short-wave regions.

The use of spark transmission, although not ruled out completely by existing laws, nevertheless received its doomsday with the announcement at the conference that all spark should be discontinued by amateurs as well as the commercials. Spark discharges of whatever type and kin caused much of the interference encountered and should be avoided.

The conference gave the broadcasters five wavebands in the short-wave-

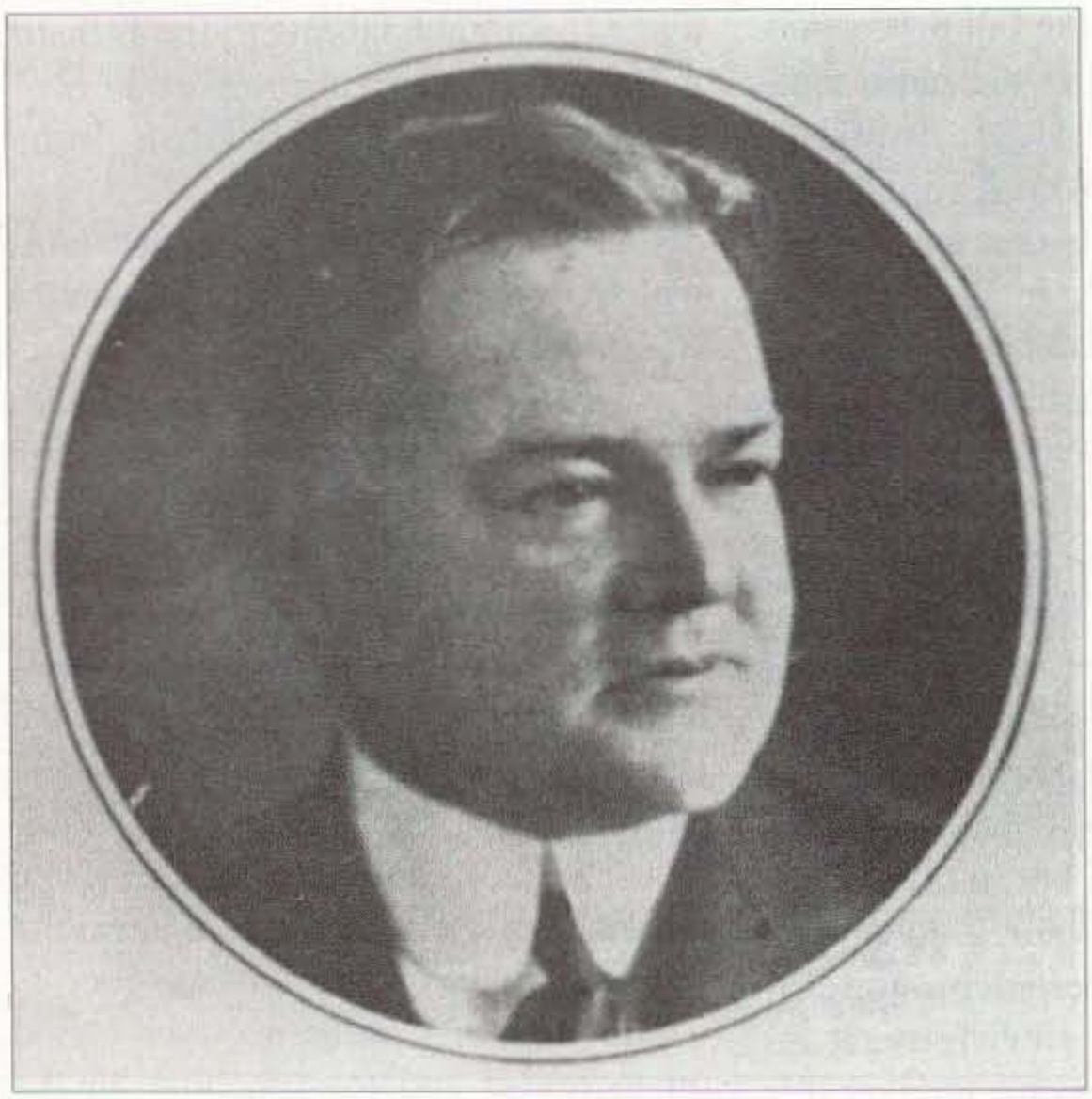


Photo E. Secretary of Commerce Herbert Hoover.

length region for use primarily for relay broadcasting. All actions taken at the conference were recommendations to the Department, pending further outcome from future legislation.

The conference concluded by listing wavelengths in effect for one year. All wavelengths from zero (0) to 3158 meters were allocated. The radio amateurs retained the previously assigned wavebands as confirmed, with minor changes, as shown in **Table 1**.

The government departments were authorized to work in the wavebands below 150 meters "with due regard to the authorized use given to other legitimate services."

To be noted was the method of allocating wavebands. Namely, the dovetailing of assigned ranges in such a manner that the frequencies in one band were octaves of those in the preceding band. This manner of band distribution for all services receiving assignments would, therefore, cause disturbances only to the respective assignees operating from one band to the other. Note the distribution, for instance, for the radio amateurs, all being in harmonic relation: 1.5 MHz to 2.0 MHz; 3.5 MHz to 4.0 MHz; 7.0 MHz to 8.0 MHz; 14.0 MHz to 16.0 MHz; 56.0 MHz to 64.0 MHz.

Meters	Kilocycles	Allocation
200–545	550–1,500	Broadcast
150–200	1,500–2,000	Amateur (160m)
137–150	2,000–2,200	Point-to-point
120–137	2,200–2,500	Aircraft
109.2–120	2,500–2,750	Mobile
103.3–109.2	2,750–2,900	Relay broadcasting
85.6–103.3	2,900–3,500	Public service
75–85.6	3,500–4,000	Amateur (80m)/Army mobile
66.7–75	4,000–4,500	Public service/mobile
60–66.7	4,500–5,000	Relay broadcasting
54.5–60	5,000–5,500	Public service
51.7–54.5	5,500–5,800	Relay broadcasting
42.8–51.7	5,800–7,000	Public service
37.5–42.8	7,000–8,000	Amateur (40m)/Army mobile
33.3–37.5	8,000–9,000	Public service/Mobile
30–33.3	9,000–10,000	Relay broadcasting
27.8–30	10,000–10,800	Public service
25.8–27.8	10,800–11,600	Relay broadcasting
21.2–25.8	11,600–14,000	Public service
18.7–21.2	14,000–16,000	Amateur (20m)
16.7–18.7	16,000–18,000	Public service/Mobile
5.3–16.7	18,000–56,000	Beam transmission
4.7–5.3	56,000–64,000	Amateur (5m)
0–4.7	64,000–	Beam transmission

***Table I.** 1924 Hoover Conference frequency allocations.*

Theory of frequency propagation: Still a mystery?

There existed an unanswered question in the minds of most. Why are 100-meter waves able to carry across oceans at night with little power? This problem baffled the scientists and radio experimenters in the field. Dr. A.E. Kennelly of Harvard University suggested that there must be conducting layers in the upper regions making possible the transmission of radio waves. The layers most likely represented ionizing action to accomplish such results at long distances. As Professor Kennelly theorized, the greater volume activity of the higher-frequency waves enabled them to cut a sharper conducting boundary surface in the upper air than was possible for the longer waves of the lower frequency. The longer waves had a greater tendency to follow the surface of the earth, thus restricting their efficiency.

The Hoover/White Bills

The changing conditions surrounding radio, especially in the field of broadcasting, definitely necessitated comprehensive legislation by Congress. Hoover had in mind a bill in the form of emergency legislation. He thought of the White Bills which had been pending as holdovers from the previous Congress. In communication with Congressman White, his proposal

was submitted in the following form to satisfy the public interest until final legislative policy could be enacted in Congress:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that it is hereby declared and re-affirmed that the ether within the limits of the United States, its territories and possessions, is the inalienable possession of the people thereof, and that the authority to regulate its use in interstate and/or foreign commerce is conferred upon the Congress of the United States by the Federal Constitution."

That Section 1 of the act of Congress approved August 13, 1912, entitled, An Act to Regulate Radio Communication, is hereby amended by adding at the end of said section the following: The wavelength of every radio transmitting station for which a license is now required by law, its power, emitted wave, the character of its apparatus, and the time of transmission, shall be fixed by the Secretary of Commerce as in his judgment and discretion he shall deem expedient, and may be changed or modified from time to time in his discretion."

The pending White Bill was temporarily sidetracked. The National Association of Broadcasters could hardly disagree with Mr. Hoover's suggestion, so long as he was Secretary, and so long as unfair decisions could be appealed with the consent of the present Secretary.

The amateurs responded by stating that, although the bill needed amending by limiting the life term or by placing the discretionary powers into the hands of some appointed radio commission to provide appeals from unfair decisions, no further suggestions would be forthcoming.

A memorable ARRL undertaking

The evidence of the popularity and the splendid results obtained with shortwaves in the hands of amateurs was clearly exemplified through the experiences conducted jointly with the United States Navy and the ARRL in the summer of 1925.

A shortwave station, call letters NRRL, was placed aboard the *USS Seattle,* flagship of the Navy fleet operating in the Pacific waters. ARRL traffic manager F.H. Schnell assembled the transmitter and receiver along customary amateur radio lines, typically breadboard but compact. Schnell was put in complete charge of the floating station, which was stashed in a small cubbyhole on the compass shack of the ship. There was no other vacant space on board. Schnell strung a single #12 wire vertical antenna up in the rigging of the ship. The Hartley circuit use operated in the 20, 40, and 80 meter bands. For a period of six months, Schnell, as sole operator, made almost daily contacts everywhere. He convinced the Navy personnel that long-range transmissions with low power could consistently outperform on short wavelengths, and had definite value over any of the longwave installations aboard ship. 73

The Cheapest Supplies Ever

continued from page 13

supplies used for computers are pulsewidth-modulated (PWM) such that the duty cycle of the oscillator is varied under regulation control.

Most of the power supplies that I've encountered have used either a TL494 or a KA7500B PWM IC. Within the IC is a built-in oscillator and two voltage comparators along with a voltage reference. In each case that I've observed, voltage comparator pin 1 has been the voltage "sense" pin, but it could also be pin 16 in some designs. **Fig. 2A** shows the top view of the TL494 IC and the function of each pin. **Fig. 2B** shows resistors R1 and R2, which are the voltage sense inputs from the +5 V and +12 V output circuits.

To raise the output voltage a small amount, it is necessary to lower the voltage appearing at pin 1 of the comparator. I've found that adding a resistor in parallel with R3 works well. Because power supplies vary in the values that are used in the sense circuit, same experimentation is required to find the desired resistor value to add across R3.

My suggestion is to tack insulated jumper wires to both pins 1 and 7 to obtain access to the comparator. Extend the wires to the outside of the box, and with the power supply operating and the 12 V output being monitored with no load, place a resistor between the ends of the jumper wires. I'd suggest starting with a 47k resistor and then dropping the value to 22k, then 15k, and then 10k or until the 12 V output rises to perhaps 13.7-13.9 V. When a suitable value has been selected, then tack-solder the resistor between pins 1 and 7 of the IC.

Conclusions

The real answer as to whether a computer power supply is suitable for your application is for you to run some test evaluations and make a decision. If the first power supply fails to work for your application, perhaps as a function of noise, try another supply and evaluate it.

The one conclusion that I can make regarding computer power supplies for ham applications is that they are more valuable in the hands of a ham than in the trash heap. DC power supplies capable of providing 12 VDC at 6-10 A are fairly expensive, while computer power supplies are essentially dirt cheap in comparison.

Try one and see how it performs for you! 73

Your Long-Lost Transistor Notebook

continued from page 17

out circuit values for our amplifier design. Part 4 of this series will begin with determining the resistor values that establish the basic parameters around which the transistor operates.

Additional stops in our tour will take us into determining the input and output impedance of our design, followed up by putting the completed amplifier into use, which requires coupling it to other circuits. Also, putting

our amplifier to use involves frequency roll-off characteristics and the factors that control it. 73

Movable Microphone Boom

continued from page 21

1" on the several lamps that I've modified) is almost exactly the same as the distance between the two mounting holes on the flange of the SO-239. Thread the 4-40 x 3/4" machine screws through two opposite holes on the SO-239. They may fit a bit tightly, but with a little careful work the screws should "self-tap" the holes. Next, place the 1/2" PVC spacer between the machine screws so that it covers the pin on the SO-239. (Actually, you may find it easier to just cut the pin off.) Slide the ends of the screws through the holes in the flange. Put the lock washers in place and tighten down the nuts. You now have a stable mechanical mount between the SO-239 and the modified flange on the lamp.

Now, all that's left to do is to screw the microphone holder onto the threads of the SO-239 and mount your favorite microphone. Then select a good location for the base of the boom, attach the mount, and you're done!

For a neater appearance, you can run some shielded microphone cable though the same internal channel that the line cord used. And, you can make up a simple switchbox such as I have made to provide easy push-to-talk control — or just go with VOX. Either way, your operating enjoyment has just been greatly improved with the addition of a new, attractive, and versatile station accessory.

Usage notes

The microphone I used for this project is the Yaesu MD-1. Normally, this microphone is mounted on a stand containing the usual switches for push-to-talk operation. Conveniently, it uses the same 8-pin round connector to attach the cable coming from the base as is used to plug into the transceiver. I used the same connector on the boom cable, which allows me to switch the microphone between its original base and the boom as the situation requires. For the final professional touch, I added a foam windscreen (RS part #33-4001).

Acknowledgments

Very special thanks to my wife Margie Bachman KF4UVK for her support, encouragement, and great editing skills. This article is dedicated to the memory of the late Don Shoff AF4IM — a fine man and a great ham missed by many. 73

Read All About It!

continued from page 23

Thompson got up and put his nose to the vent holes.

Just at that moment Doug and Al arrived, bursting through the front door and racing for the upstairs, with incoherent shouts of explanation to Mom and Dad in the kitchen. They were too overwrought to notice me, about ten feet behind them, and they had reached about the fourth step from the top when the transmitter blew.

It sounded very much like a rifle crack, and was followed in about a second by a sizzling frying sound reminiscent of old Frankenstein movies. We figured a filter cap shorted first; then, with no fuse to protect them, the transformer and filter choke fried. Of course, immediately following the rifle crack came a sound impossible to describe, but very definitely associated with an extremely distressed wild animal.

We heard several thumps as the animal careened off various closet doors trying for an exit. Finally, as the black smoke started rolling out the door to the hall, Mr. Thompson rocketed out about five feet above the floor level, four sets of claws outstretched and ready to slice to ribbons anything in his way. He never seemed to touch the floor. Maybe he got his purchase off a wall or the banister. In any case, he literally flew over our heads, down the stairs, and out the front door, howling a mixture of fright and defiance all the way.

I never even bothered to price a replacement transformer. I just put in one salvaged from an early '50s television set — so the DX-35 was demoted from a 65-watt to a 50-watt rig, but it continued to give me many enjoyable QSOs. In fact, I still have it, these 42 years later. And, in an illustration of the benefits of adversity, once I had modified the power supply, I felt no hesitation about making other modifications: 160-meter coverage, sidetone oscillator, speech processing, etc. This led to a series of home-brew rigs, and eventually a career in electronics.

As for Mr. Thompson, I guess the ordeal scared him pretty badly. He never came back. Although my thoughts about him in the days immediately after he ruined my transmitter were not so charitable, I often find myself hoping now that he managed to get himself adopted by a retired couple who spent their winters in Florida. 73

One More Hospital Test

continued from page 27

unused telemetries powered up for this test demonstrated no indication of my transmissions. This suggests that there is no interaction between the telemetries and the FRS radio.

Perhaps higher power, or digital modes, or a different frequency of operation, would have elicited interference to the operation of the monitoring equipment, but this FM, low-power handheld radio did not produce interference in this test.

While my ham colleagues may not employ FRS radios in the course of their community service, the process that I used to address the concerns of the officials of the hospital employing me may be useful to you. You might use this process to reassure the officials of the hospitals that you serve, that you will not interfere with life-safety-critical systems. Similarly, testing in advance of "The Big Day" might reveal RFI issues you ought to resolve, and assist you in effectively serving your community.

Given that experience suggests that when the public telephone network is out of service, so too are the cellular

providers, the likelihood is that amateur radio operators will have the opportunity to provide communications support to the hospitals (among other agencies) in our hometowns. While Y3K may be far enough off in the future that none of us reading this will be around to serve, perhaps the next winter ice storm, spring tornado, summer thunderstorm or autumn hurricane will allow us the opportunity to be of service. Now might be a good time to determine if our equipment will interfere with life safety devices in the hospitals in our towns, or what we need to do to prevent such interference. While we have the leisure time, seems like a good time to do this sort of tinkering. It certainly will allow us to look more professional than jury-rigging the "solution du jour" in the heat of an emergency! 73

Gold Is Where You Find It!

continued from page 31

with a BFO, maybe a crystal filter, and manufactured by someone like Hallicrafters, National Radio, or Hammarlund! (I'm thinking: There! That ought to straighten him out!)

Bud said: "Yes, I think that is just what you might be able to use. It's a Hallicrafters SX-9 radio in a metal case with large metal dials, a BFO, an S-meter, and, I think, a crystal filter."

I said: "HOLY COW! HOW WRONG CAN A GUY BE? OF COURSE, I WOULD LOVE TO HAVE IT!"

To make a long story short, Bud gave me the radio and it was a beauty. I used it for several years and made many contacts with it. It had great stability, the BFO worked perfectly, and the crystal filter was very sharp. Never again have I made a quick assumption on what I expected a person to know on any subject. Bud had very little technical knowledge of ham radio but he sure knew that he had what I needed in the way of a receiver! (A special thanks also to you, Bud.)

Unfortunately, as time went on, I got the fever for a new Hallicrafters SX-96 CW/SSB receiver. Allied Radio gave me a $50 trade-in allowance for my Hallicrafters SX-9.

I have regretted it ever since! 73

Calendar Events

continued from page 33

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 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.

SPECIAL EVENTS, ETC.

SEP 15, 16

BENTON HARBOR, MI Heathkit Educational Systems and the Blossomland ARA will host Special Event Station W8KIT, to celebrate the 75th Anniversary of Heathkit. Operation will be 1400Z-2400Z on September 15–16. Frequencies will be: 7.250, 14.260 and 21.360. Station equipment will be all Heathkit. Send an SASE for QSL card to W*8KIT, c/o Heathkit Educational Systems, 455 Riverview Dr. - Bldg. 2, Benton Harbor MI 49022 USA.*

SEP 22, 23

BERLIN, PA The Somerset County ARC will participate in the celebration of the 8th Annual Berlin Pennsylvania Whiskey Rebellion Days by operating a special event station on the lower 100 kHz of the General class SSB portions of 80m, 40m, 20m; and SSB between 28.3 and 28.4 MHz of the 10m band, for a 24-hour period starting at approximately 12 noon (EST), September 22nd. A certificate will be awarded to contacted stations that send a large SASE with the contact info on their QSL card or paper to the Somerset County ARC, c/o J. Crowley, 135 Baxter Dr., Somerset PA 15501 *USA*. The certificate is 8.5 inches by 11 inches. For more info about the Whiskey Rebellion, go to [http://www.angelfire.com/pa3/berlinpa/whiskeymaster.ht*ml*]. 73

Hamsats

continued from page 35

Day from the ISS using the call NA1SS. The W2LV Field Day group in New Jersey made their contact with Susan while demonstrating their station to onlookers including a county sheriff and a state congressman.

The AMSAT rules will be changed for 2002 to allow contacts with ISS. In other news from ISS, a new packet terminal node controller (TNC) is scheduled to be sent up to the space station in August. No more NOCALL from space! Expect to see RZ3DZR instead.

Field Day 2002

While there are no guarantees that AO-10 will still be on the air for Field Day next year, there are also no promises about HF propagation. Sunspot Cycle 23 has started its decline. We hope however that both will be in reasonable shape. We are also hoping for a fully commissioned AO-40 to be online for the event. Will you be ready? 73

Homing In

continued from page 39

they've been, know where they're going and usually know that they want. A lot of them have families and realize that they have to learn in order to earn. Kids are different when it comes to motivation. How do you motivate a kid? I think we've found some great ways.

"On the other hand, a lot of these kids do know the direction they want to go. They may not necessarily want to be an engineer, but they may want to work in the medical field with the new technologies, for instance. Wireless technology is part of that, and they know it."

If you enjoy the benefits of ham radio and high tech, you owe it to the next generation to help jump-start the scientists and engineers of the future. Why not do your part by sharing your passion for your favorite ham radio activity? I hope that it's transmitter hunting, but whatever it is, the kids are waiting. And I'm waiting, too, ready to tell your story in "Homing In"! 73

On The Go

continued from page 40

choose the proper tool for a particular challenge.

What tools do you choose? Why do you choose a particular mode or frequency for a particular purpose? Have you used a combination in a new or creative way? Why not share your success story or lesson learned? Send your ideas by E-mail, snail mail, carrier pigeon or whatever. With all the activity I hear out there, I'm sure there are some exciting stories to tell! 73

The Digital Port

continued from page 44

Dave AA6YQ, who developed WinWarbler for PSK31. That is a great program that allows the monitoring of three signals simultaneously and does an excellent job of it.

It seems WinWarbler was merely a release for some stored up energy when you take a look at his other offerings. You will find some interesting freeware-for-thought if you will go to the WinWarbler site listed in The Chart.

Don't be intimidated if you do not own an Icom rig. Though Dave has built an impressive gallery of software that includes automation of the Icom rig, there is much more. You will find logging, DX spotting, path plotting, and propagation. All these are meant to work together for nearly effortless DX ham communication. Quite an impressive array and, after watching comments on the DXLab reflector, I am sure the software is working for its faithful users. Just one more chink filled on the way to a fully digitized hobby courtesy of hams dedicated to the quest.

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

QRX

continued from page 7

And give your Elmer your thanks and a hug
His caring and efforts have come to fruition
By seeing your joy in preserving tradition
Why dedicate this poem? Why did I bother?
You see, my Elmer was also my father
Though all those nostalgic days are gone
I'll always be grateful for what he passed on
His wisdom and patience in this endeavor
Gave me a hobby I'll treasure forever
With this I'll close, I have to go
Dad's calling CQ on the radio!
I've waited all year so I could say
Thank you and Happy Father's Day!"

Author unknown. Thanks to The Communicator, *the monthly newsletter of the Central New Hampshire ARC, July 2001.* 73

Never say die

continued from page 4

with an emergency-powered ham rig. All other communications will have been wiped out and won't be back for years.

As Alfred E. Newman says, "What, me worry?" Now, leave me alone so I can start building that ark.

Coué

A hundred years ago Émil Coué had millions of people saying, "Every day, in every way, I'm getting better and better." They shouldn't have stopped. If you doubt it, spring $14 for a copy of Barbara Levine's *Your Body Believes Every Word You Say*. [Aslan Publishing, 3356 Coffee Lane, Santa Rosa CA 95403 (1-800-275-2606), ISBN 0-944031-07-2, 203p, 1991, $14 ($2.50 s/h)]. Well, we already know from Stone's *The Secret Life of Your Cells* that every cell in your body is in constant communication with every other cell, even when they have been separated by thousands of miles—so, when we think something, it has an effect on every cell of our bodies.

When you forget something do you comment on how your memory is getting worse? Well, it sure will. When I have trouble remembering something I wait and when it comes to me a few minutes later I congratulate my memory on doing such fine work.

If you've read the *Secret Life of Plants*, you know that plants can sense what we're thinking. If you tell them they are going to be big and beautiful, they will.

The more you talk positively about yourself, the better you're going to be. The more you put yourself down, the worse things will get. So watch your language. None of this so and so giving you a pain in the ass stuff. Do you really want hemorrhoids? Or so and so makes me sick. Hello, flu.

I once knew a beautiful young girl who kept saying she believed she was ugly. You should see the fat, ugly matron she turned into. Her belief sure came true.

On the positive side, many people have survived cancer by visualizing the cancer dissolving and going away. I'd also want to change my diet and not depend totally on positive imagery to save my butt every time.

A New Mode To Pioneer

This could be the answer to the spectrum limitations facing the FCC. How about a communications mode that is instantaneous (not limited by the speed of light), does not use the electromagnetic

spectrum, is interference-free, and works over any distance using almost no power?

In *The Secret Life of Your Cells* (see page 5 of my wisdom book) it's shown that cells taken from a person and kept alive in a nutrient, and then connected to a meter, register exactly the same meter movement as one connected to the cell's host a thousand miles away. No amount of electronic shielding prevents this cell to cell communication.

My next step would be to do this same test using cells from a plant, modulating one set of cells and demodulating the distant cells. Then I'd want to find out what bandwidth this link provides. Will it only work for CW, or can we send TV bandwidth?

Will the TV set of the future have a plant cell in a nutrient solution for each station? I can see the HDTV wide-screen 200 cell TV set of 2020.

Cell phones may be the real thing, with no antenna needed—run by a couple of AA lithium solar-charged batteries.

IQ

In this case I'm referring to Ignorance Quotient. You see, a high Intelligence Quotient is like having a higher powered computer. Which is fine, but only if it has data with which to work.

One of the reasons I write about so many things (which I think should interest you) is to encourage you to think and to read more (non-fiction) books.

About how many non-fiction books have you read in the last year?

Yes, I read some fiction too. Well, most of it Sherry reads to me while I'm driving us places. The latest Kinsey Milhone ("O") is a turkey, but her "A" through "N" books were great. So I'm keeping up with the mischief in Santa Turisa.

The popular concept that one's education is all taken care of by our schools is a myth totally without foundation. Education is a life-long adventure, and an exciting one. That's me out there in front, the guy with all the arrows in his back. Every so often I send back a note (via my editorials) saying, hey, guys, look at what I've found!

The ignorant are busy entertaining themselves with ball games, golf, and seeing how fat they can get before it kills them. As the founder of American Mensa, I've met an awful lot of high IQ "geniuses." What I haven't met are many of these elite who aren't pathetically ignorant.

Amusements

In early December I got a call from a fan in Las Vegas, asking me to send her another copy of my *Secret Guide to Health*. It seems her father, a Mayo Clinic doctor, grabbed hers and took it with him before she had a chance to read it. Her father, it developed, had been King Hussein's doctor, and now was King Abdulla's doctor.

"When will he be back?" I asked. She said he'd be back for the Christmas holidays. Could she arrange a meeting? No problem.

So Sherry and I got airline tickets to Las Vegas, plus a hotel room at Arizona Charlie's East and an Alamo rental car. I then called Art Bell W6OBB and arranged to visit him. Well, I've been wanting to see his ham station and emergency power setup.

Now, have you guessed what got me into action so quickly? The lure of Las Vegas? No way. Been there dozens of times for hamfests, computer, and consumer electronic shows—and I don't gamble. No, my goal was to get an introduction to visit King Abdulla. I'd like to talk to him about making major changes in Jordan's agriculture, schools, and health care.

If you've been reading my essays you know what I mean. I believe I can help Jordan easily double or triple its agriculture, and at much lower cost. Plus, the resulting fruits and vegetables would be far healthier to eat. I can show Jordan how to cut its school costs, while enormously improving their children's education—making Jordan an educational center for the entire Arab world.

And if I can get the government to encourage the Jordanian people to stop poisoning themselves, they could have the best health in the world.

In each of these fields I'd like to have a test case to show what can be done. It was worth a trip to Las Vegas.

Thirty years ago, when I heard that King Hussein's wife had gotten him a ham rig for Christmas, I sent him a cable asking if he'd like someone to show him how to use it. He cabled back saying sure. A couple days later I landed at Amman, where I spent two weeks making thousands of contacts, with His Majesty staying up all night with me, having a ball.

After talking with his Minister of Communications and Minister of Education, I explained to His Majesty that if he would put ham club stations into the schools and provide a teacher to go around teaching the fundamentals of electricity and radio, that instead of having to pay technicians from Germany, Sweden and Switzerland several hundred dollars a day to install telephones and electrical equipment, this could be done by Jordanians at a fraction of the cost.

He liked the idea and had me explain it to his government leaders at a special meeting the next day. I promised to write a set of ham rules and regulations for them. Done deal.

A few days later, after I'd returned home, the Palestinians tried to kill His Majesty and a civil war erupted, with the TV news showing the hotel where I'd stayed being strafed and bombed. Close call.

Three years later, while I was swapping slow scan photos with a ham in Athens, JY1 broke in and asked me to meet him in Washington during his coming visit. I met him at Blair House, presenting him with a Drake 2m FM rig to use during his visit. He handed me an envelope with first class round trip tickets to Amman saying, "I want you to come over and see what you've done."

When I arrived I was met at the airport by Hisham Ansari, the chap who had been going around to the new ham clubs, teaching the children the fundamentals of radio and electronics. He drove me from one end of Jordan to the other, from Irbid in the north to Aqaba in the south, visiting the schools and youth clubs and talking with over 400 newly licensed and excited young hams. Both boys and girls.

On my last visit to Jordan, again as a guest of His Majesty, Prince Raad JY2RZ arranged a meeting of the Royal Jordanian Amateur Radio Society, where he introduced me as the man who had had more of an influence on Jordan than anyone but the King.

I hope that, in a few years, I can hear that said again, as a result of changes I can help introduce in their health, education and agriculture.

Las Vegas

There's nothing else on Earth that even comes close to Las Vegas. It is the entertainment capital of the world.

And that got me to thinking—and I don't think you're going to like my thoughts. The Roman Empire was destroyed while the Roman people were being distracted by the games. I've been reporting in my essays what's happened to our schools, the trillion and a half dollar medical industry scam, the phony drug war, the war on poverty that's increased black illegitimacy from around 3% to 70% over the last 30 years, the billions wasted on scientific welfare such as hot fusion and the linear accelerator. And that stupid space station.

In the meanwhile almost everyone has been distracted by spectator sports, hundreds of TV channels, Oprah, Judge Judy, rock music and junk novels.

Continued on page 61

Jim Gray II
210 E Chateau Circle
Payson AZ 85541
[akdhc2pilot@yahoo.com]

Things Are Looking Up

My calculations for September show a steady decline in solar activity, a possible indication that we have passed the peak of Sunspot Cycle 23. It is more likely that we have reached a lull between peaks, but for this month we ought to at least see fewer disruptions as older sunspots fade away and less new ones appear.

This, coupled with a seasonal improvement in propagation conditions, should bring a noticeable upswing in DX opportunities across the HF radio spectrum. For the first time in a long while the calendar shows more good (G) days than poor (P) and fair-to-poor (FP) ones combined!

The worst period is likely to fall at the beginning of the month, with a minor geomagnetic storm possible. Other "suspect" days include the 9th–10th, 15th–16th, but as of this writing (June) none seem likely to produce strong or long-lasting disruptions. The very best periods for above average DXing appear to be the 12th–14th and 28th–30th, with the 4th–5th and 18th–19th running a close second.

Band by Band Summary

10 and 12 meters

Expect DX to improve throughout the month with regular paths to Europe before noon and to Africa after noon. South America and the Pacific should open up later in the afternoon with the Far East appearing before sundown. Short skip from 1,000 to 2,000 miles is anticipated on most days.

15 and 17 meters

The southern hemisphere is your best bet, but excellent daytime opportunities exist for most areas of the globe. Try Europe or the Middle East before noon and other areas after noon. Daytime short skip beyond 1,000 miles is expected.

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.*

September 2001

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

20 meters

DX openings to most parts of the globe can be worked on good (G) days. From around sunrise until several hours past sunset. Peak conditions will usually occur an hour or two after sunrise and again in the late afternoon. Short skip will extend from 500 to 2,000 miles during the day, and from 1,500 to 2,000 miles after dark.

30 and 40 meters

From local sunset until sunrise this may be the place to be, especially to the southern hemisphere. Average skip during the day is about 1,000 miles, but at night the distance can vary between 500 and 2,000 miles.

80 and 160 meters

World wide DX will begin to open up as the equinox approaches, although static from thunderstorms will often mask signals. Nighttime short skip will average between 1,000 and 2,000 miles. 73

NEVER SAY DIE

continued from page 59

Oh, I almost forgot that band of crooks we support in Washington. The ones who are taking our money and spending it for us on all this crap.

After inflation has been factored in, the purchasing power of a working couple in 1995 was only eight percent better than that of a single working man in 1905. This has forced both parents to work, leaving children to day care centers and nursery schools instead of a home and mother.

The promise was that schooling was the cure for unevenly spread wealth, it's been the reverse, with wealth 250% more concentrated at the end of the century than its beginning.

Like prototypical American Homer Simpson, most of us are far more interested in watching ball games than in helping our children to grow and learn.

And Las Vegas is the epitome of entertainment.

Ham Radio, Too

Our hobby provides plenty of opportunities for us to learn about new technologies. But what percentage of hams have gone to the trouble of making any satellite contacts? Or been involved with RTTY, slow scan, or anything other than rag chewing or chasing DX? Or contests?

My first ham contact was with a 2-1/2 meter transceiver I built myself from an article in *Radio*. It had a 1G4GT superregenerative receiver and a modulated oscillator transmitter (1Q5GT), and it worked great. After WWII, when we were first allowed back on the air, 2-1/2 meters was the first band they opened and I was on immediately with my walkie-talkie rig from the Submarine Base in New London CT, where I was teaching electronics.

When they opened 10m I quickly got on with another home-built rig running a pair of 813s in the final.

When narrow band FM was developed I was one of the first on with it. By 1949 I was active on RTTY and had helped put up a repeater. Then came SSB, with me quickly building an exciter for that new mode. Then slow scan, ham satellites, and repeaters. I helped pioneer all of 'em, and I had the time of my life, learning every inch of the way.

Our hobby provides plenty of opportunities to experiment and learn new things. Or you can sit and rag chew night after night, or join the DX pileups. Or make meaningless short contacts by the gross. Yeah, I did all of those. For a while. Got over it. It was even fun operating from rare countries like Nepal, making ten-second contacts by the thousands. Got over that too. And I had a great time making contacts with seven states on 10 GHz with a tenth watt rig. Then there was my 2m station on the highest mountain in southern New Hampshire running a kW and a 336-element beam. What a thrill to hear my signal coming back from a ham satellite, and working guys all over Europe and into South America. I learned a lot and have had more fun than should be legal.

How about you?

The Bottom Line

A National Adult Literacy Survey in 1993 showed that 42 million Americans over the age of 16 can't read. 50 million can recognize words at the 4th and 5th grade level, but cannot write simple messages. 3.5 percent reached the reading level 30 percent did in 1940, and which 30 percent do in other developed countries today. 96.5 percent of Americans are mediocre to illiterate. Say, why am I bothering to write books if so few people can read 'em?

It's no wonder, too, that almost all of today's magazines waste huge amounts of space on large, irrelevant illustrations. They're picture books.

Our schools have done this to us, with the complicity of the government.

Which is why I'd like to use Jordan as an example of what a school system can do—enough to drop everything and fly to Las Vegas to follow up on serendipity.

Yes, I enjoyed seeing the New York City building, Venice and so on. No, I didn't drop a nickel in a slot machine, but I sure did enjoy the lavish, inexpensive buffets.

How It Works

In a world where almost nothing is as it is made to appear, it should not surprise you to learn that lobbyists are paying off our senators and representatives with cash, trips to "conferences" in prime vacation areas and so on. And that the same thing is going on in the medical field, where the drug companies are lavishing attention of doctors. I'm talking $900 dinners at the fanciest of restaurants, trips to exotic places for an hour or so "conference," and so on.

Yes, of course the drug companies keep track of how this influences each doctor's prescription record. Is he pushing more Zoloft or Paxil on his patients?

All of the pressure and "information" have to do with prescribing drugs. That's where the money is. That's where yo*ur* money is going.

The fact that *any* illness can be cured without drugs is something doctors never hear about. There's no one to tell them. No one to pay them to hear about it. And since it would put them out of business in short order, it's something they don't *want* to hear. It's their worst nightmare. There's just Dr. Lorraine Day in San Francisco, Dr. Bruno Comby in Paris, and Wayne Green up here in New Hampshire preaching to empty pews.

Hey, don't believe a word I write, but at least download Barbara Simpson's interview of Dr. Day by going to [www.artbell.com] archives, July 10th, 2001 program, starting with the second hour of the show. Dr. Day explains how cancer, AIDS, and so on are totally curable by anyone, and without any drugs. She is living proof!

The Different Drum

Since I write some seemingly preposterous things it's easy just to dismiss me as crazy. As a conspiracy nut. And so on. That's the easy way out. That doesn't take any thinking.

The fact is that, despite my advanced age, my mind is still working pretty well, and I don't (and haven't in the past) written about something in my editorials where I haven't done my homework.

So I'm able to get up in front of a couple thousand professional educators and lecture them on what's wrong with our school system, what can be done to improve it, and where the whole field is heading over the next twenty years. It takes some guts to tell a couple thousand teachers that they've all been bamboozled

— led by the educational unions just like a toreador leads a bull with a waving red flag — and to convince them it's true.

I'm reminded of the radio talk show host who said, "I believe we went to the Moon and I don't want to hear anything more about it."

So here's Wayne, telling teachers they have been duped. Telling doctors they, too, have been duped — big time. And telling anyone who will listen that very little that they've been taught to believe is really true. Sure, I have good solid references to back up everything I say, but for the most part I'm preaching to deaf ears, backed up by blind eyes.

These days we tend to roll our eyes and ignore nut cases rather than crucifying them. That's some progress for which I'm thankful.

Club Newsletters

With used Macintoshes selling in the $200 range, and excellent printers available for $50, the cost of producing a ham club newsletter is no longer a factor. If you want to include photographs, even the price of brand new scanners has plummeted. Last year's scanners? They're probably giving 'em away by now.

I prefer the Macs because they're so easy to learn and use. I prefer PageMaker software for my books. Heck, that's what we're using to produce *73* every month!

A club newsletter, if it's interesting, can substantially boost meeting attendance and the turnouts for club activities like Field Day.

Aha, "interesting." That's the key. When you get *QST* what do you turn to first? Your section activities? If you get *CQ*, what do you turn to first there? Contest results? I know what you turn to first when *73* arrives. It isn't my ham oriented writing that does it, it's stuff like my research into milk, where I explain that if you are feeding your family milk you are enormously increasing their potential for breast or colon cancer — unless you're paying a lot extra to make sure the milk you're buying doesn't contain bovine growth hormone and is laced with the antibiotics farmers have to feed their cows to counter the mastitis and hoof problems the growth hormone causes.

Well, I've got a patent on ham-irrelevant editorial essays, so what can you do to make sure the club members open the newsletter the minute it arrives? How about drumming up enthusiasm for a coming club event? Or an in-depth report on one just past?

How about the latest fun that club members pursuing special ham interests are having. What new countries have your DXers snagged? Maybe scan in the QSL card. What's doing on six meters? The band is going crazy, so those up there are having the time of their lives. Anything new with the local repeaters? How about any members active on our ham satellites? RTTY? Slow scan? Packet?

What's on the Internet that the members will find of interest? Are there any upcoming hamfests within driving distance? Have any members attended a hamfest recently? How much fun was it? What were the highlights? What did those who went to Dayton think of it this year?

Oh, has any club member bought a new piece of ham gear or put up a new antenna? Get the story! How about any members operating HF mobile — what have they been working?

What's going to be special about the next club meeting? Will there be a talk via a telephone hookup and an amplifier by a manufacturer or some ham luminary?

You get the picture.

One more thing — I'm going to be very disappointed if I'm not on your mailing list. Or, if you distribute it via E-mail, that a copy doesn't go to [w2nsd@aol.com].

Now, get hot!

Killing Wayne

At 14, when I was walking to school one day, I managed to catch a finger on a nail sticking out of a short fence post. It made a gash over a half inch long and there was blood all over the place. The school nurse wrapped it up and sent me home. My folks were out, so my grandmother took me to a doctor across the street who sewed up the cut. And, just in case, he gave me an anti-tetanus shot.

Minutes after when we got back home I collapsed and was in a coma for several days. It turned out I was allergic to the shot, which was made from horses. Like my father, I was allergic to almost all animals. The doctor apologized for not testing the serum first on my arm and said that another shot like that would probably kill me.

By the time I joined the Navy in 1942 there was a new anti-tetanus serum, one not made from animals, so when I got my obligatory Navy vaccinations I made sure it was the safe stuff.

Three years later it was time for booster shots. I reported into sick bay and again explained about my allergy. The doctor assured me that there was no problem, but I insisted on his testing it on my arm first. He shot a tiny bit into my forearm and said to come back in a half hour.

When I came back my arm was fine. No redness, no swelling. But the vaccine had been put back in the refrigerator for lunch, so the doctor said to come back after lunch.

I did. By then my arm had swollen several inches and I could no longer bend my elbow.

I came that close to death.

Now I find that there have been only a few cases of tetanus in the U.S. — ever. This whole lockjaw thing is a pharmaceutical scam to sell useless vaccinations. And always has been.

Our Schools

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

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

Then there's the government. It's run by three groups — congress, the administration, and the bureaucrats who do 99.9% of what little actual work is done, and who continue in power while congress and administrations change. None of these groups see any benefit to them in a better educated citizenry. They have a huge vested interest in the people being manipulated by the media, and being sheep.

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

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

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

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

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

The teacher unions keep hammering on the need to spend more money. Well, we have. Currently the tab is $389 billion a year. That's with a "B." We've

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)

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. In this book I explain about the various disaster scenarios, like Nostradamus, who says the poles will soon shift (as they have several times in the past), wiping out 97% of mankind. Okay, so he's made a long string of past lucky guesses. The worst part of these predictions is the accuracy record of some of the experts. Will it be a pole shift, a new ice age, a massive solar flare, a comet or asteroid, a bioterrorist attack? I'm getting ready, how about you? $5 (#31)

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

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)

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)

NH Reform Party Keynote Speech. It wow'd 'em when I laid out plans for NH in 2020, with much better, yet lower cost schools, zero state taxes, far better health care, a more responsive state government, etc. $1 (#85)

Stuff I didn't write, but you need:

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, and 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)

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

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

Radio Bookshop 16

Box 416, Hancock NH 03449

Name _____ **Call** _____

Address _____

City-State-Zip _____

Use the numbers in the brackets or copy page and mark the books you want. Add $3 s/h per total order in US ($5 priority mail), $6Can, $10 foreign. _____

Order total: US$_____ Phone (for CC orders) _____

MC/Visa for orders over $10. #_____ Expire ____

www.waynegreen.com • phone orders: 603-588-0107 • fax: 603-588-3205 • w2nsd@aol.com

Yes! Put me down for a year of *73* for only $25 (a steal). Canada US$32. Foreign US$44 by sea.

I need some industrial strength stress reduction so send me your Adventures In Music CD catalog

Allow 4 weeks for delivery except foreign, though we try to get most orders shipped in a day or two.

Your e-mail address: _____

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 November 2001 classified ad section is September 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

RF TRANSISTORS TUBES 2SC2879, 2SC1971, 2SC1972, MRF247, MRF455, MB8719, 2SC1307, 2SC2029, MRF454, 2SC3133, 4CX250B, 12DQ6, 6KG6A, etc. **WESTGATE**, 1-800- 213-4563. BNB6000

METHOD TO LEARN MORSE CODE FAST AND WITHOUT HANGUPS Johan N3RF. Send $1.00 & SASE. SVANHOLM RESEARCH LABORATORIES, P.O. Box 81, Washington DC 20044 USA. BNB421

Cash for Collins: Buy any Collins Equipment. **Leo KJ6HI.** Tel./FAX (310) 670-6969. [radioleo@earthlink.net]. BNB425

Browse our web site and check out the **"Monthly Special."** TDL Technology, Inc. **[www.zianet.com/tdl].** BNB500

MAHLON LOOMIS, INVENTOR OF RADIO, by Thomas Appleby (copyright 1967). Second printing available from **JOHAN K.V. SVANHOLM N3RF**, SVANHOLM RESEARCH LABORATORIES, P.O. Box 81, Washington DC 20044. Please send $25.00 donation with $5.00 for S&H. BNB420

Ham Radio Repair, Quality workmanship. All Brands, Fast Service. **Affordable Electronics**, 7110 E. Thomas Rd., Scottsdale, AZ 85251. **Call 480-970-0963**, or E-mail **[HAM SERVICE@AOL.COM].** BNB427

SATELLITE TV — Large selection of items at reasonable prices. We specialize in Big Dish TVRO C & Ku Band equipment. Check us out at [www.daveswebshop.com]. BNB646

HEATHKIT COMPANY is selling photocopies of most Heathkit manuals. Only authorized source for copyright manuals. **Phone:** (616) 925-5899, 8–4 ET. BNB964

"MORSE CODE DECIPHERED" Simple, elegant, inexpensive, comprehensive, logical, easy! E-mail [judlind@earthlink.net]. BNB428

Electricity, Magnetism, Gravity, The Big Bang. New explanation of basic forces of nature in this 91-page book covering early scientific theories and exploring latest controversial conclusions on their relationship to a unified field theory. To order, send check or money order for $16.95 to: American Science Innovations, P.O. Box 155, Clarington OH 43915. Web site for other products [http://www.asi_2000. com]. BNB100

COLLOIDAL SILVER GENERATOR! Why buy a "box of batteries" for hundreds of dollars? Current regulated, AC powered, fully assembled with #12 AWG silver electrodes, $74.50. Same, but DC powered, $54.50. Add $2.50 shipping. **Thomas Miller**, 216 East 10th St., Ashland OH 44805. Web address **[www.bioelectrifier.com].** BNB342

COLD FUSION! - FUEL CELL! - ELECTRIC BICYCLE! Each educational kit: (Basic - $99.95, Deluxe - $199.95, Information - $9.95.) CATALOG - $5.00. ELECTRIC AUTOMOBILE BOOK - $19.95. **KAYLOR-KIT**, POB 1550ST, Boulder Creek CA 95006-1550. (831) 338-2300. BNB128

ANTENNA SCIENCE: Why do antennas radiate electromagnetic waves? Learn for yourself from this enlightening paper by **MAX RESEARCH.** Gain an understanding of the radiation mechanism of antennas! Written in a clear style for radio hobbyists, inquisitive amateurs and experimenters. $4.95 ... ppd. Order from **MAX RESEARCH**, P.O. Box 1306, East Northport NY 11731. BNB426

DWM COMMUNICATIONS - Neat stuff! SASE brings catalog! POB 87-BB, Hanover MI 49241. BNB641

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 62

increased spending by 72% in the last ten years in constant dollars, yet SAT scores have been steadily dropping. The spending per student in constant inflation-corrected dollars has gone from $3,367 in 1970 to $6,584 in 2000. The number of students per teacher has dropped from 22 to 17, and yet our kids are learning less and less.

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

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

The Heritage Foundation recently published the Carter Report, which cited 21 High Performing Poverty Schools, so it can be done. 73

Real Performance for the Real World!

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)

HF 200 W All-Mode Transceiver
MARK-V FT-1000MP

For Elite-Class Amateur Radio Operators...

A NEW BREAKTHROUGH IN TRANSMITTED AUDIO QUALITY:
THE YAESU MD-200A8X HIGH-FIDELITY DESKTOP MICROPHONE.

- New-Technology Polyethylene Terephthalate Film High-Fidelity Dynamic Microphone Element
- Vibration-Resistant Housing
- VSPC (Variable Side Pressure Control) Technique (Patent Pending)
- Ease of Operation through Ergonomic Design
- Provision for User-Supplied Additional Microphone Element

VSPC (Variable Side Pressure Control)

APPLICABLE TRANSCEIVERS

MARK-V FT-1000MP, FT-1000MP, FT-1000/-1000D*, FT-990*, FT-920, FT-900, FT-847, FT-840*, FT-817

* The FT-1000/-1000D/-990/-840 do not support the illumination of the TX LED during transmission.

Ultra-High-Fidelity Desktop Microphone
MD-200A8X

Expand Your DX Horizons With The FTV-1000 50 MHz Transverter!

- 50 MHz Transverter with 200 W PEP Power Output
- Class-A Bias Selection for Low TX IMD (PO: 50 W)
- High-Performance Receiver Front End
- Automatic, Effortless Operation with MARK-V FT-1000MP
- Upgrade to High Power with VL-1000 Linear Amplifier

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

YAESU
Choice of the World's top DX'ers℠

Vertex Standard
US Headquarters
17210 Edwards Road,
Cerritos, CA 90703 (562)404-2700

For the latest Yaesu news, visit us on the Internet: http://www.vxstd.com

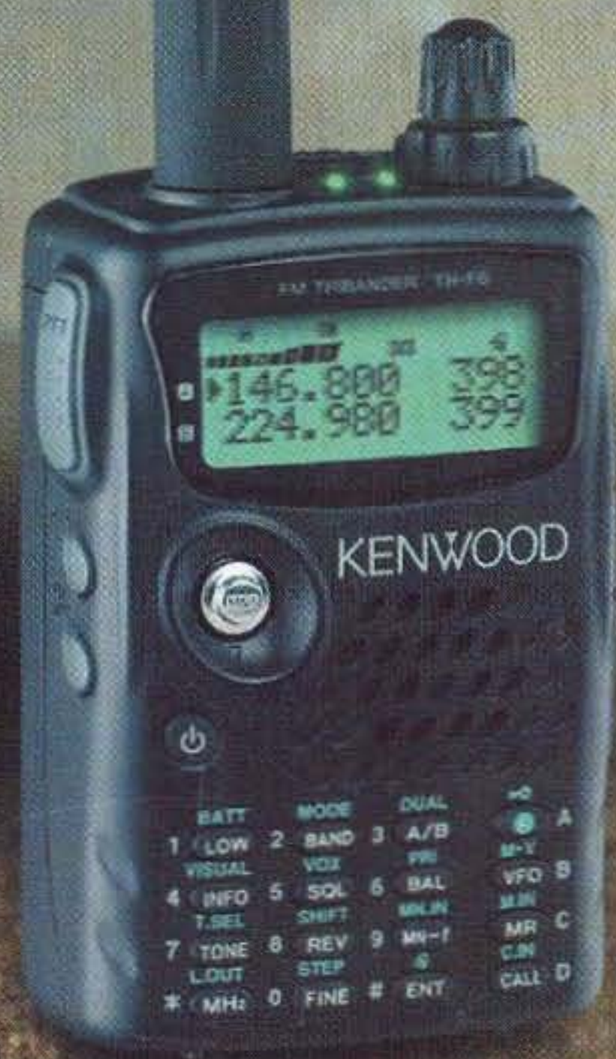
144 220 +440

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

- Receives 2 frequencies simultaneously even on the same band
- 0.1~1300MHz high-frequency range RX (B band)[1]
- FM/FM-W/FM-N/AM plus SSB/CW receive
- Bar antenna for receiving AM broadcasts
- Special weather channel RX mode
- 435 memory channels, multiple scan functions
- 7.4V 1550mAh lithium-ion battery (std.) for high output[2] and extended operation
- 16-key pad plus multi-scroll key for easy operation
- Built-in charging circuitry for battery recharge while the unit operates from a DC supply
- Tough construction: meets MIL-STD 810 C/D/E standards for resistance to vibration, shock, humidity and light rain
- Large frequency display for single-band use
- Automatic simplex checker
- Wireless remote control function
- Battery indicator • Internal VOX • MCP software

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

"Specifications subject to change without notice."



NEW TH-F6A FM TRIBANDER

KENWOOD COMMUNICATIONS CORPORATION
AMATEUR RADIO PRODUCTS GROUP
3975 Johns Creek Court, Suwanee, GA 30024
P.O. Box 22745, Long Beach, CA 90801-5745, U.S.A.
Customer Support: (310) 639-5300 Fax: (310) 537-8235

01ARD- 2114 #050701

ISO 9001
JQA-1205
Communications Equipment Division
Kenwood Corporation
ISO9001 certification

INTERNET
Kenwood Website
http://www.kenwood.net
Kenwood Information
ftp://ftp.kenwood.net