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Monitoring Times®

The Full-Spectrum Radio Magazine
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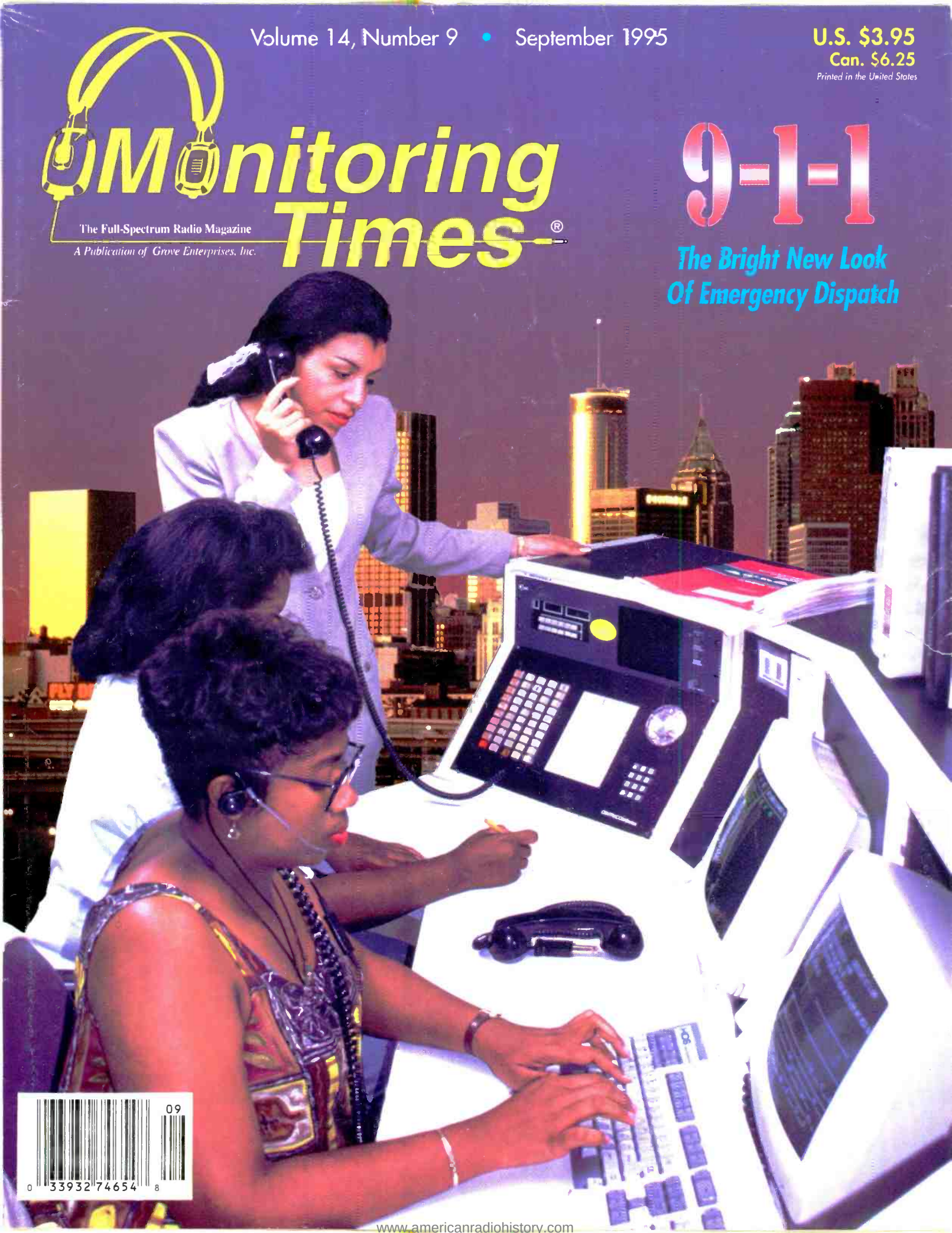
9-1-1

The Bright New Look Of Emergency Dispatch



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All prices and specifications are subject to change without notice or obligation.

Made in the U.S.A

Monitoring Times™

Vol. 14, No.9 September 1995

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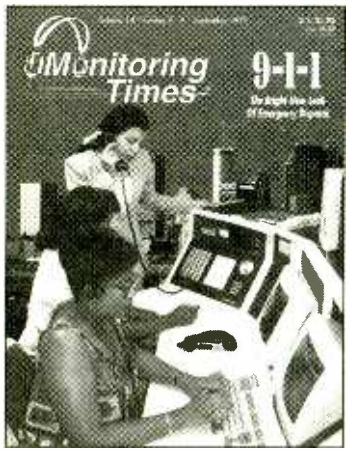

Cover Story

Emergency 9-1-1!

By Jack Sullivan

Advanced emergency dispatch centers, such as the Fulton County Communications Center pictured on our cover, are changing the way public officials respond to our calls for help. Author Jack Sullivan gives us a tour of his local center in Hunterdon County, New Jersey—a county with a fairly typical suburban/rural mix.

The enhanced 9-1-1 system can be a significant life-saver. It's important that each community understands how it works, exploits its full potential, and is prepared with a back-up when the system fails. See page 9 for the story.

Our cover shot of Atlanta's multi-agency dispatch center, shown in a composite against the Atlanta skyline, was photographed and designed by John Bailey.

Reviews:

The new Lowe HF-250 tabletop communications receiver is in many ways what Lowe fans were waiting for. See page 102 for Magne's review. The Radio Shack PRO-60 replaces the notable PRO-43 portable scanner, and expands its coverage even further. See what Parnass thinks of its other features on page 100.

This month, *MT* also looks at the Par Intermod Filter (p. 97), MFJ's 784 DSP Filter, CTP Voice Descrambler (p.98), and the Iso-Tip cordless soldering iron (p. 90).

DEPARTMENTS

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Editorial Staff

Correspondence to columnists should be mailed c/o Monitoring Times. Any request for a personal reply should be accompanied by an SASE.

Scanners/CB/Weather Stations

New Scanner Products Available

Now it's easy to purchase communications, emergency management supplies, weather forecasting equipment and more directly from Communications Electronics Inc. Your **free fax-on-demand catalog** including unadvertised specials is instantly available by calling 313-663-8888 from your fax machine.

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Monitor police, fire, marine, aircraft, emergency medical transmissions and more with a Bearcat scanner.

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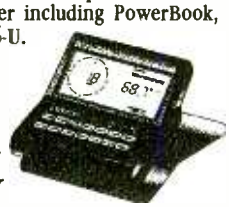
Bearcat 760XLT-U base/mobile $189.95
Bearcat 700A-U information mobile $144.95
Bearcat 560XLA-U base/mobile $76.95
Bearcat 220XLT-U handheld/SPECIAL $207.95
Bearcat 178XLT-U base with weather alert $124.95
Sportcat 150-U handheld with 800 MHz. $158.95
Bearcat 148XLT-U base with weather alert $83.95
Bearcat 120XLT-U handheld $129.95
Bearcat 80XLT-U handheld with 800 MHz. $144.95
Bearcat BCT7-U information mobile $168.95

Weather Stations

Now you can be your own weather reporter with the Davis Weather Monitor II. Our top-of-the-line weather station combines the most advanced weather monitoring technologies available into one incredible package. Glance at the display, and see wind direction and wind speed on the compass rose. Check the barometric trend arrow to see if the pressure is rising or falling. Push a button, and read indoor and outdoor temperature, wind chill, humidity and barometric pressure. Our package deal includes the new ultra high resolution 1/100 inch rain collector part #7852-U, and the external temperature/humidity sensor, part #7859-U. The package deal is order #DAV1-U for $479.95 plus $15.00 shipping. If you have a personal computer, when you order the optional Weatherlink computer software for $139.95, you'll have a powerful computerized weather station at an incredible price. For the IBM PC or equivalent order part #7862-U. Apple Mac Plus or higher including PowerBook, order part number 7866-U.



The Weather Monitor II (7440) comes complete with anemometer with 40 feet of cable, external temperature sensor with 25 feet of cable, junction box with 8 feet of cable, AC-power adapter, detailed instruction booklet and one year limited factory warranty.

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Davis Weather Wizard III 7425-U $154.95
Davis Perception II indoor stand-alone weather monitor 7400-U .. $124.95
Davis Remote Display Unit 7815-U $84.95
Davis Rain Collector II 0.01" 7852-U $59.95
Davis Rain Collector II 0.2 mm 7852METRIC-U $59.95
Davis Rain Gauge Stand-alone 0.01" 7520-U $79.95
External Temperature/Humidity Sensor 7859-U $99.95
Davis Anemometer Mast Mount 7890-U $15.95
Weatherlink Software for IBM PC-Version 3.0 7862-U $139.95
Weatherlink Software for Apple-Version 3.0 7866-U $139.95
4-Conductor 40' (12.2 m) extension cable 7876-U $17.95
6-Conductor 40' (12.2 m) extension cable 7878-U $21.95
8-Conductor 25' (7.6 m) junction box cable 7880-U $14.95
8-Conductor 50' (15.2 m) junction box cable 7881-U $24.95
8-Conductor 100' (30.5 m) junction box cable 7882-U $44.95
Modem Adaptor 25-Uln for communications port 7870-U $9.95
Car/Boat/RV Lighter Power Cord 7873-U $9.95
2400 baud modem for Weatherlink MEXT-U $29.95
Talking weather card - Call 313-994-9000 for demo IT1-U $474.95
Weatherlink language disks: Française, Deutsche, Italiana, Española 7863-U $24.95
Barometer, Indoor Hygrometer & Thermometer, Clock/Calendar BA888-U . $89.95
Indoor-Outdoor Thermometer/Barometer & Hygrometer by OSI BA213-U .. $79.95
Thermometer with transparent calender & clock display by OSI TC188-U .. $19.95
Thermometer with AM/FM clock radio by Oregon Scientific CR388-U $39.95
Indoor/Outdoor Thermometer with Jumbo Display by OSI JB880IX-U $24.95

Bearcat® 9000XLT-U Radio Scanner

Mfg. suggested list price $769.95/CE Special $369.95
500 Channels · 20 banks · Alpha numeric display
Turbo Scan · VFO Control · 10 Priority channels
Auto Store · Auto Recording · Reception counter
Frequency step resolution 5, 12.5 & 25 KHz.
Size: 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High

Frequency Coverage:
25.000-549.995 MHz., 760.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-1,300.000 MHz.

The Bearcat 9000XLT gives you pure scanning satisfaction with amazing features like TurboSearch™ to search VHF channels at 300 steps per second. This base and moble scanner is ideal for surveillance professionals because it has a selectable attenuator to help eliminate annoying intermodulation from adjacent frequencies in highly populated areas and selectable AM, Wide FM and Narrow FM modes that allow you to change the default receiving mode of the BC9000XLT. Other features include ***Auto Store*** - Automatically stores all active frequencies within the specified bank(s). ***Auto Recording*** - This feature lets you record channel activity from the scanner onto a tape recorder. Hi-Cut filter to help eliminate unwanted static noise. You can even get an optional ***CTCSS Tone Board*** (Continuous Tone Control Squelch System) which 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; **BC005** CTCSS Tone Board $54.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. The BC9000XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited warranty from Uniden.

CB/GMRS Radios

The Maxon GMRS 210+3 transceiver is a PLL synthesized 10 channel radio on General Mobile Radio Service frequencies. It's the ideal radio for long range communications. Two repeater channels are programmable and one channel (462.675 MHz.) is set aside for emergency and safety communications. The seven remaining interstitial frequencies 462.5625, 462.5875, 462.6125, 462.6375, 462.6875 & 462.7125 MHz are all-purpose GMRS radio channels. 2 watts of RF power for exceptional transmitting range. Up to 5 watts when used with the supplied 12 volt vehicular DC power cord. CTCSS built-in. Includes 450mAh Ni-cad rechargeable battery pack, AC/DC wall battery charger, owner's manual, FCC license application, belt clip, antenna. Call 1-800-USA-SCAN to order.

Maxon GMRS210+3-U GMRS transceiver $188.95
SPECIAL Buy 2 or more GMR210+3 at $174.95 each
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WTA6GN2-U Ni-cad pack gives 2 watts power with 210+3 ..... $29.95
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WTA8GA-U Carrying case for Maxon GMRS210+3 ..... $29.95
WTA10G-U Speaker/microphone for Maxon GMRS210+3 ..... $18.95
WTA13G-U Push-to-talk mini-VOX headset for GMRS210+3 ..... $47.95
WTA14-U Antenna adaptor/screw-in male to BNC connector $9.95
ANT4GM-U 1/4 wave UHF magnetic mount mobile antenna $29.95
Cobra 2010GTLWX-U SSB base with weather alert† $379.95
Cobra 148FGTL-U CB with frequency counter $209.95
Cobra 29LTDWX-U CB with weather alert $114.95
Cobra HH40-U CB 40 channel handheld transceiver $99.95
Ranger RCI2950-U 25 watt 10 meter transceiver $239.95
Uniden GMR100-U GMRS handheld transceiver $144.95
Uniden WASHINGTON-U SSB CB Base († $25.00 shipping) $199.95
Uniden GRANTXL-U SSB CB Mobile $139.95
Uniden PRO538W-U CB & Weather $59.95

VHF Transceiver

RELM® WHS150-U Transceiver/SPECIAL

Mfg. suggested list price $481.67/**CE price $299.95**

Police and fire departments depend on the RELM WHS150 transceiver for direct two-way communications with their police, fire department, civil defense agency or ham radio repeater. The WHS150 is our most popular programmable five watt, 16 channel handheld transceiver that has built-in CTCSS, which may be programmed for any 39 standard EIA tones. Frequency range 148.000 to 174.000 MHz. Will also work 144.000-148.000 with slightly reduced performance. The full function, DTMF compatible keypad also allows for DTMF Encode/Decode and programmable ANI. Weighing only 15.5 oz., it features dealer programmable synthesized frequencies either simplex or half duplex in both 5.0 and 6.25 KHz. increments. Other features include scan list, priority channel, selectable scan delay, selectable 5 watt/1 watt power levels, liquid crystal display, time-out timer and much more. When you order the WHS150 from Communications Electronics Inc., you'll get a complete package deal including antenna, battery, belt clip and user operating instructions. Other accessories are available. A leather carrying case with swivel belt loop part #LCWHS is $49.95; rapid charge battery charger, part #BCWHS is $69.95; speaker/microphone, part #SMWHS is $54.95; extra ni-cad battery pack, part #BP007 is $59.95. The radio technician maintaining your radio system must order programming instructions part #PI150 for $18.00 to activate this radio. FCC license required for United States operation.

Other neat stuff

PH5000-U Waber 500VA/340 Watt computer uninterruptable power supply $159.95
WX70-U weather radio with National Weather Service storm alert $29.95
WB-U USA Today The Weather Book, Guide to USA weather by Jack Williams $15.95
PSUN-U Partly Sunny, Weather Junkie's Guide to Weather by Alan Fields $11.95
Grundig Yacht Boy 400-U digital portable shortwave - 40 memory $179.95
Grundig Yacht Boy 230-U portable shortwave receiver $109.95
Sangean ATS800-U portable 20 memory shortwave receiver $69.95
Sangean ATS803A-U portable shortwave w/AC adapter - 9 memory $129.95
Sangean ATS808-U portable 45 memory shortwave receiver $129.95
Uniden EXP9200-U 900 MHz. 1 or 2 line spread spectrum cordless phone . $289.95
Uniden EXP9100-U 900 MHz. 1 line cordless spread spectrum telephone ... $224.95
Uniden EXP901-U 900 MHz. 1 line cordless analog telephone $149.95
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Bogen FR3020-U memory module for Fax Friday/up to 36 minutes $99.95
Bogen FR2000-U Digital two-line voice mail & answering machine $279.95
Bogen FR0018-U memory module, doubles recording time to 36 minutes $79.95
FANS P161P-U 60 name/number caller ID, unwanted call blocker, paging .. $149.95
SNI ID200-U Bouncer name/number caller ID, call reject, forward $89.95
ICOM GP22-U handheld global positioning system (GPS) $489.95
RELM WHS150-U VHF handheld 5 watt, 16 channel transceiver $299.95
RELM RH256NB-U VHF 25 watt, 16 channel synthesized transceiver $289.95
Ranger RCI2950-U 25 watt 10 meter ham radio transceiver $239.95
Cobra RDL712SW-U Safety Alert & Super Wideband Laser/Radar receiver .. $139.95
Uniden LRD6399SW-U Super Wideband Laser/Radar receiver-VG2 protection $99.95
ANTK-U VHF scanner/VHF transmitting antenna PL259 connector $29.95
ANTMMBNC-U magnet mount scanner antenna w/ BNC connector $29.95
ANTMMMOT-U magnet mount scan antenna w/Motorola plug $29.95
ANTMMPL-U magnet mount scan antenna with PL259 connector $29.95
ANTSGBNC-U glass mount scanner antenna with BNC connector $29.95
ANTSGMOT-U glass mount scanner antenna with Motorola jack $29.95

Buy with confidence

It's easy to order from us. **Mail orders to:** Communications Electronics Inc., P.O. Box 1045, Ann Arbor, Michigan 48106 U.S.A. Add $15.00 per radio product or weather station for U.P.S. ground shipping and handling in the continental U.S.A unless otherwise stated. Add $10.00 shipping for all accessories and publications. Add $10.00 shipping per antenna. For Canada, Puerto Rico, Hawaii, Alaska, Guam, P.O. Box, or APO/FPO delivery, shipping charges are two times continental U.S. rates. Michigan residents add state sales tax. No COD's. Satisfaction guaranteed or return item in 31 days for refund, less shipping. 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 or MasterCard. Call anytime 1-800-USA-SCAN or 800-872-7226 to order toll-free. Call 313-996-8888 if outside the U.S.A. FAX anytime, dial 313-663-8888. For technical assistance, call our technical support hotline for $2.00 per minute at 1-900-555-SCAN. Dealer and international inquiries invited. Dial 313-663-8888 for fax-on-demand info.

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LETTERS

Welcome to the Internet

The excitement has been mounting around the office as we have been preparing to go on line with the Internet's World Wide Web. The location of **www.grove.net** will, before long, bring you most of the services and publications of Grove Enterprises, along with some new features not previously possible.

It will take some time for us to create the kind of presence that will be most useful to our readers: the Web is not the same medium as the printed page. We welcome your input during our evolution—as we always have. Over the years, *MT* has developed and maintained a certain "personality" (characterized, as several readers have told me, as the "slick cover magazine with the newsprint pages.") I think that approach will also translate well onto the Internet.

A significant number of radio-related companies, publications, and interest groups are now making their way onto the Internet. A mere decade ago the word "computer" was breathed with trepidation within the monitoring community. The eventual, resigned acceptance of the past few years is now blossoming into excitement as the possibilities expand, and as software and hardware solutions make it easier for the novice to "plug and play."

Monitoring Times will never abandon its roots of radio monitoring, but we welcome this new tool to move our information-sharing, communication, and doing business into a more international forum. Watch for our home page on the Internet!

Raising Hopes and Raising Questions

"Kudos to *Monitoring Times*," says Glenn Richter of New York, New York, "for running Dewey Bertolini's informative article on Israel Radio's shortwave broadcasts (6/95), even though their English-language transmission schedule is a pale ghost of its recent past. Those of us who've listened avidly for years are still prayerful that despite severe budget constraints and uncomprehending bureaucrats, some cuts can be reversed.

"Mr. Bertolini reports that Kol Israel's 'one transmitter' is on Tel Aviv's outskirts. I had been told that the transmitter was the one outside Ramallah, an Arab town just north of Jerusalem. I saw it last January. Has the transmitter's location been changed in the interests of security? Who's using the Ramallah transmitter now? Additionally, Kol Israel's *Calling All Listeners*, shortly before its demise under the cutback knife, raised the possibility of reaching the station via E-mail. Is this now a reality?"

Can any readers help answer Glenn's questions?

This great radio shack and QSL card belonged to Bill Thomas, KL7KI, before he retired and moved from Alaska to western Pennsylvania. "The best move I ever made was retiring. I haven't worked so hard in 20 years," says Bill. "The new shack will be smaller than the one in Alaska but it will be sufficient (12 x 12.5 ft). My shack in Alaska was 25 x 32 feet with full bath. (!) Had many a good time in that shack."

U.S. "Domestic" Shortwave

July's article by Glenn Hauser on the media reaction to the Oklahoma City bombing, and to the mainstream media's "discovery" of shortwave broadcasting raised some eyebrows among our readers. At the time, it seemed we could scarcely ignore the prominent and controversial appearance of what Canadian John Musgrave appropriately calls "U.S. domestic" shortwave broadcasters in the national press. However, our coverage prompted several thoughtful letters which we excerpt here.

• Walter Talmadge Oliff, Woodville, Florida, says, "I am concerned about what direction our SWL hobby is going. Supposedly we SWLers are in the hobby for various reasons, the main one being outright gathering of information, and another, that SWLers have access to all sorts of news and information not carried by the main radio and TV media. Then, the Oklahoma City bombing happens, [fomenting the public] against talk show hosts, militia, and (possibly) SWLers themselves.

"I am fully aware (and thankful) of Mr. Hauser's contribution to our hobby over the years, and *MT*'s desire to put as much radio publicity out as possible, but I feel Mr. Hauser's article should have appeared in some other magazine or newspaper than *MT*. ... Only arguments about radio or communications should be *MT*'s forte, not political views.

"Whatever position these people have in the political spectrum is none of our (SWLers) business. Whatever programs SWLers listen to is, indeed, none of our business. Let us cleanse the hobby by staying out of politics."

• William Lauterbach, Jr., DWM Enterprises, Jackson, Michigan, agrees. He says, "I will be the first to admit that [Hauser] has *excellent* shortwave information. But save the political commentary for 'news and views' magazines and radio shows!

He adds, "I object to the constant referral to these [shortwave] stations and their programmers as some kind of wackos, crazies, loonies, and goofs. These are very well educated people from all walks of life ... Regarding the 3950 kHz 'hate net,' I've participated in that net before, and so has many an ARRL, media, and political official. The only hate I've seen demonstrated on that net are from jammers who feel the best way to silence what they don't like to hear is by keying up and yelling inciting comments."

• Pete McLaughlin, Ridgecrest, California, admits, "I have been listening to shortwave for only a few months. I purchased a Zenith Trans-Oceanic Royal 3000 and with the help

(Continued on Page 114)

RAMSEY America's #1 Source For Hobby Kits

TONE GRABBER

Grab Touch-Tone numbers right off the air, phone or tape. A simple hook-up to any radio speaker or phone line is all that is required to instantly decipher touch-tone phone numbers or codes. A 256 digit memory stores decoded numbers and keeps its memory even in the event of power loss. An 8 digit LED display allows you to scroll through the memory bank to examine numbers. To make it easy to pick out number groups or codes, a "dash" is inserted between sets of digits that were decoded more than 2 seconds apart. A "central-office" quality crystal controlled decoder is used allowing rapid and reliable detection of numbers at up to 20 digits per second! For a professionally finished look, add our matching case set. Start cracking those secret codes tomorrow with the Tone Grabber!

TG-1 Tone Grabber kit	$99.95
CTG Matching case set	$14.95
TG-1WT Fully assembled TG-1 and case	$149.95

FM RECEIVER/TRANSMITTER

Keep an ear on the local repeater, police, weather or just tune around. These sensitive superhet receivers are fun to build and use. Tunes any 5 MHz portion of the band and have smooth varactor tuning with AFC, dual conversion, ceramic filtering, squelch and plenty of speaker volume. Complete manual details how the rigs work and applications. 2M FM transmitter has 5W RF out, crystal control (146.52 included), pro-specs and data/mike inputs. Add our case sets for a nice finish.

FM Receiver kit	$34.95
Specify band: FR-146 (2M), FR-6 (6M), FR-10 (10M), FR-220 (220MHz)	
CFR Matching case set	$14.95
FT-146 Two Meter FM trans kit	$99.95

SCRAMBLER/DESCRAMBLER

Descramble most scramble systems heard on your scanner radio or set up your own scrambled communication system over the phone or radio. Latest 3rd generation IC is used for fantastic audio quality-equivalent to over 30 op-amps and mixers! Crystal controlled for crystal clear sound with a built-in 2 watt audio amp for direct radio hook-up. For scramble systems, each user has a unit for full duplex operation. Communicate in privacy with the SS-70. Add our case set for a fine professional finish.

SS-70 Scrambler/Descrambler kit	$39.95
CSSD Matching case set	$14.95
SS-70WT Fully assembled SS-70 and case set	$79.95

SCA DECODER

Tap into the world of commercial-free music and data that is carried over many standard FM broadcast radio stations. Decoder hooks to the demodulator of FM radio and tunes the 50-100 kHz SCA subcarrier band. Many radios have a demod output, but if your radio doesn't, it's easy to locate, or use our FR-1 FM receiver kit which is a complete FM radio with a demod jack built-in. These "hidden" subcarriers carry lots of neat programming-from stock quotes to news to music, from rock to easy listening-all commercial free. Hear what you have been missing with the SCA-1.

SCA-1 Decoder kit	$27.95
CSCA Matching case set	$14.95
FR-1 FM receiver kit	$24.95
CRR Matching case for FR-1	$14.95

SCANNER CONVERTER

Tune in on the 800-950 MHz action using your existing scanner. Frequencies are converted with crystal referenced stability to the 400-550 MHz range. Instructions are even included on building high performance 900 MHz antennas. Well designed circuit features extensive filtering and convenient on-off/bypass switch. Easy one hour assembly or available fully assembled. Add our matching case set for a professional look.

SCN-1 Scanner converter kit	$49.95
CSCN Matching case set	$14.95
SCN-1WT Assembled SCN-1 and case	$89.95

FULLY WIRED & TESTED

DSP FILTER

What is DSP? DSP allows the "construction" of various filters of great complexity by using computer code. This allows us to have easy access to a variety of filters, each perfectly optimized for whatever mode we are operating. The DSP II has been designed to operate in 10 different modes. Four filters are optimized for reducing interference to SSB phone signals from CW, heterodynes and random noise interference. Four more filters operate as "brick-wall" CW bandpass filters. the remaining two filters are designed for reliable recovery of RTTY and HF packet radio information signals. A single front panel switch selects any of these filters. Easy hookup to rigs speaker jack.

W9GR DSP Filter	$299.95
12V DC Power Supply	$11.95

BROADBAND PREAMP

Ever wish you could "perk up" your counter to read really weak signals? Or, how about boosting that cable TV signal to drive sets throughout the house, or maybe preamping the TV antenna to pull in that blacked out football game. And, if you're into small broadcasting, boost your transmitter power up to 100 mW! The PR-2 broadband preamp is the answer to all those needs as well as many others. You can use the PR-2 anywhere a high gain, low noise, high power amp is called for: digging out those weak shortwave signals or putting new life into that scanner radio-especially at 800 MHz. The PR-2 has a high power compression point, meaning that it does not overload easily-in fact many folks use it for boosting the power on their FM-10A stereo transmitters. Newly designed microwave MMIC chips from NEC in Japan enable the PR-2 to have gain all the way up to 2 GHz, although we only spec it to 1 GHz-believe it or not, the connector lead length is the limiting factor! Customers tell us the PR-2 outperforms professional lab units by the "big boys" that go for hundreds more. The PR-2 is the ideal general purpose amp you'll wonder how you got along without.

PR-2 Specifications: Gain: 25dB, Noise Figure: 2.5 dB, Input/Output Impedance: 50-75 ohms, Compression point: +18 dBm

PR-2 Broadband Preamp, Fully Wired and Tested $59.95

STEREO TRANSMITTER

Run your own Stereo FM radio station! Transmits a stable signal in the 88-108 MHz FM broadcast band up to 1 mile. Detailed manual provides helpful info on FCC regs, antenna ideas and range to expect. Latest design features adjustable line level inputs, pre-emphasis and crystal controlled subcarrier. Connects to any CD or tape player, mike mixer or radio. Includes free tuning tool too! For a pro look add our matching case set with on-board whip antenna.

FM-10A Stereo transmitter kit	$34.95
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Cramped for space? Get longwire performance with this desktop antenna. Properly designed unit has dual HF and VHF circuitry and built-in whip antenna, as well as external jack. RF gain control and 9V operation makes unit ideal for SWLs, traveling hams or scanner buffs who need hotter reception. The matching case and knob set gives the unit a hundred dollar look!

AA-7 Kit	$28.95
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Tune into the exciting world of aviation. Listen to the airlines, big business corporate jets, hot-shot military pilots, local private pilots, control towers, approach and departure radar control and other interesting and fascinating air-band communications. You'll hear planes up to a hundred miles away as well as all local traffic. The AR-1 features smooth varactor tuning of the entire air band from 118 to 136 MHz, effective AGC, superheterodyne circuitry, squelch, convenient 9 volt operations and plenty of speaker volume. Don't forget to add our matching case and knob set for a fine looking project you'll love to show. Our detailed instruction manual makes the AR-1 an ideal introduction to two life-long, fascinating hobbies at once-electronics and aviation! See *Kit Planes* magazine (January 1991) or *Popular Electronics* (January 1993) for excellent product reviews of the AR-1.

AR-1 Aircraft Receiver Kit	$29.95
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The Interceptor will lock on instantly to the nearest transmitter and allow you to listen with perfect audio quality. Since the Interceptor does not have to search through all frequencies, those quick transmissions that are hopelessly lost on scanners are captured easily. The Interceptor does not need tuning, making it ideal for hands-free surreptitious monitoring of nearby transmissions. The Interceptor is complete self-contained with internal speaker and earphone jack for private listening. Included are: Nicad battery pack, AC/adaptor charger, antenna and earphone. Increase your security and awareness-intercept the communications around you with the Interceptor. Fully wired with 1 year warranty. Covers 30-2000 MHz frequency range, FM deviations from 5 kHz to 200 kHz.

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AM-1 Transmitter kit	$29.95
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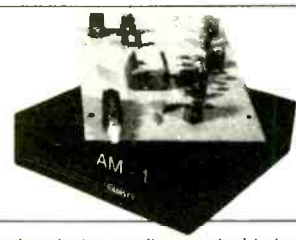

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DF-1 Foxhound direction finder kit	$59.95
CDF Matching case set for DF-1	$14.95
FHT-1 SlyFox Foxhunt transmitter kit	$129.95
FHID-1 Voice ID option	$29.95
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SHORTWAVE CONVERTER

The SC-1 converter brings the sounds of the world right into your car radio or home stereo (set to AM broadcast band). Front panel push switches let you choose easily between regular AM radio and the shortwave bands. An additional switch allows the selection of any two bands of interest, each 1 MHz wide. Set one range for daytime frequencies and one for nighttime when propagation is different, choose any two frequencies between 3 and 22 MHz. Frequencies are tuned on your AM radio, making it easy to log stations or set presets. A built-in antenna switch automatically switches the existing AM antenna to either the radio or converter, making hook-up easy and fast. As with many of our kits, a handsome matching case and knob set is available to put the finishing touches on your kit.

SC-1 Shortwave Converter Kit	$27.95
CSC Matching Case and Knob Set	$14.95

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Here's a complete shortwave radio guaranteed to inspire awe in any listener. Imagine tuning in the BBC, Radio Moscow, Radio Baghdad and other services with just a couple of feet of antenna. This very sensitive (about a microvolt!) receiver is a true superhet design with AGC, RF gain control and plenty of speaker volume. Smooth varactor diode tuning allows you to tune any 2 MHz portion of the 4 to 11 MHz frequency range, and the kit conveniently runs on a 9 volt battery. Add our matching custom case and knob set to give your radio a finished, polished, look. Amaze yourself-and others-see how you can listen to the world on a receiver you built in an evening.

SR-1 Shortwave Radio Kit	$34.95
CSR Case and Knob Set	$14.95

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TERMS: Satisfaction guaranteed. Examine for 10 days. If not pleased return it in original form for refund. Add $4.95 for shipping, handling and insurance. For foreign orders add 20% for surface mail. COD (U.S. only) add $5.00. Orders under $20 add $3.00 NY residents add 7% sales tax. 90-day parts warranty on kit parts. 1-year parts and labor warranty on wired units

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Honey, Don't Play With the Phone

■ In New Jersey, a six-year-old girl turned up as the suspect in a series of more than four hundred prank calls to the Jersey City E911 system. City police staked out the telephone booth where the calls originated and their trap snared the youngster. "We were surprised that she was so young," said Director Michael Moriarty. The girl and her family will be treated to counseling on the importance of the 911 system.

"Hello, 911? There's a terrible tricycle accident at 1st and Broad."

The Many Uses of Baby Monitors

■ A Kitchener, Ontario, couple decided that they'd had enough. They planted a baby monitor under a female relative's bed to alert them if the woman had "company." If there was any hanky-panky, the two would react.

It worked, and one evening at midnight, the two people broke into the female relative's apartment, punched the male visitor in the eye and nose, and threatened hm with a knife. The boyfriend reacted by jumping from a window to safety.

"Obviously," said Waterloo Region Police Sgt. Jim Doyle, "they didn't approve of her boyfriend."

Pool Monitor

■ Parents and kids alike were feeling the heat when the Botany Woods community pool near Greeensboro, SC, was repeatedly vandalized. After motor oil was dumped into the pool, folks began to worry about what they might put in it next. But the budget was spent—there was no money for security guards or alarms.

It was John Owings who came up with the idea of the baby monitor. It had just enough range to transmit about 1,000 feet to the house of one of the parents. When suspicious noises were heard over the monitor in the wee hours of the morning, the parent phoned the Greenville Co Sheriff's Office.

Four juveniles, engaged in varying degrees of mischief, were rounded up in the vicinity. They were released to their parents, who promised to pay for the damages to the pool.

Have Pager, Will Treat

■ Doctors on the golf course or in a board meeting now can keep in touch with patients in the hospital. Hewlett-Packard Company has introduced a palm-sized wireless computer that receives electrocardiograms, heart rates, and blood pressure and sends the data to any pager within range. The system, called PalmVue, runs $25,000, but, says Mike Bunnell, marketing manager for HP, "When you can provide treatment sooner and more accurately, the patient progresses faster and can be released from the hospital sooner, which reduces cost."

PalmVue sends data from the hospital computer to a modem and then on to a pager. The data is said to be scrambled en route for security.

German Police Monitor Mobile Phones

■ The German government has ordered mobile telephone operators in that country to make it possible for police to eavesdrop on cellular phone networks. Police say they need the ability to listen in order to "close a huge loophole in the fight against organized crime." The directive, drawn up by Post Minister Wolfgang Boetsch, was approved by the Cabinet and forces the country's three mobile phone operators to open their technology to the listening ears of police.

Officials said the operators will have to pay an estimated $36.5 million to upgrade each digital mobile phone network. The companies have been so far unwilling to assume this cost.

Failed Mike

■ A police officer in Pompano Beach, Florida, experienced every undercover cop's worst nightmare when his hidden microphone failed. The detective, working a drug sting, had just been sold $100 in crack cocaine by a drug dealer. The detective gave a verbal signal to his three backup officers, advising them to move in for the arrest, and then proceeded to identify himself as a police officer to the suspect.

"Okay, (crackle) fellows, you can start (crackle, crackle) now. Er (crackle) guys?"

However, the microphone he was wearing began "cutting in and out," according to police spokeswoman Sandra King. "When the detective was giving the signal, nobody moved," she said.

The suspect floored the gas pedal on his Jeep and, with the detective hanging onto the passenger window, crashed through a pair of parked cars. The detective was thrown clear and sustained minor injuries. The backup officers pursued the suspect, who struck another vehicle with his Jeep, killing the driver. The suspect then ran into a concrete light pole. A foot chase ensued and the suspect was captured without further incident.

No disciplinary action is planned against the detective. What he did was "exactly picture perfect, outside of the equipment failing, which you can't help," said King.

Walkman Bandit Gets an Earful

■ The FBI called San Diego bank robber Scott Allen Wilson the "Walkman Bandit" because of the earphones and radio he wore while committing his crimes. Wilson, 25, recently pled guilty to holding up four banks in the La Jolla, Hillcrest, and Mission Valley areas of San Diego. Security camera films and eyewitness reports confirmed that the robber wore a Walkman radio during the holdups, but apparently he wasn't listening to music, he was monitoring a police scanner.

"He was listening to what the cops were saying," Assistant US Attorney Jay Alvarez told the news media. The scanner didn't do Wilson any good in avoiding the law; he was sentenced to ten years in federal prison.

Scanner Withdrawal in Ohio

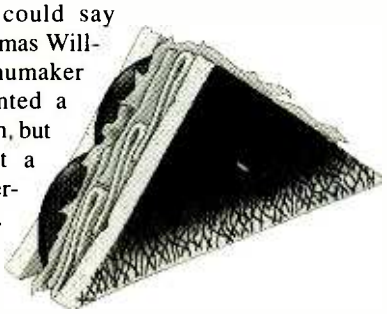
■ The Akron Police Department has gone and done it, switching recently to an all-digital communications format. Robert Scarlatelli, Akron manager of communications, said "you won't be able to hear anything broadcast on this new system on the scanners used today." This means scanner listeners who aid police by calling in reports of stolen vehicle and criminal sightings will no longer be able to assist.

Police Chief Larry Givens acknowledged this, saying, "by going to this technology, we're going to lose a lot of friends who used

to listen to us." The system will also serve the fire and public works departments in Akron.

Sandwich Snatch

■ You could say that Thomas William Schumaker just wanted a sandwich, but he went a little overboard. The 49-year-old Royal Oak, Michigan, man robbed a Subway sandwich shop of sixty dollars. The gun he used looked real, but turned out to be a toy.



Schumaker took his dough and headed for the hills, but a scanner listener who heard the call phoned police to say that he saw a man matching the suspect description run through a back yard nearby. Other witnesses reporting seeing the man enter a house owned by his father. Schumaker was arrested.

Did Aurora Exist?

■ According to *Military Space* newsletter, the shadowy hypersonic aircraft that scanner listeners and the public have been chasing did exist, but it was an unmanned prototype. One of the prototypes crashed in 1990, proving the engines unworkable. The entire project is said to have been cancelled in 1993. In its place, Lockheed/Boeing is working on the Tier 3 Minus unmanned aerial vehicle, which has been heavily reported. Nevertheless, sightings continue. Is Aurora really dead?

Signals in Space

■ NASA scientists checking on the health of the WIND solar detector spacecraft were shocked to hear a strange signal. The communication began at 1300 hours and lasted thirty minutes. Scientists began an all-out hunt for the source of the signal and quickly discovered that it wasn't an alien program, just the BBC Latin American Service's "Via Libre."

The Spanish language broadcast, relayed from Bush House in London through the VOA's Delano station, had been angled to bounce off the ionosphere. Unfortunately, the ionosphere isn't perfect, and some of the signal escaped 120,000 miles into space. I wonder if aliens speak Spanish? Maybe they do now.

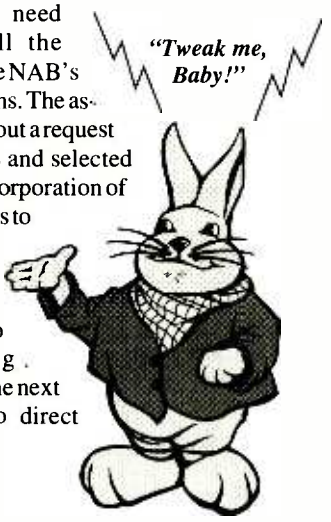
Residents Catch Car Thieves

■ A Carnegie, Pennsylvania, police officer got a little help from residents when he stopped a suspicious vehicle, only to have the occupants flee. Residents who had been listening to their scanners immediately began calling in suspect locations to the police communications center. A 15-year-old male and 16-year-old male were apprehended. Police Chief Jeffrey Harbin said that calls from residents were instrumental in the apprehension of the suspects.

Bunny Ears

■ Believe it or not, there are still some poor souls out there who rely on rabbit ears for television reception. The National Associaton of Broadcasters claims that nearly sixty percent of TV sets in the US rely on the metal ears to pull in the signal. Unfortunately, constant adjustment is a fact of life for rabbit ear owners.

"We need a nice, passive set-top antenna that doesn't need tweaking all the time," said the NAB's Kelly Williams. The association put out a request for proposals and selected Megawave Corporation of Massachusetts to develop set-top antennas that will require no tweaking. Sounds like the next best thing to direct broadcast.



Gotcha!

■ Tooling along in his car, innocently listening to his scanner, a Whitefish Bay, Wisconsin, man heard a police report of bank robbery. Spotting the suspect vehicle, he immediately rang up the police on his cellular phone and followed the suspects until police could move in. Brown Deer Police Captain Louis Barth called it "outstanding work by the citizen."

Subliminal TV Messages

■ A group of private broadcasters in Japan has announced that they will ban television programs containing subliminal messages. Japan's National Association of Commercial Broadcasters issued a statement saying that "a method like this is not fair and runs counter to the basic principles of broadcasting guidelines."

The statement came after it was revealed that a private TV network aired a program containing subliminal photos of religious cult leader Shoko Asahara, who is accused of murder and attempted murder in a 1994 gas attack on a Tokyo subway.

Enough With the Soaps, Already!

■ Estonian Television has decided to drop soap operas in favor of increased socio-political programs. ET's autumn schedule will include a program for pensioners, consisting of advice and a drama series, as well as a series discussing police activity. No word yet on what Estonian housewives think of this idea.

Ukraine Restricts TV Advertising

■ In a move that US viewers might envy, the Supreme Council of Ukraine passed a law limiting the use of advertisements on state television channels. Ukrainian news agency Infobank reported that "the law envisages that the transmission of TV programs which last more than 45 minutes can be interrupted only once by an advertisement insertion." Broadcasts of lesser duration, as well as cinema and TV films, cannot be interrupted.

Communications" is written by Larry Miller with help from Laura Quarantiello, Rachel Baughn and the following readers who are members of the Communications Media Monitoring Team; Charles Allen, Carnegie, PA; Dave Alpert, New York, NY; Ron Bruckman, Hampstead, MD; Eric F. Cutler, San Rafael, CA; Bob Fraser, Cohasset, MA; Bruce Frederick, Burlington, MA; Scott Glicker, Sunrise, FL; Paul Jablonowski, Greenfield, WI; Eva Kabago, Ventura, CA; Maryanne Kehoe, Atlanta, GA; Jack McCartan, Newark, DE; Paul McDonough, Somerville, MA; Ira Paul, Royal Oak, MI; Mike Pollack via Internet; F.E. Pope, Greenville, SC; Rick Rawlinson, Middleburg Heights, OH; Rick Romig, Barberton, OH; Brian Rodgers, Allen Park, MI; Larry Salisbury, Overland Park, KS; Richard Sklar, Seattle, WA, and John Wolf, Denver, CO. We also consulted the following publications and we list their names in appreciation: BBC *World Broadcast Information, National Scanning, Radio World,* and *W5YI Report.*

EMERGENCY!

Photo by Garry Watts

Advanced emergency dispatch centers are changing the way public officials are responding to our calls for help

By Jack Sullivan

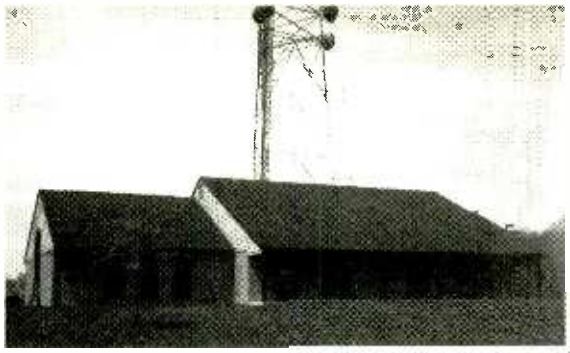
Nearly everyone is familiar with the increasingly commonplace "9-1-1" emergency telephone access system. A simple, nearly universal, and easy to remember phone number puts you into immediate contact with the dispatchers who control the vital services of fire, police, and paramedics. Even those who do not yet have direct 9-1-1 access are familiar with the popular TV series that dramatizes the tremendous contributions to personal safety that this service represents.

Few people, however, have had a chance to look behind the scenes at a busy 9-1-1 emergency communications system and to fully appreciate how this important service directly effects nearly everyone in the United States. Recently I decided I wanted to learn more about 9-1-1, how the system works, and how it impacts on the lives of those who depend on it for protection.

I could have gone to the emergency communications center of any good-sized community or large suburban area. But as I turned my car into the driveway of the modern one-story building with its imposing radio towers, I knew that this one had special meaning to me. I was about to visit the communications center in Hunterdon County, New Jersey—the facility that serves the major suburban area in which I live.

I had chosen to visit this facility not only because of its closeness to my home but also because it is fairly representative of the communications centers serving many of the *MT* readers who live in the suburbs of major metropolitan areas. Hunterdon County (population 113,674 spread over 429.6 square miles) is a thriving mix of rural and small metropolitan areas located almost exactly midway between New York City and Philadelphia. A significant amount of light industry co-exists with agricultural ventures, plus a heavy influx of shoppers from adjacent areas who visit the numerous discount shopping centers. Running through the county is a major interstate highway (I-78) and a busy railroad mainline (Conrail's Lehigh line).

A geographical description of the county includes a broad mix of



The Hunterdon Co. emergency communications center is ideally situated on the highest point around. The tower is used by the State Police 800 MHz trunked system as well.

features, ranging from river bottom flat land to steep mountains (yes, even in New Jersey!) and a deep river valley (the Delaware). Add to all that a couple of state prisons and reform schools, plus a major medical center, and I think you will agree that Hunterdon County routinely deals with the full range of emergency communications that you would expect anywhere.

The 9-1-1 System

While the concept of a national emergency access phone number has been around in the United States since the late 1960s, this type of universal system had already been in place in Britain since 1937.

Following a recommendation by the President's Commission on Law Enforcement, the numbers 9-1-1 were decided upon and were reserved by AT&T for this purpose. Implementation of a nationwide 9-1-1 system was given further impetus in 1973 when the Office of Telecommunications Policy issued a national policy statement recognizing the benefits of 9-1-1 and encouraging its use. The system has been developing slowly ever since.

Today, 11 years later, about 75% of the country is covered by 9-1-1. New Jersey, in parallel with many other states, mandated implementation of 9-1-1 systems in 1990, and has proceeded to install it on a county by county basis.

Before 9-1-1, emergency communications were routed directly to the individual services involved. If there was a fire, you called the fire department; if there was an accident, you called the police. Coinciding with the development and growth of 9-1-1 has been a move by local governments to consolidate communications and emergency dispatch services into centralized, multiagency communications centers. Not only has this trend brought together different agencies, but, in the case of larger counties, it has also brought together adjacent communities under the single umbrella of a central communications agency.

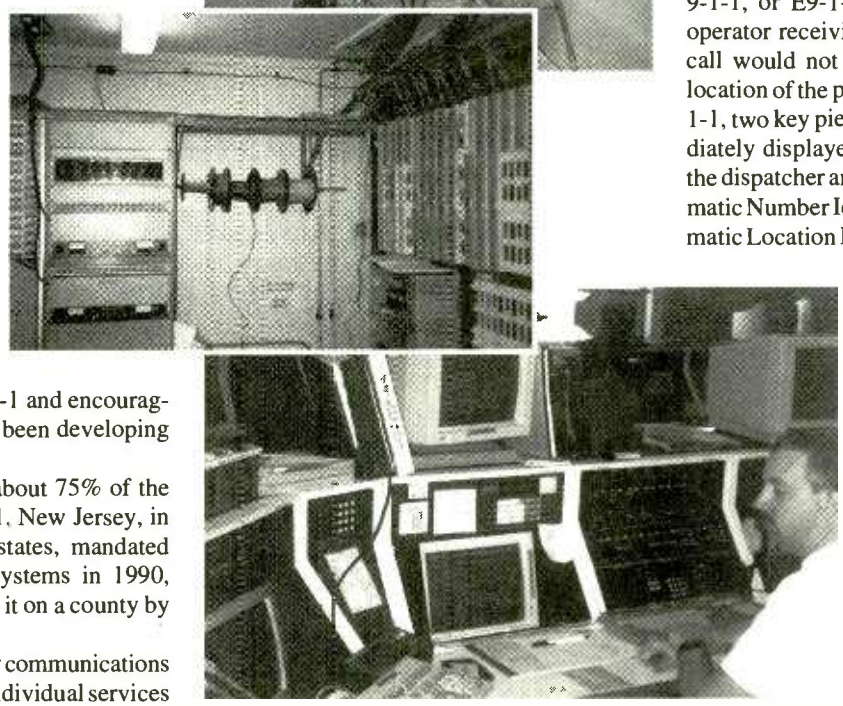
Staffed by dispatchers, service technicians, and a full-time director to oversee operations and planning, the consolidated communications center (or comm center, as it is usually called) is supported financially by its component community members.

The savings and efficiencies in this type of system are enormous. Staffing one center rather than several brings obvious benefits. There are also great savings in terms of needing fewer emergency phone lines and radio frequencies. The centralized communications approach also provides for more efficient utilization of resources in situations requiring prompt coordination of resources between member communities in "mutual aid" situations.

The original 9-1-1 system, known as Basic 9-1-1, only functioned by switching an incoming call to the location where the dispatchers were located. Each emergency service usually had its own dispatcher and the incoming calls were usually transferred to the dispatcher responsible for that service. In many cases the dispatchers were still located at remote sites, and there would be a delay while the incoming call was transferred.

The present system standard is Enhanced 9-1-1, or E9-1-1. In the basic system, the operator receiving the incoming emergency call would not know the phone number or location of the person calling. In Enhanced 9-1-1, two key pieces of information are immediately displayed on the computer screen of the dispatcher answering the call: ANI (Automatic Number Identification) and ALI (Automatic Location Identification). The computer screen displays the phone number, the address where the phone is located, the name the phone is listed under, the type of location (residential, store, etc), additional location information ("second floor, Apartment #5," for example), and the identity of each of the emergency services that have jurisdiction at that location.

The heart of Enhanced 9-1-1 is a computer located either at the main switching center of the telephone company serving the area, or at the communications center. This computer stores all of the information discussed above in a "database." (An address book is an example of a simple database.) Basically, the database program responds to the ANI information from the phone



Modern switching methods and a comprehensive computer database helps ensure the call is answered, the caller is identified regardless of their ability to speak, and the appropriate service is dispatched to help.

company switching center by looking up the ALI information associated with it and making it available almost instantly to the receiving dispatcher. (ANI data is also the basis for the Caller ID service being marketed by phone companies in many areas.)

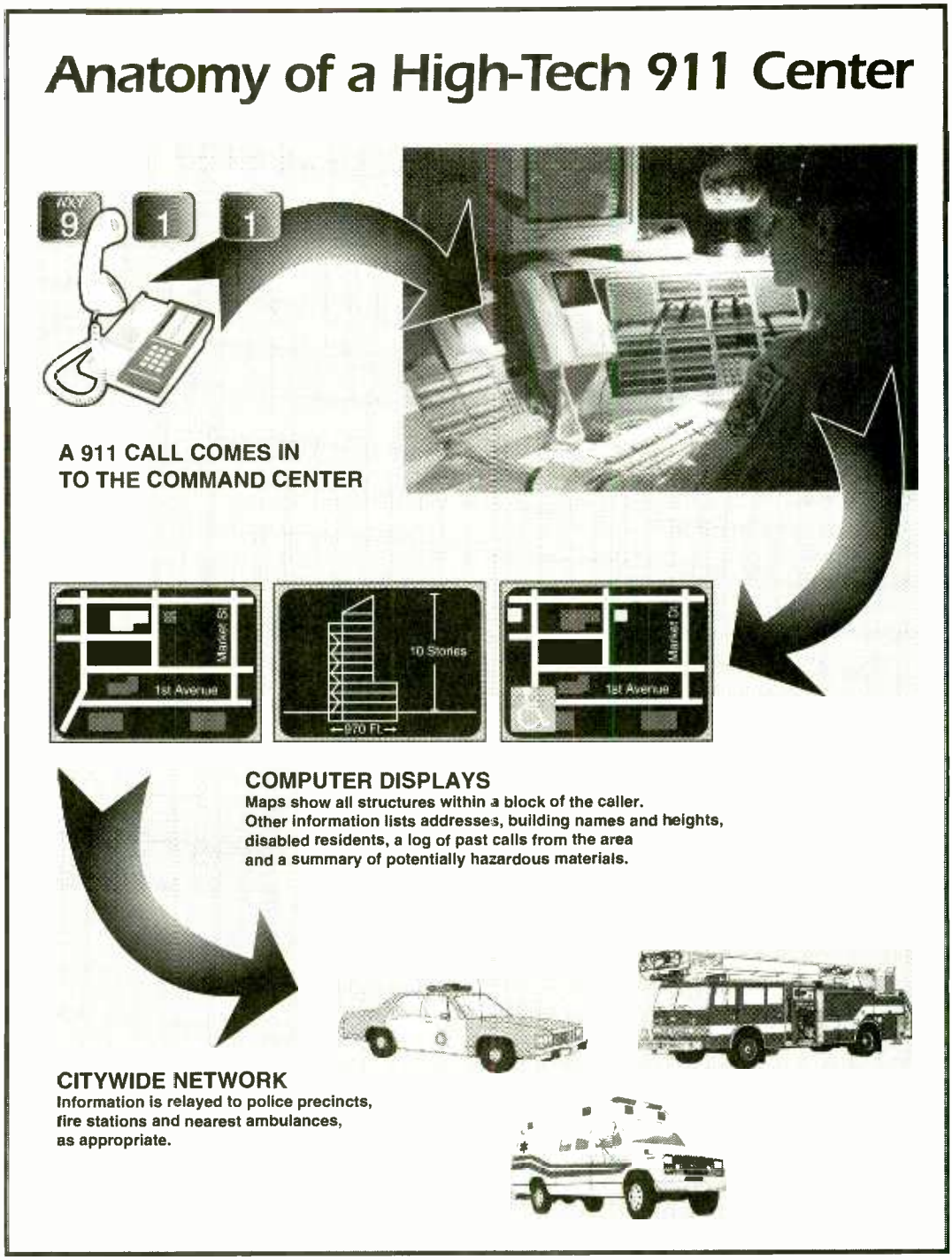
The Hunterdon County database has over 60,000 ALIs. As with any database, constant maintenance is needed in order to keep up with changes and to correct errors when they are identified. About 3800 of the ALIs in the Hunterdon County database are currently "bad" (about 6%). Anyone familiar with database management will recognize that this is still a pretty good average.

There are a number of interesting features in common between Basic and Enhanced 9-1-1. One is coin-free dialing from coin-operated telephones. A second is termed "called party control." This feature allows the emergency communications center to hold a call for tracing by the telephone company by simply not hanging up.

Another interesting ability of all 9-1-1 systems is called "emergency ringback." An emergency dispatcher can ring the phone that has just called 9-1-1, even though they have hung up, as long as the dispatcher has not disconnected. The 9-1-1 dispatcher can also differentiate between a hang up and a caller who is either unable or unwilling to speak, using "calling party switch hook status indication."

A basic part of any 9-1-1 system is a UPS, or uninterruptable power source. With their computers and radios totally dependent on electric power, emergency communications centers employ heavy-duty rechargeable battery UPS units backed up by oil- or propane-fueled emergency generators.

Hunterdon County's emergency communications center has its own telephone "switch," in which eight trunk lines terminate to handle incoming 9-1-1 calls. Incoming 9-1-1 calls enter the facility on fiber-optic cables from two different outside sources. This duplication of a critical asset (known as redundancy), provides greater security in emergency situations.



How it Works in Practice

Inside the emergency communications center, incoming 9-1-1 calls are automatically routed to the first available dispatcher. Besides providing essential 9-1-1 ANI and ALI information, the dispatchers' computers are used for Computer Aided Dispatch (CAD). In this system, the same screen displaying the 9-1-1 data is used to record and keep track of the status of dispatched emergency units. In overload situations, where more calls are being received than can be handled by the available dispatchers, alternate routing will automatically switch calls to another facility. No one calling 9-1-1 is ever supposed to receive a busy signal. (Other uses for dispatcher computers include the national NCIC and the New Jersey SCIC systems for tracking wanted persons, vehicles, etc.)

All calls to a 9-1-1 facility are recorded on magnetic tape which is then subsequently saved for a time in case there is a need to review the content of a call. Hunterdon County normally reuses tapes after 90-120 days. In the case of pending legal action, however, tapes can be kept indefinitely. One celebrated local case has put one reel of tape on hold since 1983!

Problems still exist with the proper work-

A Multi-Agency Dispatch Center

Our cover image and the photo at left show off the Fulton County Communications Center in Atlanta, Georgia. This center is second largest in the nation, and integrates their E9-1-1 system with computer-aided dispatch, automated vehicle locator, mobile data terminal, and 800 MHz trunked radio systems for all the public safety agencies of Fulton County.

When it's a seamless and integrated system, there are some real advantages to housing so many related services under one roof. Sharing E9-1-1 support and dispatch positions in the FCCC are Fulton Co. Police and Fire Departments, Palmetto Police and Fire Departments, Grady Emergency Medical Service, Fulton Co Sheriff's Dept, and Fulton County Marshal's Office. Since the center opened in 1984, this has been an ongoing consolidation, so we don't know where they intend to stop!

Two tours of this high-tech facility are currently in the planning stage for a limited number of Grove Expo attendees. Sign up when you preregister, or call 1-800-438-8155 to place your name on the list for the tours which will take place October 13.

ing of the 9-1-1 system. Calls from PBX systems (Private Branch Exchanges), for example, do not indicate the ANI/ALI data for the extension originating an emergency call. Instead, the data for the main trunk number of the PBX is displayed. In some cases this has resulted in death, due to delays in dispatching the correct emergency response for the location of the caller, which may not be the same as that of the main PBX trunk number.

Another problem for 9-1-1 operations is caused by cordless telephones. Many owners of these radio units program 9-1-1 into the speed-dial memory of the unit. Reportedly, many false 9-1-1 dialings have been caused by cordless phones with weak rechargeable batteries. This problem has diverted valuable resources in many cases when it has been necessary to send a police patrol car to an address to check on the nature of the problem. The newer 46/49 and 900 MHz cordless phones may help to reduce this problem.

The mushrooming use of cellular telephones has also created problems for 9-1-1 emergency dispatch services, and it's expected the coming Personal Communications Networks (PCNs) will produce similar difficulties. The basic problem stems from the fact that a person who places a mobile 9-1-1 call provides the emergency dispatch operator with only the ALI of the cellular site. The location of the cellular phone itself, being mobile, cannot be made available to the dispatcher. Calling the cellular phone (emergency ringback) is also not possible.

Some communities and cellular phone companies provide access to the local state police when 9-1-1 is dialed from a cellular phone, but this solution is by no means universal. Many systems have a feature that alerts the dispatcher to the cellular origin of the call so that the right questions can be asked about location, etc. Some communities have even tried to shut out 9-1-1 calls from cellular phones which are not part of a local system (roamers). The more progressive plans call for cellular phone companies to make the necessary investment in equipment so that at least the cellular origin of a call and emergency ringback are made possible.

The Hunterdon Co. Radio Dispatch System

Taking advantage of the mountainous terrain that passes through the center of the county, the Hunterdon County emergency communications center is ideally situated on a main road at nearly the highest point around—about 700 feet above sea level. There are two radio towers, the larger one being owned by the New Jersey State police and used by them as a key hub in their statewide 800 MHz trunked radio system.

Despite the excellent location of the communications center, the rugged terrain creates a number of areas where additional radio facilities are required for adequate coverage. A number of remote receivers and base stations are controlled by a combination of leased telephone lines and point-to-point microwave.

Hunterdon County established the first county-wide 9-1-1 emergency communications system in New Jersey in 1977. Helped greatly by a major 1976 grant from the Robert Wood Johnson Foundation (of the famous Johnson & Johnson family), 4-channel Motorola radios were purchased and configured as shown in Table 1.

A number of things have changed since the original communications system was set up. New radio transceivers are frequency-synthesized and have channel capacities than can exceed 100. While still adhering to the basic countywide system, some communities

TABLE 1
Hunterdon County, NJ, Four-Channel System

POLICE:	
Chan 1	Tactical/prosecutor (Repeater: 154.965T/158.955R)
Chan 2	North county sector (Repeater: 154.785T/158.91R)
Chan 3	South county sector (Repeater: 154.815T/159.03R)
Chan 4	Car-to-car direct (Simplex: 154.965T/R)
FIRE:	
Chan 1	Primary dispatch/operations (Simplex: 33.74T/R) (*Tone alerting on this channel triggers home monitors, pagers and community sirens.*)
Chan 2	Secondary/fireground (Simplex: 33.68T/R)
Chan 3	Secondary/fireground (Simplex: 33.62T/R)
Chan 4	Secondary/fireground (Simplex: 33.58T/R)
AMBULANCE (EMS)	
Chan 1	Tactical/police coord. (Repeater: 154.965T/158.955R) (*This channel is also used for air-to-ground coordination during helicopter MEDEVAC operations.*)
Chan 2	Dispatch/operations (Simplex: 155.205T/R) (*Tone alerting of the same type as used for the fire departments is used on this channel.*)
Chan 3	Ambulance-to-hospital ER (HEAR system) (155.34T/R)
Chan 4	Ambulance-to-ambulance/police coord (Simplex: 154.965T/R)
Note: 155.400 has been applied for as an additional ambulance channel.	

"MED 8" (463.175T/468.175R) is the primary hospital-ambulance paramedic channel, backed up by "MED 3" (463.05T/468.05R). Biomedical telemetry can be found on 458.175.

TABLE 2: Miscellaneous Hunterdon Co. Frequencies

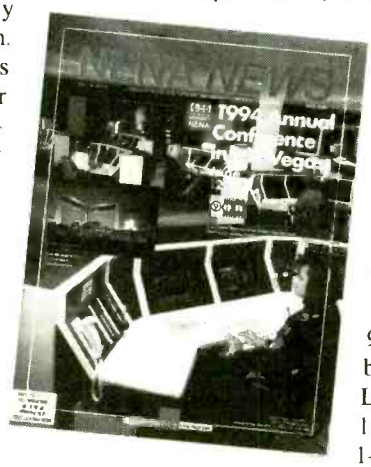
The common subaudible tone squelch frequency for Hunterdon County is 192.8 Hz. Since these channels are shared with communities in other counties, monitoring these channels is a lot more enjoyable with a scanner capable of decoding the local tone frequency.

154.68	State Police Emergency Network (SPEN) channel 1 - common interagency frequency. (*All SPEN stations use the New Jersey State Police subaudible tone of 131.8 Hz. A digital identifier burst can be heard at the end of each transmission.*)
155.475	SPEN 2 - Nationwide police emergency - interstate communications and backup for SPEN 1.
154.725	SPEN 3 - Statewide non-emergency interagency channel.
153.785	SPEN 4 - Statewide interagency coordination channel.
33.04	Rescue alerting, simulcast with 155.205.
155.34	Hunterdon Medical Center HEAR channel, monitored by the county dispatchers. The base station and antenna are located at the 9-1-1 communications center and is controlled remotely by the hospital.
155.385T/R	Hunterdon Medical Center security.
151.07T/159.00R	County road department repeater.
151.235T/159.255R	County park system & rangers repeater.
153.755T/R	County jail operations and security (Flemington)
462.575T/467.575R	Emergency Management repeater (F1)
462.575T/R	Emergency Management simplex (F2)
462.575T/467.575R	Health Department F1 (tone 186.2)
453.90T/458.90R	Health Department F2 (tone 186.2)
462.675T/467.675R	Health Department F3 (primary) (tone 186.2)

have their own alternate channels in the local government radio service programmed into their radios. Frequent references can be heard to "switch up" or "go to channel 12." Unless you know what these frequencies are, there is no way to eavesdrop on these communications. (In the case of Raritan Township, the author has confirmed that this reference signifies the local government channel of 151.205 MHz.)

9-1-1 - A Nationwide System?

After visiting the Hunterdon County emergency communications facility and seeing firsthand the advantages of the 9-1-1 system, it is difficult to understand why the entire country has not gotten solidly behind this excellent program. In many areas the problem is money—either getting it or spending it. In others it is simply resistance to change, fear of loss of local power, or a combination of such human factors.



As I was preparing this article, I was fortunate enough to be able to purchase a copy of an exellent book: *The 9-1-1 Puzzle*. Published by the non-profit National Emergency Number Association (NENA), this book gives a thorough historical and technical description of the 9-1-1 system. It also does a great job in explaining the benefits of 9-1-1 and how to go about selling the 9-1-1 concept to your local government officials through education. I would suggest you start by encouraging your local library to obtain a copy and then ask your local newspaper to plug its availability.

Information and support may be forthcoming in other ways. the NENA National Office offers guidance, advice, counsel, wisdom, support, leadership, and direction to communities working to set up a 9-1-1 system. In particular, NENA may be able to help your efforts by putting you in touch with some of their members who have experience with your particular need. If your community already has 9-1-1, it is my hope this article has given you some insight and appreciation for this unique marriage of technology and trained personnel.

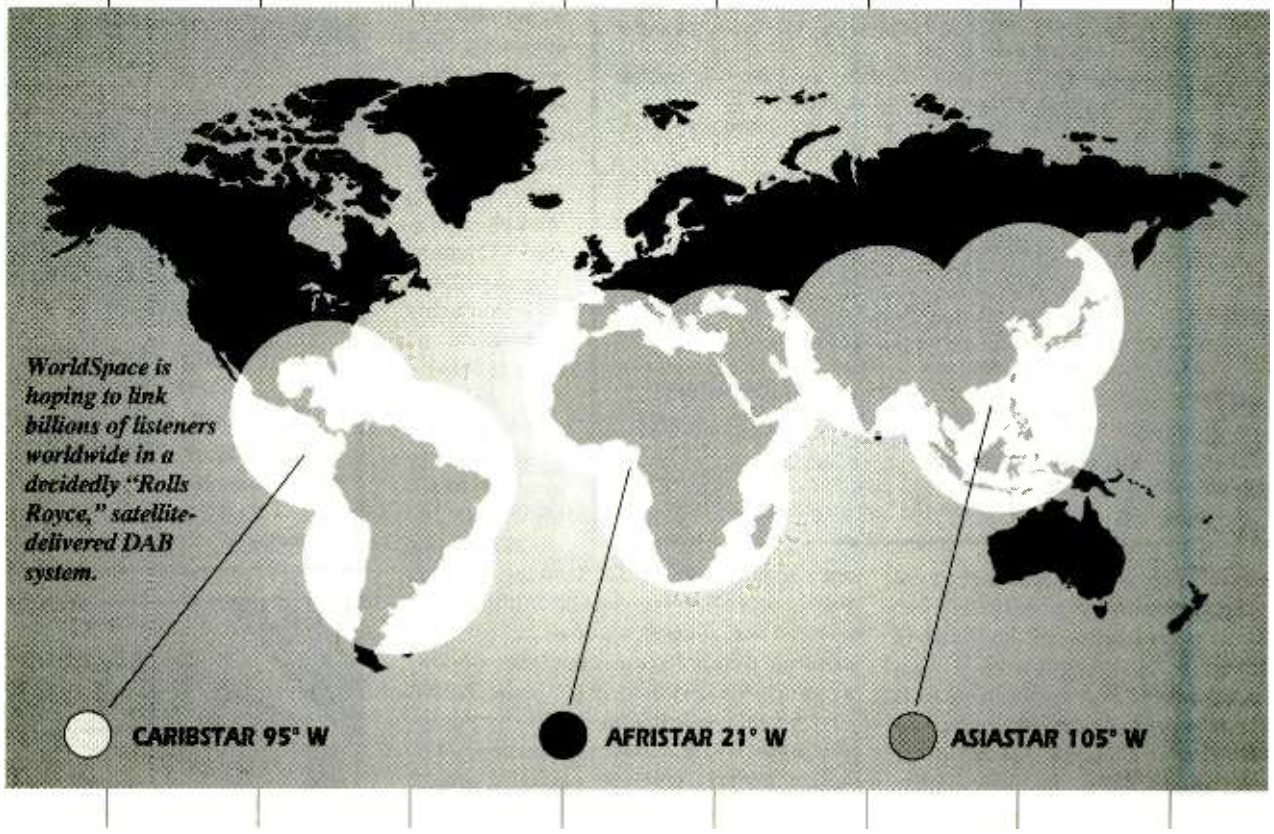
Bibliography & Suggested Reading:

The 9-1-1 Puzzle: Putting All the Pieces Together. A Guide for the Implementation and Operation of 9-1-1, by Sue Pivetta. First edition, 1993. Published by the National Emergency Number Association, 110 South Sixth Street/P.O.Box 1190, Coshocton, OH 43812-6190. Tel. (614) 622-8911. ISBN 1-883119-15-4. 162 pages, hardbound. List price $45.

9-1-1 Magazine. Published by Dispatch, Inc. Randall Larson, editor. PO Box 11788, Santa Ana, CA 92711; 1-800-231-8911.

A Logical Future for

SHORTWAVE



By Ian McFarland

The death of SW for international broadcasting is imminent, say the doom and gloomers. To that I can only reply, *No way!* And some recent developments support that positive view. As *MT* readers will have already seen from Jacques d'Avignon's article (*MT* Nov-94), several of Radio France International's transmitter sites are getting a multi-million dollar, cutting edge, state of the art upgrade. Add to that the new BBC relay station under construction in Thailand. It's expected to have a useful life of at least ten to twenty years.

As well, a consortium of interested SW broadcasters and receiver manufacturers is currently looking into the development of new technology that will make SW even more user-friendly, and put an end to a lot of the frustration attached to this fascinating pastime. This new technology is called ID-Logic. It was developed by the Hong Kong-based PRS Corporation.

Select the broadcaster you wish to listen to, and your radio will choose the strongest signal from a group of frequencies fed to your receiver from the station itself! That's the basis of ID-Logic.

A year or so ago PRS approached the BBC World Service with the idea. BBC then got together with Voice of America to study the idea more closely. Next came a meeting in Hong Kong involving PRS Corp., BBC, VOA, Radio China International, Deutsche Welle, TDF (the technical service provider for Radio France Int'l), along with receiver manufacturers Sony, Phillips, and Sangean. Now, with the addition of Radio France Int'l, Radio Australia Int'l, and Radio Austria Int'l, there's a full-blown consortium of interested parties involved.

What is ID-Logic?

Basically, the ID-Logic system allows a receiver to have a built-in, updatable database of frequency and transmission information. This information would effectively put an end to all the frustration of trying to cope with the seasonal frequency and other changes that SW stations make to adapt to changing propa-

gation conditions and interference from other stations.

The updating of information would be done automatically by the SW stations themselves. Two means of doing this—one silent and the other audible—are currently being studied. The silent way, known as the Amplitude Modulated Data System or AMDS, is a system similar to the Radio Data System (RDS), currently being used in Europe for FM stations. The AMDS signal is broadcast by phase-modulating the transmitter's carrier by plus or minus 15 degrees. This signal would be transmitted on a continuous basis during a broadcast, so even if the signal faded down or out at any point during a broadcast, the data would still be received.

The audible means of transmitting data to an ID-Logic equipped receiver is by means of Frequency Shift Keying, or FSK. This signal, which would sound to the listener like a burst of RTTY, or a signal from a fax machine, would be sent only at the end of a broadcast. With this system (since the data is only transmitted once), a signal fade at the wrong time would result in a loss of some or all of the data.

A fairly basic ID-Logic receiver would simply give the listener a menu of station frequencies for the listener to choose from. A high-end, table-top set, on the other hand, could scan the data in the ID-Logic database and pick out and automatically tune to the best frequency for any given broadcast.

On-air trials of the ID-Logic system are planned for sometime in the second half of this year. While there are barely a handful of ID-Logic receivers around at the moment, RCI's Chief Engineer, Jacques Bouliane, predicts that this will change during 1996. As soon as an encoder appears on the market, he says, he's planning to put it into operation at RCI. It would appear, though, that Deutsche Welle is well ahead of everyone else in that regard. They've been transmitting an AMDS signal on one of their SW transmitters for some two years now.

Ian Davey, the engineer in charge of ID-Logic activities at the BBCWS says that, "we do in fact see ID-Logic as a possible movement forward into a new dimension in SW broadcasting. We have always felt that we had to help the listener in this crowded spectrum, and the concept of having the schedules within the receivers was an approach which we felt was worthwhile pursuing."

There will clearly have to be international standards regarding the data format that's transmitted, and Davey says that the receiver manufacturers who took part in the Hong Kong meeting recognized that future receivers will have to accommodate both the AMDS and FSK types of modulation.

Prototype StarMan™ Radio.

The BBC view of shortwave's future is largely echoed by the VOA's Chief Engineer Robert Kamosa. "While it may take quite a long time," he says, "for listeners in some underdeveloped areas of the world to be able to equip themselves with the necessary equipment to pick up satellite radio broadcasts, they might more easily be able to afford a SW receiver with the ID-Logic technology. I think that based on what we've seen to date," Kamosa says, "pursuing the ID-Logic technology is still a reasonable thing to do."

"As we track our DBS efforts as well as other DAB broadcasting, be it terrestrialy or satellite based," he added, "we'd still like to keep all the options open."

All we need now is a logic system that will stabilize propagation conditions!

■ More Irons in the Fire

Speaking of DSB and DAB, there's another consortium of international broadcasters that's been busy at work for the past 18 months trying hard to secure a solid spot for international broadcasting in the field of satellite DAB. "Digital Radio for the World" as the consortium is known, includes BBCWS, RCI, VOA, Deutsche Welle, Radio Netherlands, Radio France Int'l, Channel Africa, Radio Japan, and EuroDigital Radio. The consortium held its third meeting in 15 months at the VOA in Washington in early April. Earlier meetings were held in 1994 at the BBC in London and at Deutsche Welle in Cologne.

There were numerous items on the agenda at the London meeting, but by the VOA meeting a streamlined agenda dealt mainly with possible satellite service providers and regulatory issues. There were also discussions on ideal DAB receiver specs.

At WARC-92 the ITU allocated part of the L-Band (1452-1492 MHz) for Satellite Sound Broadcasting. Since the U.S. military uses this chunk of spectrum, it's not available for broadcasting. So, the U.S. will use the S-Band for Satellite Sound Broadcasting.

There's also another potential source of conflict in international DAB. Most members of the DAB consortium, including Canada, have already settled on the Eureka-147 DAB system for both domestic and international DAB. However, in the U.S., the radio industry, under the aegis of the NAB, is developing what's called the In-Band-On-Channel (IBOC) system, which would allow digital broadcasting in the existing AM and FM bands. The NAB doesn't want to create a third system.

A public demonstration of the IBOC system at the recent NAB-95 in Las Vegas was reported to have been very successful. So it looks like the skeptics may have been wrong about IBOC, and when international broadcasting makes the move to DAB, it's likely that receivers—at least in North America—will have to be able to cope with at least two DAB transmission systems.

At the VOA conference there were three main contenders to provide satellite DAB services for international broadcasting. There was the U.S.-based WorldSpace, Inmarsat, and the European Space Agency. The WorldSpace presentation was the most ambitious of the three, and by far the most polished. They plan to launch their geostationary Afristar and Caribstar satellites in 1998, and Asiastar in 1999. The satellites will each have up to 96 channels of 16 kilobits each. Motorola is developing WorldSpace's StarMan DAB receivers, and a demonstration of the project in the L-Band is planned for late this year.

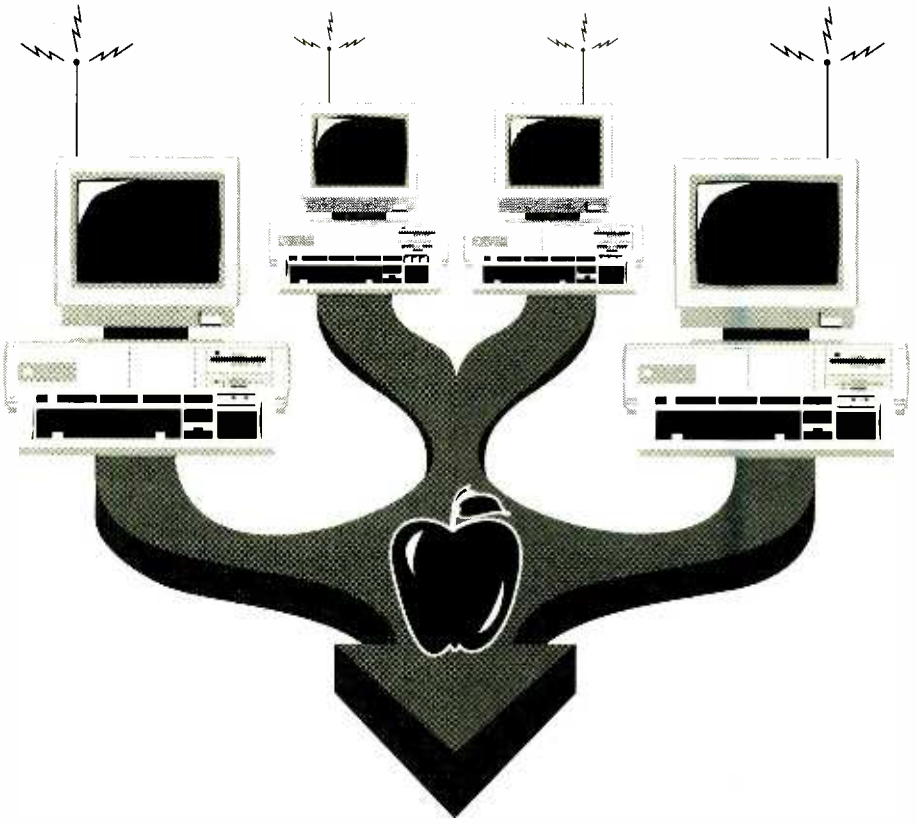
WorldSpace is hoping to link billions of listeners worldwide with a mix of commercial entertainment programs as well as public service broadcasters, including international broadcasters. The members of the consortium seem to have a preference for WorldSpace's offering, which is a decidedly "Rolls Royce" system compared to the others.

From a 16-kilobit signal demonstration at the VOA meeting it was obvious that a successful DAB system will have to be at least 32 kilobits. The 16-kilobit signal sounded too much like a telephone call, and would not likely entice too many listeners to listen in more than once.

There's still much work to be done yet before "Digital Radio for the World" becomes a reality, but the amount of work that's been accomplished by this consortium in only 18 months augurs well, I think, for the future of international broadcasting. The consortium meets next in Johannesburg in November.

The Internet (and More) via Radio

Students, teachers and administrators in a New Mexico school district benefit from innovative radio technology which plugs them into the world and links them to each other—offering both educational benefits and savings in terms of cost and efficiency.



By B. W. Battin

When public-school students in Valencia County, New Mexico, switch on their computers this fall, they'll be linked to the Internet by radio. It's one of the first operations of its kind in the nation.

Computers in each school building are tied in to a transmitter-receiver that communicates with a central site, which has the district's Internet connection. Valencia County has two school districts, Belen and Los Lunas. Each is independently installing the new system.

The operation is more than just a means of getting kids on line. It also provides each school district with both local area and wide area networks. The local network allows communication within schools, while the wide area net allows system-wide communications.

Who gets to be on the network?

Just about everyone in the school system. In Belen, the network will include the district's eight schools, the administration building, the special education facility, the school bus compound, and the maintenance warehouse. Computers at all these sites will be able to communicate among themselves—and all of them will have access to the worldwide resources of the Internet.

Cheap it ain't

Each school district is spending about $300,000, a third of which goes to pay for the radio part of the system.

"It will save us at least $1,500 a month over the cost of using phone lines at each school," explained Greg Anderson, technology specialist with the Belen school district. "But that's figured on a 56-kilobit-per-second phone connection. The radios give us a T-1 connection at each site, and that's 24 times as much bandwidth."

Jim Landavazo, the program manager for Tamsco, the Albuquerque firm that's the primary contractor on the project, says the savings over time can be quite substantial. He estimates that over five years a 24-site radio-linked system would save more than half a million dollars in operating costs, compared to a phone line system of the same size and capabilities.

Here's how it works

All communications from all the schools pass through a central location, even when the sites are communicating with each other. In Belen it's the high school.

"It's sort of like a switchboard," Anderson said.

The high school is also the site of the network's only direct Internet connection.

"All of the other schools are linked to the

high school through the network," Anderson explained. "So any computer at any school can have Internet access."

Each school has its own transmitter-receiver and antenna. Depending on the distance the signal has to cover, the antenna is one of three types: a ten-element yagi with 11 dB of gain, an eighteen-inch solid dish with 14 dB gain, or a large screen-type parabolic reflector with 22 dB gain. The yagi is used for frequencies in the 900 MHz range; the others are used for 2.4 GHz.

"Which one we use depends on the distance," Tim Devine, an engineer at Tamsco said. "For longer distances, we use the big reflector, and for shorter ones we can use the yagi."

The transmitters are low-power, only a quarter of a watt. "At that power, we don't need an FCC license," Devine explained.

Technical stuff

The digital signals are neither AM nor FM. "They're QPSK modulated," Devine

(Continued on Page 20)

Teacher Melody Srader helps five-year-old Denise Gonzales use a computer at Gil Sanchez Elementary School in Belen, New Mexico. Soon, computers in this school will be linked to Internet by radio.

GROVE COMMUNICATIONS

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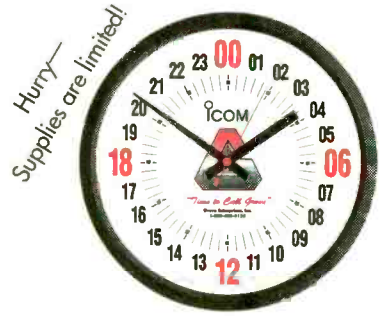

Don't Miss The Top U.S.

New expanded program includes satellite communications! Outstanding seminars now cover shortwave, scanning and satellite communications—the entire listening spectrum. Come and enjoy the company of friendly hobbyists in a relaxed atmosphere of learning and sharing!

Here are just a few of the reasons why you need to attend this year's Grove Communications Expo!

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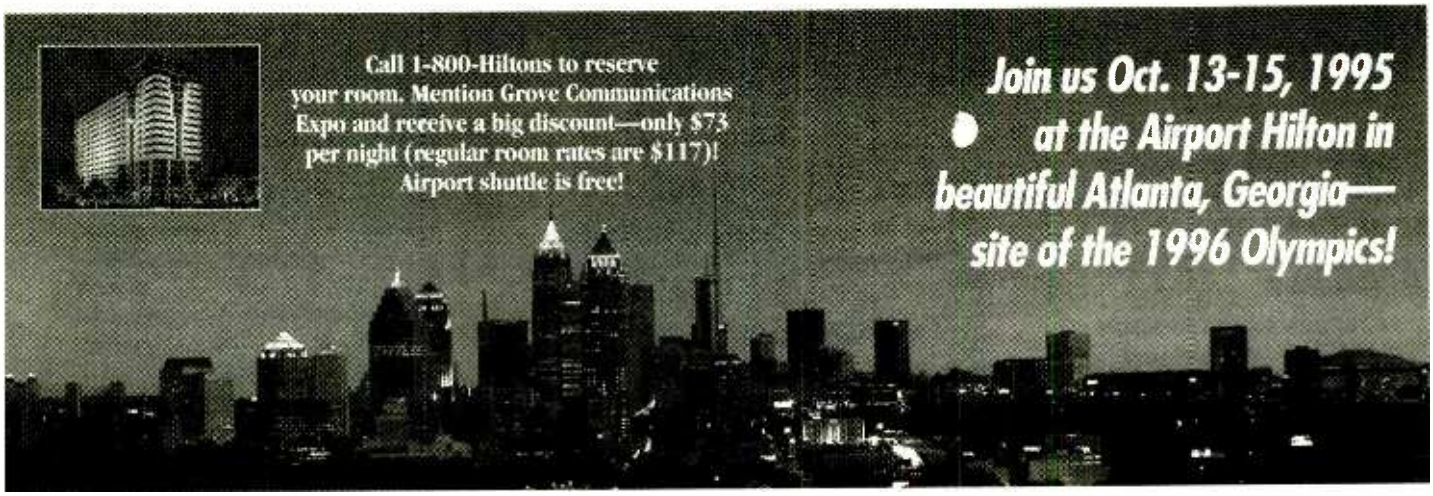

Communications Event!

Special programs this year include scanning Atlanta during the Olympics, Atlanta-area tours, an all-new "Listening Post," sales and demos by top manufacturers, a fabulous banquet, International Broadcasters Forum—and much more!

Preliminary Schedule (Abbreviated)

FRIDAY, October 13, 1995

10am-4pm	Workshop for Educators(call Grove for additional information)
9:30am-11:15am	Tours of WSB Broadcasting
1-2 pm	Scanning Atlanta - Roger Cravens
3-4:30pm	Tours of the Fulton County Sherrif"s Dept. w/Roger Cravens
2 - 4 pm	International Broadcaster's Forum, Ian McFarland, moderator
7-7:30pm	Opening ceremony; greet VIPs (espec int'l broadcasters) w/Bob Grove host
7:30-8:30pm	MT Expert panel w/Rachel Baughn host
8:45-9:45pm	ST Expert Panel w/Larry Van Horn host

SATURDAY, October 14, 1995

	SW Ute/BC	*Scanner/Pers. Comm*	*Satellite*
9:00 - 10:00am	Utility DX Bob Kay	Public Service B. Kay	Satellite Monitoring L.Van Horn
10:15-11:15am	BC Developments G.Hauser	Monitoring & the Law J.Rodriguez	Weather Sats J.Wallach
11:15-1:00am	LUNCH		
1:00-2:00pm	Begin SW L. Magne	Monitoring Military VHF/UHF L.Van Horn	Beginning Sats K. Reitz
2:15-3:00pm	SWBC Programs Jim Frimmel	Federal Monitoring J.Fulford	Personal Commun. D. Dickerson
3:15-4:15pm	HF Aero B.Evans	Causes & Cures of Computer Interfer. J. Catalano	Domestic TVRO K. Reitz
4:30pm	Bug Hunt (outdoors)		
5:15pm	Prize dawing		
7:00pm	Banquet, Joe Adamov, Moscow Mailbag, Speaker		

Post banquet Bug hunt, Listening post, special interest groups

SUNDAY, October 15, 1995

9:00-10:00am	AM DXing G. Hauser	Begin Scanning B.Grove	Monitor NASA L. Van Horn
10:15-11:15am	HF Digital Modes B.Evans	Trunking Technology Doug Graham	Amateur Sats K.Baker
11:30-12:30pm	Pirate/Cland G.Zeller	VHF Aero J.Baker	Radio Astronomy J. Lichtman
12:45pm	Close w/Bob Grove host		

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explained. He says it stands for quadrapture phase shift key. It involves modifying the phase, or timing, characteristics of the transmission rather than the amplitude or the frequency. (Your humble reporter is not going to try to explain that further.)

■ A lot of wire

Los Lunas school officials estimate that 85 to 90 percent of the classrooms in the district's 11 schools will be wired into the computer system. In Belen every room in every school will have a computer outlet, including offices and teachers' lounges. The total: 331 rooms.

"Every classroom becomes a potential computer lab," Tamsco's Jim Landavazo noted.

Most of the wiring connecting the classrooms is unshielded, similar to that used by telephone equipment. Runs of 300 feet or more are fiber-optic cable. How much wire is that? The subcontractor installing it estimated the Belen job at 150 feet per room. That's a shade under nine miles of wire.

■ What are its uses?

Need a school bus schedule for a new student? One can be sent instantly to an elementary school on the other side of town. Attendance reports can be transmitted directly from the classroom to the administration building. Directives can go from the principal to every teacher, or from the administration to every principal.

"Right now, you have to physically carry a piece of paper to where it's going or send it through inter-school mail," Anderson said. "With this system we can have a paperless office—or as close to it as you can get."

But that's just administrative. Anderson says the real benefit is to the students, all that information just waiting to be tapped at major American universities...and in France, and in England, and in Australia...

■ What about that nasty stuff on the net?

"That's going to be a real issue," Anderson said, "how to handle the stuff the schools won't want students to have access to." His recommendation is to provide free access, but to develop policies for dealing with kids who abuse the privilege.

Engineer Tim Devine of Tamsco holds a 10-element 900 MHz yagi, part of a radio-based system that will give the public schools in Valencia County, New Mexico, district-wide access to the Internet. Below, he holds one of the system's tansmitter-receivers, a black box about the size of a VCR. Beside him is a large parabolic reflector that will transmit and receive data on a frequency of 2.4 GHz.

If that doesn't work, there are ways to restrict access to certain areas of the Internet. "It'll be up to the administration to develop the policies on that," Anderson said.

Security has also been considered. Kids won't be able to use the computer to change their grades. Things like student records won't be accessible through the network.

■ The future

Future possibilities for the two Valencia County networks include expanding outside the school system. "We could hook up the Belen and Los Lunas libraries," Anderson explained. "We could give students access to the library card catalogs."

Another idea is to establish a radio link between the two school systems, so they could share resources. They could also provide emergency Internet access for each other if one of the schools lost its connection to the Net.

Are radio-linked computer networks the wave of the future? Understandably, Jim Landavazo says yes.

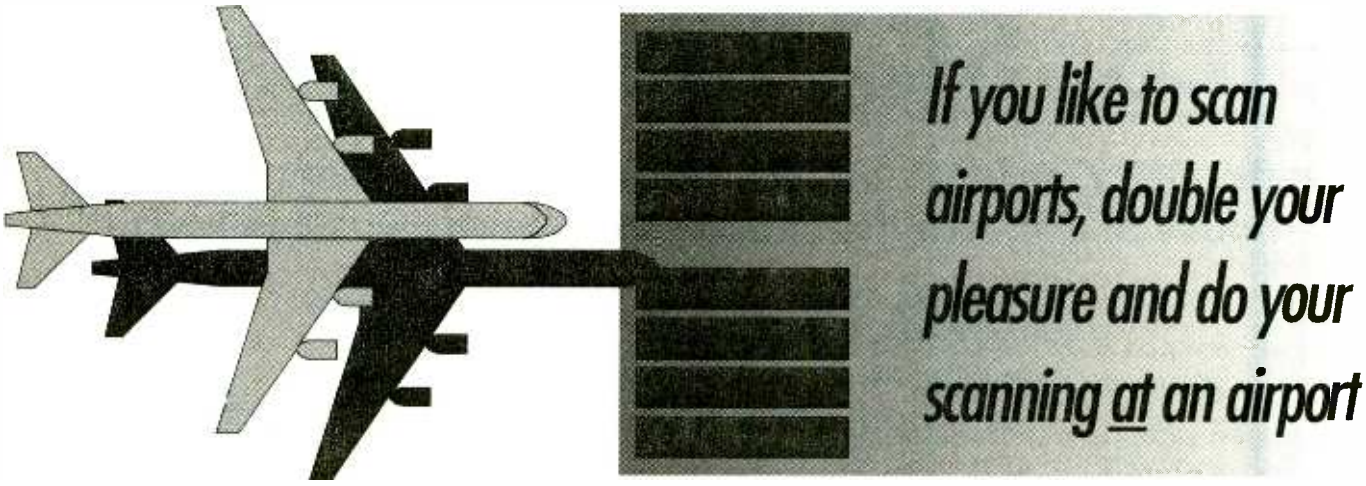
"It's the easiest way to do it," he said. "There's not a lot of infrastructure to install and there are no recurring costs." He pointed out that some conventional networks can involve laying large amounts of fiber-optic cable underground. "What are you going to do if you move to a new location—dig up the cables and take them with you? With the radios, you can just pack them up move them."

The disadvantages? One, of course, is the initial cost of the equipment. Greg Anderson sees another: "The main limiting factor is that it's line of sight. If you're in an area with a lot of tall buildings, like a large city, your line of sight may be blocked."

Another limiting factor is the range of the radios. Landavazo says that, under absolutely ideal conditions, the equipment's range can sometimes be stretched to twenty miles. An operation scattered around a state or region would be unable to connect all its facilities using this system.

So, are radio-linked computer networks indeed the wave of the future? Clearly not for all situations. But for organizations like school systems that are spread out, but over a small area, the answer may well be yes.

Scanning at the Airport



By Dick Miller, NK9H

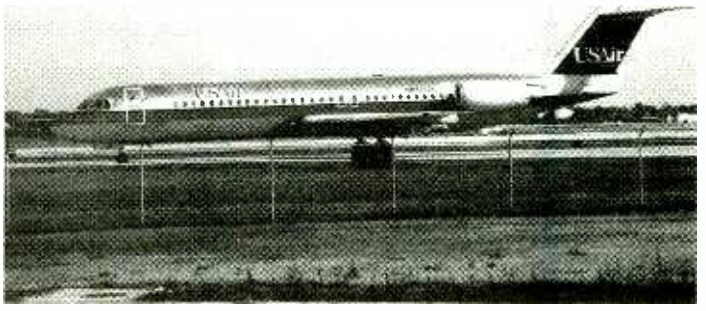
As I am driving home from work, I notice now nice the weather is. There are light, fluffy clouds. And though there is a bit of a wind, the temperature is quite warm. So as soon as I walk in the door, I turn my scanner on to 126.4 MHz and wait for the repeating message to begin again. OK. Here it comes now.

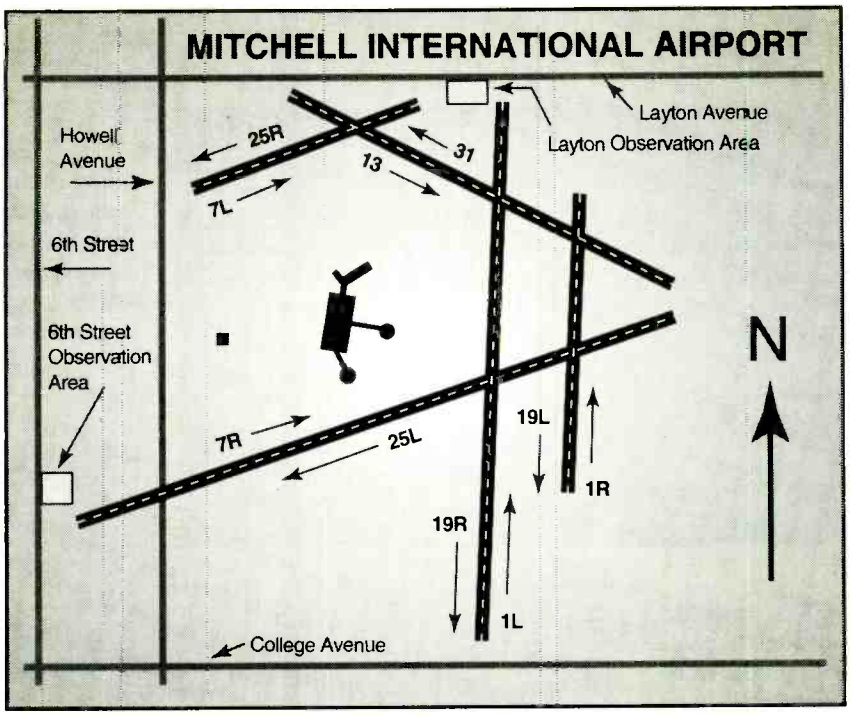
"Milwaukee Mitchell International information foxtrot. Two zero five two zulu weather. Measured ceiling five thousand scattered. Two one thousand thin scattered. Haze. Temperature eight two. Dew point five four. Wind one seven zero at one eight. Altimeter three zero one two. Localizer runway one nine right approach in use. Landing and departing runway one nine left and one nine right. Notice to airmen. Taxiway charley closed. All departures contact clearance delivery on one two zero point eight. Advise on initial contact that you have information foxtrot."

HOT DOG! This is just about perfect. "Hey Hon," I call out. "How would you like to go to the airport? They're coming in on one nine." She answers, "Is that Layton?" I respond, "It sure is." So next she calls out to the kids, "Hey kids, how would you like to go to the airport?" The expected response is, "HOORAY!" So we pack the kids in the van with a few cans of soft drink. Of course I grab my scanner, already preprogrammed with some of my favorite frequencies for Mitchell International. I also remember to bring along a set of binoculars as well as my 35 mm camera with telephoto lens. And ten minutes or so later, we're parked at the airport watching the planes come in.

And so, you ask, what does this have to do with good, hard-core scanning? If you have been scanning for any length of time, you by now have probably tried a little scanning of the airport frequencies, especially if you live anywhere near a good size airport. And if you do, you know how much fun it can be. The frequencies can be quite packed with

To really feel the rumble of the engines, the Layton observation area can't be beat. The scanning and the photography keep the whole family entertained.





action during the "rush hours" at the airport. But I would like to let you in on a secret that can multiply the excitement. Try scanning at the airport itself, if possible.

Well, not only is it possible at Mitchell International in Milwaukee—it is almost encouraged. You see, Mitchell happens to have two dedicated observation areas, specifically set aside for the purpose of allowing anyone to watch the planes as they land and depart. And these observation areas are not placed just anywhere on the grounds. They are located just a short distance away from the ends of two of the largest runways at Mitchell.

As you can see from the map, one of the observation areas is located just to the west of the northern end, or runway 19R. This observation area can be accessed from Layton Avenue, which is the northern border of the airport. It can be exciting to be driving on Layton as a plane comes in for a landing over Layton. But, this could also cause a traffic hazard if cars were allowed to park there. So, even though there is no parking allowed in that area, the county has generously provided the observation area for on-lookers to enjoy. This spot is so close to the runway that you can almost climb in the planes as they come in. (See some of the accompanying photographs.)

The other observation area is located just to the north and west of the western end of runway 7R. It is not quite as large as the Layton area. And it is not quite as close to the runway. But it still allows close-up views of the planes when the wind is coming from an easterly direction. This area can be accessed from 6th Street, just south of Grange Avenue.

These areas are not necessarily open all of the time. When they are open, you can use either one, but only one is optimum at a given time. When runway 19 Right is in use, the best viewing, in my opinion, can be had at the Layton area. In this case you can get excellent close-ups of the planes when they are either taxiing up for take-off or coming in for a landing. The next best viewing can be experienced at the 6th Street observation area when runway 7 Right is in use. One of the four main runways—19R, 7R, 1L, 25L—will always be in use for the large commercial jets, barring severe weather conditions. The small private planes will use either these main runways or the smaller secondary runways, depending upon traffic and other factors.

I suppose it is possible to find some side streets where parking is allowed, from which to watch the comings and goings. But you wouldn't be very close to the planes. And believe me, the kids really get excited at seeing the planes at what almost seems like arm's length. I have to admit to getting a charge myself as the engines roar to life while a jet speeds down the runway, or as a large 737 comes in for a perfect landing.

Where this really gets to be fun is in combining the physical action with the scanning action. Not only do we get to see the action, but I know in advance that Midwest Express flight number 123 will soon be taxiing down to runway 19 Right for take-off. I heard them receive clearance on the clearance delivery frequency 120.8 MHz. Or I know that Northwest flight 987 will soon be

approaching from the west because I heard them receiving landing instructions on the approach frequency 126.5 MHz.

Of course there are those memorable sessions, such as the time I heard the tower receive a request for an emergency landing because one of the turboprop engines went out. A short while later we saw the plane limping in on one engine. This was a twin engine commuter flight which had left a short time earlier. Right after the plane landed, their ailing engine appeared to be working again. Of course they pulled in to the terminal to have the situation corrected. If I were a true, hard core scanner buff, I would have tried to follow all of the action as the plane went in for repairs. But this is something that works out better without the family. When I'm with the family, it's more fun to keep track of the comings and goings. By the way, I heard the emergency request on the tower frequency 119.1 MHz.

These planes were caught by the camera from the 6th St. area. A busy field like Mitchell keeps the airways hot serving commercial, military, and private aircraft. The radio airways are hot, too.

Mitchell International is not just a commercial airport. There are also military bases located on the grounds. The Wisconsin Air National Guard has the 128th Air Refueling Group located at Mitchell. The United States Air Force Reserve has the 440th Tactical Airlift Wing located there as well. As a result, we can occasionally see military aircraft coming and going in addition to the commercial airliners. There was a noticeable increase in military aircraft activity here during the Gulf War. Training activity can be found at almost any time, though not to the same extent as the commercial flights.

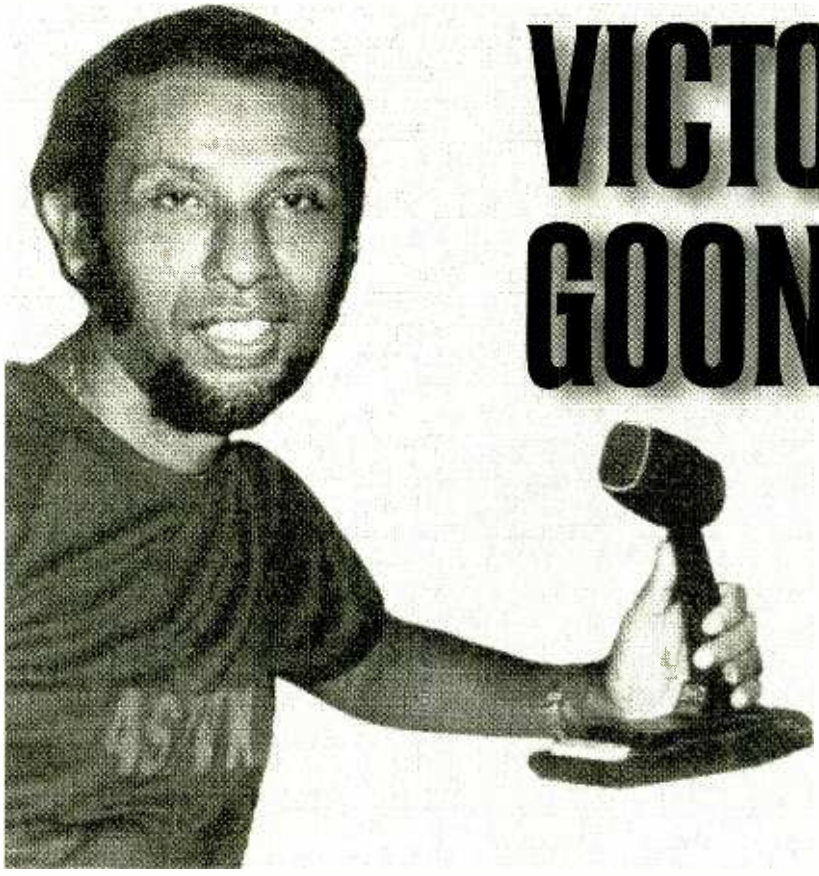
If you are willing to spend some time at your local library, you can often find out more information about your local airport which can be used to your advantage when scanning, both at home and at the airport. For instance, a good map of your area might have a more detailed picture of the layout at the airport. There are books which are normally used by pilots which can give loads of information on runways and taxiways at the airport. You can also learn a lot about flying, navigation, instrument and visual flight, and much more. You are only limited by the amount of time you wish to spend learning. For real-time information there is always the Automatic Terminal Information Service (ATIS). If your airport has one, it is a great source of current weather conditions as well as *the* source for current runway usage.

Scanning right at the airport is twice as enjoyable as it is at home, because I know what's about to happen, and I can see it going on right before my eyes. It is also an activity that the whole family can enjoy. And believe me, mine does. "Look daddy, de plane, de plane." If you live near a sizable airport of any kind, find out if it has similar facilities and give it a try. If you are in the Milwaukee area and would like to enjoy it for yourself, I have included a list of frequencies for Mitchell International. Give them a try. And happy scanning.

TABLE 1

Mitchell International Airport Frequencies

118.0	Tower & Approach
118.6	Approach
119.1	Tower
119.65	Departure & Approach
120.8	Clearance / Delivery
121.8	Ground Control
123.8	Approach
125.35	Departure
126.4	ATIS
126.5	Approach
325.8	Military Tower
348.6	Military Ground Control



VICTOR GOONETILLEKE

Portrait of an Extraordinary DXer

By Colin Miller

Have you ever wondered what it must be like to be a DXer in a third-world country? There aren't many electronics retail stores, and if you can find one, prices are way above your annual budget. Difficult and frustrating, yes, but it is possible, as is evidenced by Victor Goonetilleke, one of South Asia's authorities on international broadcasting, and a regular contributor to *Media Network* on Radio Netherlands. He lives near Colombo on the island of Sri Lanka, pearl of the Indian Ocean.

Victor was born on 29th November, 1947, and is a brown-skinned, 5 ft. 10 in. tall Sri Lankan Sinhalese. He speaks Sinhala, English, and some limited Spanish, and comes from a Roman Catholic family. His father was a highly educated university graduate majoring in Western Classics (Latin, English, and Greek), which made English the main home language of communication. The English learned in school and at home was the most significant factor in his life, because it made it possible for Victor to enjoy the hobby of DXing and SWLing.

"Listening to the cricket commentaries from the BBC and Radio Australia was the thing that made me listen to short wave," admits Victor. "In between playing time I used to tune to other stations. My father was an SWL and he would pick out some interesting stations and tell me it was such and such a country and music." Victor was about 10 at the time. Finally, the 1960 American presidential elections made his interest even keener. "Being a Catholic, I wanted JFK to win, and was stuck with VOA after his election, assassination etc."

In 1965 Victor sent an entry to the Voice of Free Korea's monthly contest. In that letter he had unwittingly made out a complete reception report, for which the station sent a QSL card. A few months later Victor's formal DXing began when another Sri Lankan teenager, Sarath Amukotuwa, wrote a letter to the national newspaper inviting interested people to join him in starting an SWL/DX club.

"Being a teenager like Sarath and only one year older, we both struck a friendship which is as ever strong today as in those early years...I owe it to him for my induction to DXing. He and I formed the first DX club in Sri Lanka"—the Ceylonese SWL club, formed in February 1966.

Growing Pains

It was always difficult to maintain a club. Although there were many hundred, even a thousand SWLs, they were mostly BBC or VOA program listeners who were not interested in a club. It wasn't until in February 1968, that they were ready to issue their first bulletin. By then, Victor and Sarath were in their late teens, a bit more mature, and also with a little more pocket money.

With advice and support from Cecil Perera, they got the club and the newsletter going. About 50 DXers of varying levels of interest joined the club. "We had a monthly (sometimes) newsletter." The first bulletin was a modest one-page issue, in which the aims and objectives were set out. Sarath was the editor, and the name of the publication was *DX Panorama*.

Sweden Calling DXers was the greatest friend that DXers had in countries where it was hard to get shortwave publications. It played a vital role in bringing the world of DXing to those who tuned in. Though it is now no more, DXers the world over are thankful for the part it played.

Another tremendous influence and friend was Stewart Mackenzie of the American Short

Victor Goonetilleke, 4S7VK, doing what he loves best—playing with radios and bridging the distance between continents.

Wave Listeners Club (ASWLC). He knew the problems of running a DX club and he could well see the hard path ahead. Stewart wrote to the club immediately after he had seen the first bulletin and told them not to give up, and keep going. As third world young DXers Sarath and Victor couldn't even afford the $3 ASWLC membership fee; Stewart sent the bulletin anyway. It was an invaluable source of information about the world of international broadcasting.

An even larger world was opened to them when Deutsche Welle, for whom they were monitors in 1967, sent Victor and Sarath the *World Radio TV Handbook*. They were in a far-flung corner of the world, away from active DXers of Europe, North America, and Australia, with hardly any money. Their radios were the old family domestic kind. Having the *WRTH,* loaded with frequencies, was like being born again.

On the Receiving End

Communications receivers were impossible to obtain in the late 60's—so much so that as a young DXer Victor wondered whether it was really possible for DXers to tell frequencies unless they listened to station announcements.

"My first receiver was an RCA CR-88 in mint condition, although it was designed during the World War II years. It was given to me by Vatican Radio in 1969 to evaluate the signal from Radio Veritas in the Philippines." That station had just opened and the engineers were eager to know how their signal was being heard in South Asia.

With the arrival of the RCA CR-88 receiver, Victor's DXing and official monitoring advanced. He was able to measure frequencies to ± 1 kHz and was even bold enough to send DX tips to *Sweden Calling DXers*. At the time, with their small newsletter giving Asian information, they were able to join a few bulletin swaps with other international DX clubs. The swaps soon gave them a better understanding of international DXing, and often Sarath and Victor sent the clubs Asian observations and helped identify unknown stations for overseas DXers. They also started scripting a bi-monthly DX program, *DX Panorama*, aired on the Ceylon Broadcasting Corporation in 1969. So, by 1971 a firm foundation was built for many years of serious DXing.

Around that time FEBA Seychelles, another religious station, had come on the air. The station inaugurated a program for DXers called *DX Postbag,* hosted by frequency manager Norman Brierley. The show included loggings sent in by Victor and other listeners in South Asia.

The DX hobby in South Asia showed signs of strength as the Union of Asian DXers (UADX) was established in 1972, with a regular bulletin for the serious DXer, and in 1974 a group of Indian DXers formed the India DX Club International.

Victor passed another DXing milestone when *WRTH* asked him to cooperate in updating Asian information. Early in the 70's, when clandestine broadcasting hit a new high in Southeast Asia during the Vietnam war, he got deeply interested in these stations, thanks to Larry Magne.

Doing a Lot with a Little

How does DXing differ in third world countries? Well, actually, the motivation is the same as for most people: you listen to gain information about other countries. However, there are fewer opportunities for a wide range of hobbies in developing countries, so hobbies like DXing, rather than ham radio, become more popular—you don't need such expensive and sophisticated equipment to participate.

One's skill goes a longer distance with limited equipment. "The main problem is money, but let me hasten to add that DXers and SWLs come from the middle class of third world societies which have a relatively high standard of living." The prices fixed on specialized goods such as communications receivers from the Western world, usually with customs duties added, become very frustrating.

"It's just nothing for me to entertain a visitor for a whole month in my country," says Victor, "giving him a very comfortable stay which he would find very costly in a hotel, but it would cost me that whole month's money to spend one day in a Western city guest house."

It's this imbalance of the world economic order that makes DXing that much different and difficult in third world countries. The situation in South Asia is changing fast, however, due to the cheaper digital portables and the growing economies of the region. But, in countries where that situation still prevails, things are sometime worse than what Victor

A picture from the past, as author Colin Miller talks with Victor from his former ham shack near Johannesburg.

and fellow DXers in Sri Lanka and India faced in the last 25 years.

Thirty Years of DXing

In the early years of Victor's DXing he used the family domestic set, and on it he was able to hear 113 countries and QSL 98 or so. However, when the communications receiver arrived, new countries rolled in, because he could be sure of the frequency. In addition, stations wouldn't drift on the new receiver, and he didn't have to contend with image frequencies or front end overloading.

After using the RCA for two years he was able to get, on loan, a Collins 51J-4 from the VOA relay station in Colombo. That was 1973, the DX Friendship Year. Since then, though he has been able to use many different radios, he still feels the 51J-4 is an incredible receiver, although mechanical wear and tear takes its toll. The lineup now consists of an ICOM R-70 which is the main receiver, the RCA CR-88, Collins 51J-4, and also a Racal RA117. Each has some form of limitation due to age.

"Sometimes I feel DXing was sort of more romantic with the domestic receiver. It was harder to hear weaker stations, and each new catch was like a newborn baby. But, with the sophistication of the equipment and my knowledge—if I use the same simile—it's as if I don't have time for the children any more."

For Victor, some of the finest catches on shortwave have been the Falklands on 120 and 75 mb, Fiji, and many Latin American stations. They were a real challenge to log, as they are some of the hardest stations to hear from South Asia. Just as for many other DXers, each of those catches has unforgettable memories linked to them.

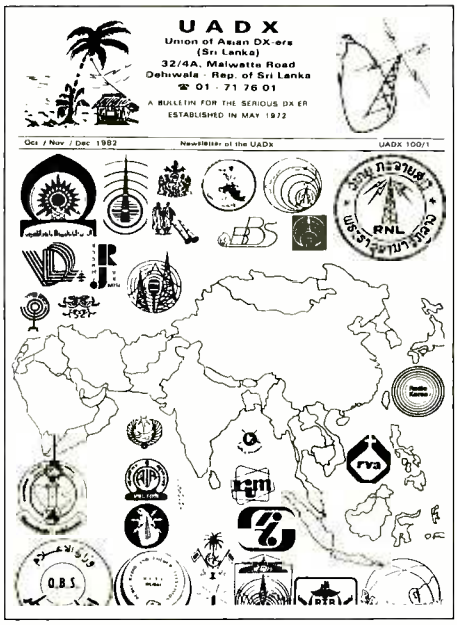
In 1983 amateur radio finally caught up with Victor, and he obtained a General Class ticket, callsign 4S7VK. He operates both CW and SSB, and has for short periods played with other modes like packet and RTTY. "I don't get the same thrill as when I really talk to people on SSB. I also don't like working pile-up after pileup ... but like to have long rag-chews, because ... it bridges the long distance gap between us." During the 80's a net for South Asian DXers was established on 40-meters, similar to the ANARC net in North America.

Victor's experience as a DXer in Sri Lanka has also brought with it a feeling of great loneliness. When he went to Stockholm as a guest of Radio Sweden for EDXC'84, he had his first opportunity to meet the people he had been corresponding with for many years—names becoming people, pictures in magazines looming "live" in front of him.

Since travel opportunities are few and far between, Victor got his amateur license and meets hobbyists on the air.

"In our far-away third world outposts we feel very lonely, yearn to have a large group of people who share the same deep joy of serious DXing. We don't find many for whom a QSL means anything, or who shares the thrill of hearing your favorite Country and Western song through static-riddled PNG stations."

Some of the nicest moments in his 11 years of ham radio have been when he came across SWBC DXers. In fact, when I lived in South Africa and operated as ZS6BYL, I maintained a regular sked with Victor a couple of times a week. We had a clear propagation path across the Indian Ocean and spent many hours talking to each other. For Victor, ham radio hasn't meant the end of SWLing, as it has for some. He will always be an avid SWBC DXer.



It was a long, uphill struggle to build an Asian DX community big enough to support even a quarterly newsletter.

"Ham radio is an extension of that interest and I like it very much, because it brings me into contact with people, and also enables me to conduct propagation tests ... As keen DXers, one tends to advance one's knowledge of propagation, because often hams get lost in their own voice."

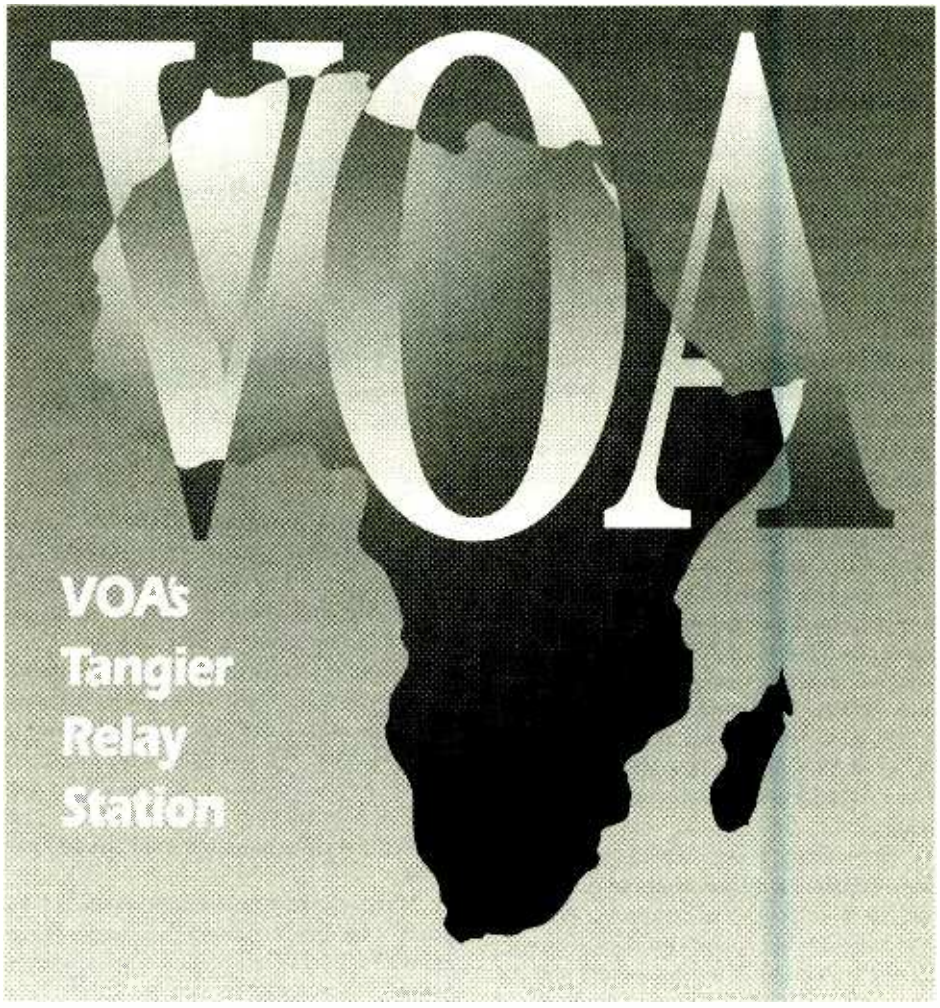
Victor married his wife Niromi in 1975. They met while at a Teacher's College where both were studying to teach English in secondary schools. They have three children: Soshana, aged 19 (a novice class amateur radio operator with the call 4S7RO), who is studying to become an architect, and two sons, Manish, 15, and Shyanke, 11. They live in their large country bungalow near Colombo. Victor has constructed and put up a couple of long wire antennas, as well as a Yagi monobander for 20-meters, and a 2-meter VHF antenna.

Their guest room has been home for many worldwide friends. "It's nice to have friends overseas visiting me, spending some days with us, to talk for hours on end under the tropical skies deep into the night." The bungalow is appropriately named "Shangri-la" after the imaginary hidden utopia mentioned in James Hilton's *Lost Horizon*.

Over the years Victor Goonetilleke has played an important part in promoting the DX hobby in his region of the world. Many DXers in South Asia can be thankful for the vision that he had all those years ago. Through his dedication and enthusiasm, DXing has become a hobby that many can now enjoy.

Victor has this message for his friends, old and new: "It's no secret that DXing is the thing that has had the greatest impact in our lives. The world has become smaller for us, dear friends across the waters, and those fine friendships have made life really enjoyable. I must thank many people who have helped me and inspired me, in a DXing life spanning nearly 30 years. Sarath Amukotuwa, my friend and teacher, who now lives in Australia, Stewart Mackenzie of ASWLC, George Jacobs formerly of VOA, the Chief Engineer of Vatican Radio, Jens Frost and Andy Sennit of *WRTH*, Bob Padula of ARDXC, George Wood and Anker Petersen, some of the finest people the hobby has known, and my closest Sri Lankan DXer and friend, Sarath Weerakoon."

A Familiar Voice in Africa



By Philip Gebhardt, VA3ACK

We've come a long way since 1901 when Marconi sent a signal across the Atlantic between Cornwall, England, and St. John's on the island of Newfoundland. The Voice of America relay station in Tangier, Morocco, is evidence of that.

Could Marconi have even imagined the current state of communications? It's hard to say what would pass through a mind such as his. But in this era of miniaturization, integrated circuits and low-voltage, low-power devices, I have drifted out of the world of the 6-tube shortwave receiver that used tubes such as the 6SK7 and 6V6. Transmitters with strange sounding tubes—807s and 4X250s—are a fading memory. I have come to accept that you can send a signal from the Moon to Earth using a fraction of a watt.

Wilfred Cooper's world encompasses integrated circuits, computers, satellites and, yes, even tubes. Wilfred Cooper is Station Manager at the Voice of America's Tangier relay station. Living in Morocco sounds exotic enough, but a visit to the station introduced me to the exotic surroundings in which he works.

The station is new. It went on the air in 1993 replacing the old station that started broadcasting in 1949. Wilfred Cooper arrived in Morocco in 1990 as part of the start-up staff for the new station.

The station is located on 1150 acres in a region south of Tangier. The land, originally subject to frequent flooding (it's a stone's throw from the Atlantic Ocean), had to be raised approximately 12 feet.

This self-enclosed "village" has an administration and transmitter building that covers 44,767 square feet. The maintenance and storage building occupy another 28,834 square feet. They have their own electrical substation, a waste water treatment facility, and a fire fighting system.

The Technical Side of the Tour

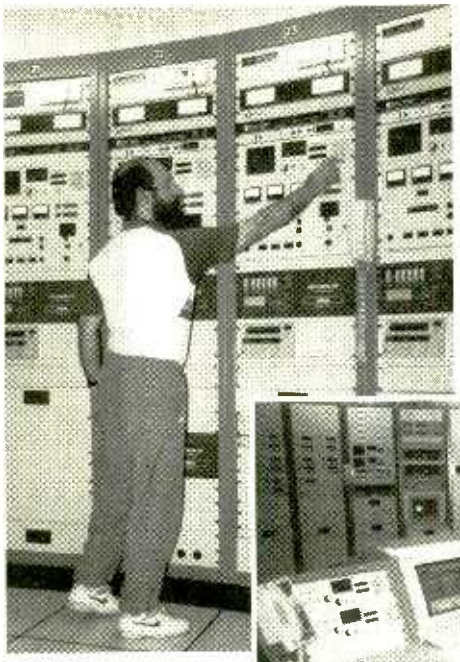
The heart, however, is the transmitting capability. The station has ten 500-kW shortwave transmitters. Each of the Marconi transmitters uses a single Thompson TH55A tube in the final power amplifier stage. The water-cooled tubes look more like they belong under the kitchen sink than in a transmitter. Water lines run in and out of the tubes. The tube envelopes are not glass, but metal. With 30,000 volts on the tube plates, the cooling water needs to have extremely high resistance, so built-in systems automatically test the water resistance as the water circulates and purify it whenever necessary.

Contributing further to the plumbing look of these transmitters are the tuned circuits. Tuning is accomplished by means of vacuum capacitors. Only slightly higher than their approximately 7-inch diameter, the capacitors are also water-cooled. And you won't find any circularly wound coils in these power amplifiers. The inductance is provided by

copper tubing—even down on the 49-meter band. Running back and forth through the transmitter cabinet, the 3-inch diameter copper pipes look more like folded sections of transmission line than inductors.

The heat in the water from the tubes and capacitors is dissipated by heat exchangers located outside the transmitter building. Since there are times when all ten transmitters are in operation, the facility has ten heat exchangers for the transmitters plus two additional units for the dummy loads.

Like amateur radio and CB transceivers, the VOA's Marconi transmitters are designed to work into a 50-ohm load. Two-state pi-networks are used to reduce the power amplifier tube impedance to 50 ohms. The first stage reduces the impedance to 110 ohms. At this point sampling circuits ensure that the transmitter is functioning correctly. The second stage further reduces the impedance to the required 50 ohms. Should the sampling circuit detect a problem, the transmitter is automatically shut down momentarily. Should the problem continue when power is reapplied, the circuit shuts down the transmitter once again. If the power-down sequence occurs four times, the transmitter is shut down entirely and an alarm alerts the technicians.



Left: Although the transmitters can be completely controlled by computer, the technicians must be prepared to manually select the time-on/time-off, frequency, appropriate antenna, antenna take-off angle, antenna slew angle, and program. Each of the ten 500-kW transmitters has a control rack. Four of the racks are shown here.

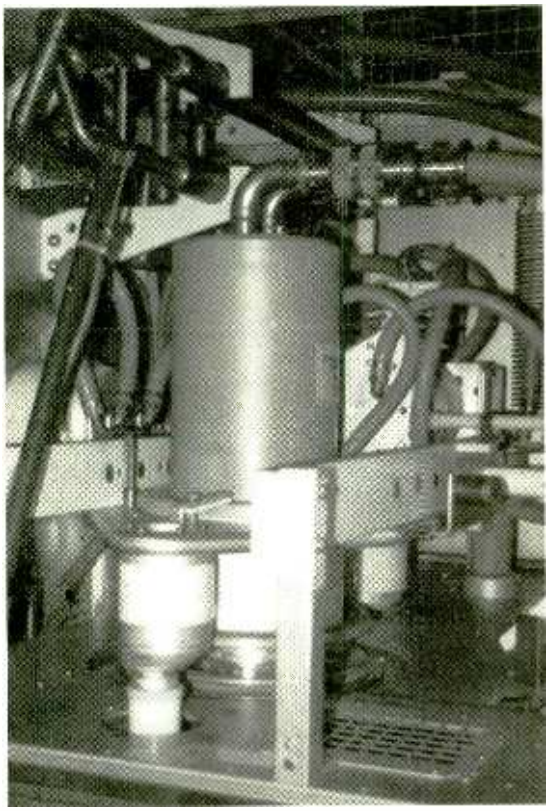
Below: Technicians show the control console in the control room at the VOA relay station in Tangier.

With several transmitters operating at once, it can be difficult to quickly determine which one has triggered the alarm. Consequently, a warning light system is being designed at the station. Each transmitter will have its own set of lights. When a fault develops, the staff will be able to identify the problem transmitter immediately.

The development of this warning system is typical of the expertise and self-sufficiency of the staff. Equipment faults are traced to the component level and repaired on the site. Shipping equipment out for repair means excessive time lost. However, repairing equipment on-site requires that a complete store of all possible components and materials be kept on hand. The warehouse is a homebrewer's dream come true.

Not only does the pi-network effect an impedance match and detect faults, it also acts as an rf filter to reduce the harmonics from the transmitters by 80 dB.

While most of us don't think twice before turning off receivers or transmitters, at the transmitter site in Tangier even disconnecting the tube filaments has to be weighed carefully. Because of the cost (in reduced tube life) every time the filaments are turned off and on, the filaments remain energized unless the transmitter is to be out of operation for more than six hours.



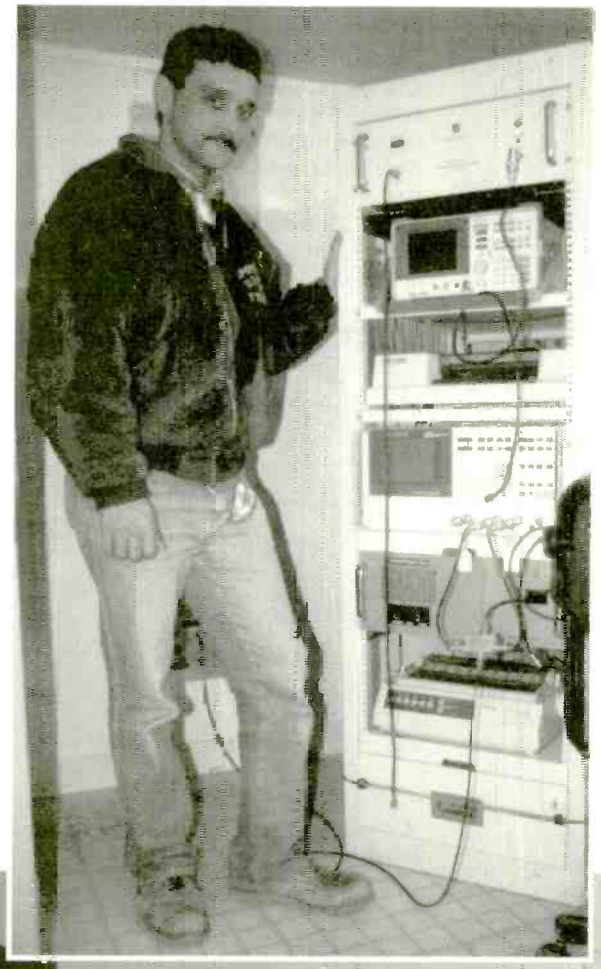
At the heart of each 500-kW transmitter is a Thompson TH-55A tube. The water-cooled tube has 30,000 volts on the plate so the cooling water must have high resistance.

Each of the ten transmitters is capable of AM and sideband operation. The station even broadcast to Europe in stereo in May 1994. It was only the second stereo transmission broadcast by VOA. A stereo broadcast had taken place a year earlier at VOA's Bethany facility. For those transmissions, one sideband acted as the left channel, while the other sideband acted as the right channel.

To many shortwave listeners, an AM transmission simply means that the transmitter generates a carrier signal at a frequency within a shortwave band and then an audio signal modulates the carrier. Well, it seems that life in the shortwave bands is not quite that simple.

VOA transmitters broadcast DAM (dynamic AM) signals. In this system, the transmitter power is low during periods of no modulation. A 500-kW transmitter produces a 100-kW carrier with no modulation. The modulating signal not only adds power to the sidebands, it also controls the level of the carrier. As the modulation level increases, the carrier output increases. At 100 percent modulation, the carrier will reach the full 500-kW level.

At the Tangier relay station, use of DAM means a 40 percent saving in power consumption for each transmitter! For listeners, there is no difference between a standard AM signal where the carrier remains at maximum and a DAM signal. During the visit, Wilfred Cooper pointed out that "much of the advancement in broadcast technology is driven



Inside the antenna test van is all the equipment needed to run the mobile unit out to the antenna site and do diagnostic work.

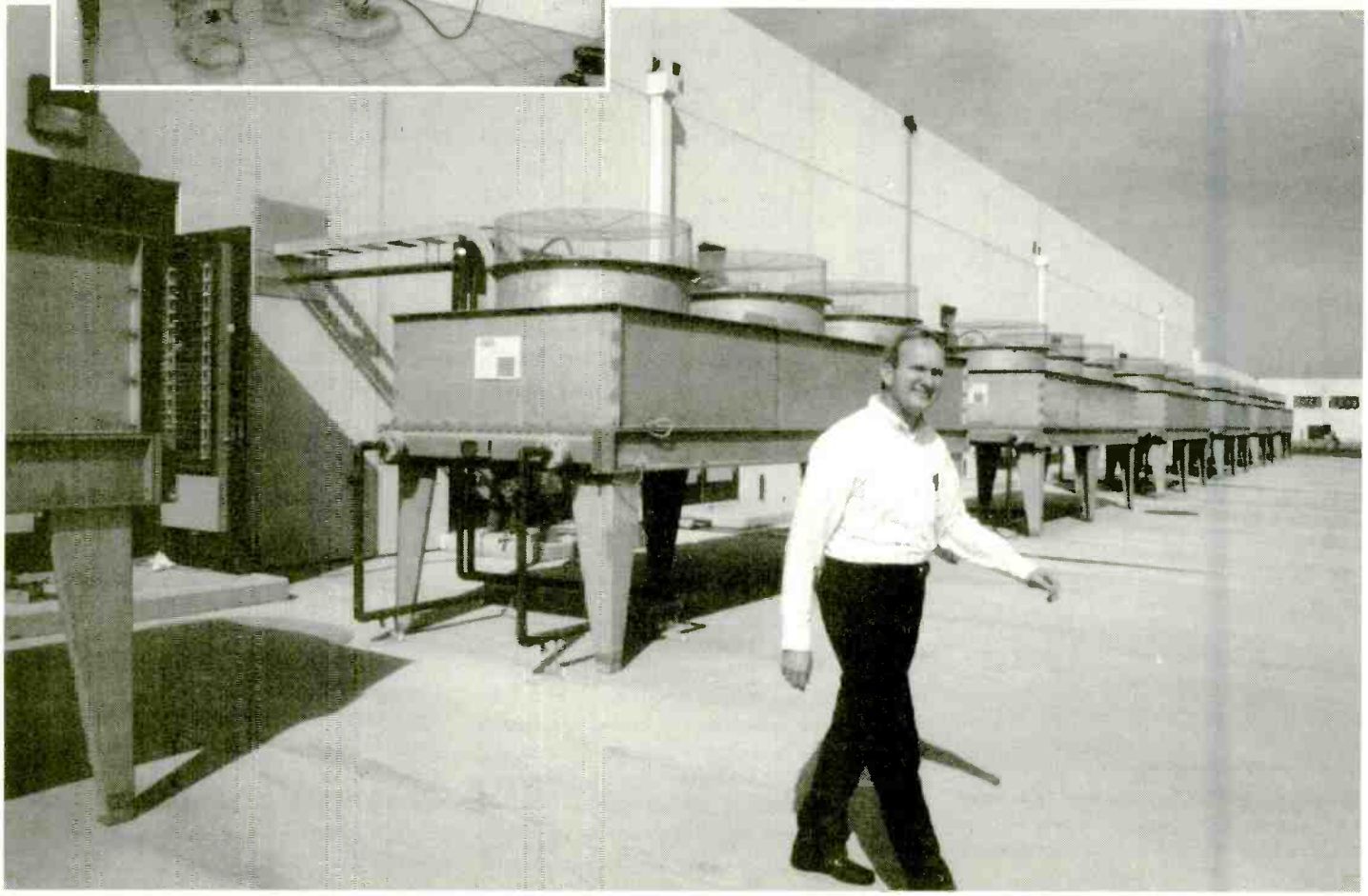
The heat exchangers that dissipate the heat in the water running through the final power amplifiers must be located outside the building. Twelve heat exchangers are needed for the ten transmitters and two dummy loads. Shown here is VOA Relay Station Manager Wilfred Cooper.

by research and development of shortwave transmitters." MW stations now also use DAM transmitters.

Feeding the Antennas

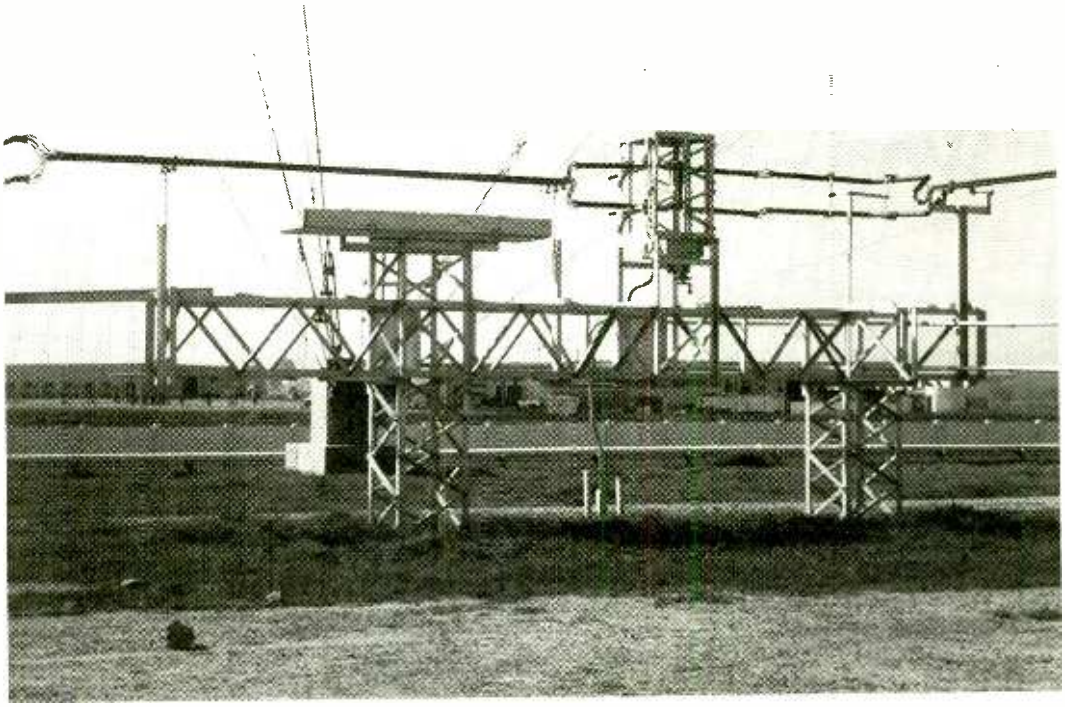
Like everything else, the antenna feedline is gigantic. The only resemblance to RG-58 is that the VOA's feedline is 50 ohms, it's round, and the outer jacket is black. Beyond that you could easily confuse the coax for large heating ducts running along the ceiling. A combination of rigid and semi-rigid coax is used. Outdoors, close to the antennas, baluns match the 50-ohm coax to 300-ohm open-wire (actually, it's copper pipe) feedline. In total, there are 11 miles of transmission line at the site.

Each transmitter can feed any of the 21 high frequency curtain antennas. The antennas are located in four groups facing different directions allowing transmission to Europe, Russia, the former Yugoslavia, the Middle East, and Africa. The curtains are strung between towers up to 450 feet high. The curtains have a gain of 24 dB and the beam can be slewed up to 24 degrees. The take-off angle can be adjusted to accommodate the



distance to the target area. Before the antennas were installed, the impact on the signal of nearby mountains had to be assessed. Fortunately, the effect turns out to be less than 1 dB loss.

Wilfred Cooper noted that "there is a lot of new technology in antennas and towers." The aerospace industry has benefited shortwave installations. Materials developed for aerospace technology reduce the weight of towers while maintaining the required strength. Hardware that feels as light as a feather has replaced heavy, bulky nuts and bolts.



The thick horizontal lines running across this photo are lines—transmission lines—connecting the transmitters to the antennas. The rectangular box just below the lines houses the pickup-up for the SWR bridge (directional coupler in technical parlance).

■ Programming Goes Hi-Tech

In addition to the curtain antennas, the installation has two parabolic dishes—one for Intel SAT's AOR (Atlantic Ocean Relay) and one for IOR (Indian Ocean Relay). The station receives VOA programs via the satellite with the primary link through the AOR while the IOR functions as a backup. Should the satellite link fail, the station can receive programs by microwave telephone circuits or directly from the other VOA stations using two sloping Vee receiving antennas.

A mobile antenna test van can be driven out to the antenna site and used for tests and maintenance.

While the station can be manually operated—transmitters turned on and off at appropriate times, correct frequency selected, correct antenna connected, antenna slewed and take-off angle chosen as necessary, and scheduled program run—the station is set up for computer operation. The local operations controller (LOC) can automatically control and monitor all aspects of broadcast operations. The LOC consists of a control computer with interconnecting local area networks and remote terminal units for interfacing to the controlled and monitored equipment.

In addition, the system includes a packet switch for communications with the world operations controller (WOC). Staff at the Tangier relay station schedule the transmitters, antennas, and programs and then forward the information to Washington where the WOC is located. The WOC is then programmed to control and monitor the Tangier relay station. The WOC is capable of controlling, monitoring, and integrating the operations of all VOA relay stations.

As receivers get smaller and more sensitive, shortwave signals seem to be getting stronger and easier to hear. The improvement is due to a great extent to the use by broadcasters of relay stations such as VOA's facility in Tangier. But there's another side benefit: while hearing an American station once meant listening to a station located in the U.S., now you can log VOA relay stations all over the world. Sometimes these relays are in countries that you otherwise could not log. How many of VOA's relay stations can you log?

Larry Van Horn, N5FPW

What's the meaning behind the messages?

I can't tell you how many times people have called me at the office here in Brasstown saying, "I just heard this really long, encrypted message broadcast on 11175 kHz. What's going on, Larry? Are we at war?"

My reply to the caller is usually, "Nothing is going on my friend; It's business as usual on the GHFS—just another routine EAM." Gee whiz, how did Larry know that?

One of the fun parts of the utility listening hobby is learning to use the little details heard during a transmission on a given frequency to build onto one's knowledge about a particular communications system.

A lot of people have asked me in years past, "Why do you spend so much time investigating utility communications systems in such depth? It seems like such a waste of time."

The answer is really quite simple—you listen to learn what is ordinary so that you can spot the extraordinary or unusual. You won't be a very effective listener of a particular radio system, even if you have all the frequencies/designators, if you haven't spent some time monitoring the normal, routine, day-to-day traffic on that system's frequencies. Even after listening to the Global HF System (GHFS) primary frequency—11175 kHz—on an almost daily basis over the last two years, I still hear new and interesting tidbits of information every day. A huge frequency list with channel designators won't do you any good if you don't monitor the traffic broadcast on those frequencies.

What's all this have to do with long cryptic messages on 11175 kHz? One of the funniest radio hobby stories I have ever read was recently published in a newsletter put out by a military monitoring hobby expert. This young man had a hot story that he was trying to connect to on-the-air events that had been monitored on HF military frequencies. One key event noted in the story was the transmission of a lengthy emergency action message (EAM) on the global high frequency system (GHFS). As part of this discussion he attempted to describe the format of an EAM, but in doing so he mixed the message content of the EAM with that of a Foxtrot message, also broadcast on the GHFS.

If the author of the story had spent some time monitoring GHFS frequencies, he would have known that these cryptic broadcasts (EAM and Foxtrot messages) are two entirely separate messages. Needless to say, that made the entire contents of the story somewhat less than convincing to this reader. I also think it confused many other readers and led to a lot of the calls I got around that time.

Long, variable character EAMs are heard on an infrequent basis on GHFS and strategic command and control system (SCACS) frequencies. These EAMs usually have a character count from 35 to 80 characters long. Occasionally, we do hear multi-hundred character counts. The 500+ character EAM broadcast on April 19 of this year is the current record holder. To the best of our knowledge, no significant real world events occurred on April 19, 1995. In fact, the only significant thing that happened on that day was a major strategic command communications exercise. In fact, it seems that almost every time I hear one of these multi-hundred count EAMs, the military seems to be doing some sort of exercise.

My advice: if you hear a long, variable character EAM transmitted on the GHFS, do not assume we have gone to war, are about to go to war, or that something of worldwide importance has happened. Listen carefully to the traffic surrounding the EAM broadcast. I do believe if we ever have a major event, there won't be any doubt in your mind that something has happened.

The following information on the Nightwatch nets is an excellent example of how productive extensive listening can be. All the information has been gathered from listening to communications transmitted on the GHFS and strategic command and control system (SCACS) radio networks.

The whole airborne command post system is still in a state of flux. As we learn new information, we will pass it along here in the Utility World column. If you have anything you would like to add to the Nightwatch discussion, I would like to hear from you at our address, Utility World, P.O. Box 98, Brasstown, NC 28902-0098.

■ Navy TACAMO Aircraft Will Assume 'Looking Glass' Missions

The Department of Defense (DoD) has announced plans to modify its fleet of U.S. Navy E-6A TACAMO aircraft, starting in August 1996, to take over the Looking Glass airborne command post mission from the U.S. Air Force. Modifications to all 16 aircraft are expected to be complete in 1998. These modifications will displace the Air Force EC-135 aircraft now fulfilling the airborne command post role.

TACAMO (Take Charge and Move Out) aircraft were originally developed to provide a communications link between the national command authorities (NCA) and the U.S. Navy's fleet of submarines armed with nuclear missiles.

It is widely believed that in June of 1992 when USSTRATCOM (U.S. Strategic Command) stood up and the Strategic Air Command (SAC) was decommissioned, the mission of the Navy's TACAMO aircraft changed. This 16-aircraft E-6A fleet now provides strategic command and control functions for the entire nuclear triad of submarines, bombers, and land-based missiles.

A little over a year ago, DoD officials decided to upgrade the TACAMO aircraft to also handle the Airborne National Command Post (ABNCP) mission that had been the function of the Air Force EC-135 aircraft. At present, the Air Force has left in service only seven of the highly specialized EC-135 Looking Glass aircraft that are used to control all of the U.S. strategic nuclear forces. The fate of these aircraft is still undetermined at press time, according to officials in the Pentagon.

Since 1989, the Navy has operated two squadrons of TACAMO aircraft, which are based on Boeing E-3A/707 airframes. In 1992, the Navy started consolidating its six TACAMO operating locations into a single air wing based at Tinker Air Force Base, Oklahoma. This new unit is called Strategic Communications Wing ONE, and it now oversees all 16 TACAMO aircraft, their crews, and maintenance personnel.

E-6A aircraft are capable of speeds up to Mach 0.88. They have a 6,600 nautical mile unrefueled range and can stay airborne up to 72 hours if refueled in-flight and with an augment crew onboard.

Some of the modifications that will be performed to the E-6A aircraft that will allow them to fulfill their new ABNCP role include:

- An Airborne Launch Control System (ALCS), to determine the in-silo status of Peacekeeper and Minuteman missiles, launch them, or change their target assignments. The ALCS equipment was removed from the EC-135 aircraft before they were mothballed.
- Three UHF transceivers capable of 1,000 watts each with full-duplex amplitude- or frequency-modulated transmissions. These transceivers are used for the post attack command and control system (PACCS) and is a key UHF command and control system.
- A MILSTAR Airborne Terminal System that provides high-priority EHF/SHF/UHF data communications via the survivable MILSTAR satellite system.
- An upgrade of these aircraft's UHF military satellite communications system that will be more reliable and supportable.
- A high power transmitter to improve the reliability of low-frequency transmissions.

As previously noted, some utility monitors have been following the subtle changes being made to the World-Wide Airborne National Command Post (WWABNCP) system since early last year. Ute World regular Jeff Haverlah has posted quite a few messages on the Grove BBS documenting these changes based on intensive listening to the Nightwatch networks. What follows is a summary of the information that he has accumulated.

The Nightwatch Call

Nightwatch 01 is the most common callsign heard on the nets. The aircraft seems to be active 24 hours a day, even when apparently on the ground. Other units on the Nightwatch nets can be heard placing phone patches to Nightwatch 01, usually to the 939 DSN (Defense Switching Network) telephone prefix. This callsign was originally believed to be the EC-135 Looking Glass aircraft; however, twice last year during active Nightwatch net periods, Nightwatch 01 was described by one of the net participants as the "kneecap" (an E-4B NEACP-National Emergency Airborne Command Post aircraft).

U.S. Air Force communications enthusiast Tim Tyler recently posted a very authoritative piece on the Internet WUN newsgroup regarding the possible identity of the Nightwatch callsigns. Tim believes that these callsigns represent the four E-4B NEACP (now called NAOC or National Airborne Operation Centers) aircraft. His arguments are certainly compelling and this could very well be the case. There is still some evidence to the contrary, however, so, in the absence of hard evidence, the jury is still out on whether Nightwatch 01-04 are E-4B NAOC aircraft or some other military command post aircraft.

Daily Tactical Callsigns

Tactical callsigns on the Nightwatch nets usually consist of 8-letters, although a few 7- and 9-letter calls have been monitored. On rare occasions 6-letter calls have been heard and, less often, 5-letter tactical calls. There have even been occasions when 10- to 12-letter calls have been heard, but nothing larger.

One of the participants of the Nightwatch nets, using a daily tactical call, initiates the EAM into the nets. It appears to be the same station each day using a different callsign. The operator is almost always male (female operators have only been heard twice in the last 12 months). Sometimes this station comes up on frequency with the 'growl' of a transmitter tuneup device (indicative of an aircraft), but for the most part this station just pops up on the nets. It wouldn't surprise me to learn that this station is the National Military Command Center in the Pentagon.

The Alternate National Military Command Center (Site R) at Raven Rock, Pennsylvania, near Fort Ritchie, Maryland, callsign WAR46, is a regular participant on the Nightwatch nets. They normally check in to the net at the top of the hour and around 40 minutes past the hour with Nightwatch 01 only. Other than this, WAR46 doesn't appear to take an active part in the Nightwatch nets.

FEMA stations are very rare participants in these Nightwatch nets. WGY 912 has been heard during exercises, providing phone patches to other WGY stations for net participants. Another FEMA station that has been heard is WGY 913. This station, believed to be located at Winchester, Virginia, was heard once participating in a Nightwatch net through a phone patch from WGY 912. During this period the station used the call sign Doolittle before 0000 UTC, and Fastball after 0000 UTC.

Most of the tactical callsigns heard on the Nightwatch nets are TACAMOs. We can deduce this by the distinctive U.S. Navy communications procedures used by the radio operators. They have also spent a lot of time calling STRATCOM Wing One (Strategic Command Wing One) at Tinker Air Force Base, Oklahoma, using the 339 DSN prefix. The personnel being called at Strat Wing One also use tactical callsigns. We have also heard these same aircraft placing DSN calls to Naval Air Station Patuxent River in Maryland. One of the Navy's TACAMO squadrons (VQ-4) used to be based there.

Nightwatch Net Frequencies

Nightwatch nets are almost always active on one of the strategic command and control system frequencies. Stations on the SCACS nets normally have primary and secondary frequencies assigned for net use, but lately, they have been noted using a primary and two secondary frequencies.

These stations have been heard on frequencies other than SCACS or GHFS networks, including those of the Federal Emergency Management Agency (FEMA) and Department of Energy (DoE). Most of the time, however, you will find the Nightwatch nets on the following frequencies:

P-381 (5700) X-903 (6730) X-904 (9017) X-905(11226)

Another very common frequency for Nightwatch activity is the old SAC Alpha channel 11244 kHz (ex-11243 kHz). The lower frequencies seem to be in use for several hours after local sunrise here in the eastern part of the U.S. Sometimes it's not until midday or later that the net will start moving upward in frequency.

Nightwatch Net Activity

If you monitor the Nightwatch nets for any length of time, you will notice that most days are relatively quiet. If you hear a lot of activity on these nets then you can assume that the U.S. military is probably conducting some sort of exercise. During these active periods, expect to hear quite a few EAMs and Foxtrot messages broadcast on the SCACS and GHFS networks.

Jeff Haverlah has posted three excellent outlines on the Grove BBS that cover EAMs, Foxtrot messages, and Nightwatch nets. If you haven't visited the BBS lately, stop by conference 10 for these important military monitoring guides. We'll have a list of SCACS frequencies for you next month.

As most of you are probably aware, next month is the annual Grove Communications Expo in Atlanta. If you are serious about learning more about the hobby, then you owe it to yourself to attend this event. Get on the phone right now and make sure you are registered!

Now it's time to see what you have been hearing this month in the world of utility communications.

Utility Loggings

Larry Van Horn

UTILITY WORLD

Abbreviations used in this column

AFB	Air Force Base	MFA	Ministry of Foreign Affairs
AM	Amplitude Modulation	MHz	Megahertz
ARQ	Synchronous transmission and automatic repetition teleprinter system	MDD	Ministry of Defense
		M/V	Motor Vessel
		NORAD	North American Aerospace Defense Command
ARQ-E	Single-channel ARQ teleprinter system	NW	Nightwatch
		Packet	Teleprinter system commonly used by amateur radio operators
ARQ-E3	Single-channel ARQ teleprinter system		
ARQ-M2	Multiplex ARQ teleprinter system with two data channels	POL-ARQ	Polish diplomatic ARQ teleprinter system
		ROU-FEC	Romanian diplomatic version of the FEC teleprinter system
ARW	Air Refueling Wing		
Canforce	Canadian Forces		
Comms	Communications	RTTY	Radioteletype
CW	Continuous Wave	SAM	Special Air Mission
EAM	Emergency Action Message	SCACS	Strategic Command and Control System
FAA	Federal Aviation Administration	Selscan	Selective scan
		SITOR-A	Simplex teleprinting over radio system, mode A
FAF	French Air Force		
Fax	Facsimile	SITOR-B	Simplex teleprinting over radio system, mode B
FEC	Forward Error Correction		
		SOCC	Sector Operations Control Center
FEC-A	One-way traffic FEC teleprinter system	SWBC	Shortwave Broadcast
		Tanjug	Telegrafska Agencija Nove Jugoslavija
FF	French Forces		
GHFS	Global HF System		
HF	High Frequency	Unid	Unidentified
LDOC	Long Distance Operational Control	U.S.	United States
		USAF	U.S. Air Force
MARS	Military Affiliate Radio System	USB	Upper Sideband
		USN	U.S. Navy
Meteo/Meteo	Meteorology	WFM	Wideband Frequency Modulation

All frequencies in kilohertz (kHz), all times in UTC. All voice transmissions in English and USB unless otherwise noted.

2357.7 OUA32-Danish Naval Radio, Stevns, with V CW marker at 2343. (Ary Boender-Netherlands)

2474.0 PBC-Dutch Navy Goeree Island, Netherlands, with 75 baud RTTY channel checks at 1740. (Dman-UK)

2893.0 MTO-Royal Navy Rosyth, Scotland, with 75 baud RTTY channel checks at 1659. (Dman-UK)

3064.0 Unid station KDPO with 5-letter groups in CW at 2215. (Boender-Neth)

3067.0 Unid station NT7R working GR1D with coded CW messages at 2130. E68W working 5USW with CW traffic at 2135. (Boender-Neth)

3282.0 Unid station LHMO working 5OEM with 5-letter CW groups at 2200. (Boender-Neth)

3390.0 MGJ-Royal Navy Glasgow, Scotland, with 75 baud RTTY transmissions at 1707. (Dman-UK)

3693.2 RFLI-FF Fort de France, Martinique, (IGE) to St. Jean Du Maroni using ARQ-E at 0100, recently upgraded to 192 baud. (Fred Hetherington-Drmond Beach, FL)

3824.0 German female 5-digit number station (Swedish Rapsody) in AM at 2300 (Wednesday). (Boender-Neth)

3831.0 Unid station V58J working HJ9U with CW traffic at 2245. (Boender-Neth)

3832.0 FDC-FAF Metz, France, with V CW marker at 2245. (Boender-Neth)

4050.0 Mice 51 at 0241 calling Mice 96, no joy. (Rick Baker-Austintown, OH)

4540.0 SZVY-M/V *Ionian Wind* working Boulogne Radio in CW at 2155. (Robin Hood-UK)

4601.0 Unid station RGC7 working Z4C5 on 4602.5 with CW at 2315. (Boender-Neth)

4602.5 Unid station ESUP sending "VVV XXXXXX ESUP ESUP 06365 Barwinok 570" repeated 3 times in CW at 2210. 5E9S working many stations with 5-letter groups at 2232. (Boender-Neth)

4739.0 RAF Volmet broadcast heard several times. New frequency replaces 4722. (Hood-UK)

4742.0 Nightwatch at 1121 working WAR46 with communications checks. (Baker-OH)

4780.0 KFA2-Israeli Mossad number station from 0200-0220. (Ed Rausch-Cedar Grove, NJ)

5097.4 CFH-Canforce Halifax, NS, Canada, with 75 baud RTTY traffic at 1100. (Hetherington-FL)

5255.0 Unid station UBVV calling Q550 with 50 baud RTTY RYs then encrypted traffic at 1640. (Dman-UK)

5267.0 RFFA-MOD Paris, France, with ARQ-E transmission at 1715. (Dman-UK)

5303.5 D06 working T06, "wait for 2406 to feed ARCOM for party line." F45 working I45...percent complete at Fairhaven." Very strong, Army Corps of Engineers at Fairhaven, NY? (Harry Riddell-Rochester, NY) *I believe this is a army reserve channel rather than ACOE-Larry.*

5359.5 W73 working W45, Ratrig/Ratvan/NCS mentioned at 1410. Also heard administrative messages passed from Sgt to Sgt. (Riddell-NY) *Another U.S. Army frequency pops up on the air-Larry.*

5371.0 CIA-Unid station with msg for 568 in AM at 2100. (Boender-Neth) *Ary is this a Mossad station?-Larry.*

5419.0 Spanish female 5-digit number station in AM at 0700 (Sunday/Monday UTC). (Tom Mazanec-Maple Heights, OH)

5456.7 RFHJ-FF Papeete, Tahiti, with ARQ-E3 traffic ro RFLI-Fort de France at 1000. (Hetherington-FL)

5687.0 Wise 81 working Plantation (Hurlburt), both very strong here discussing cancelled fueling of Cowbow 22 at 0140. (Jeff Haverlah-Houston, TX)

5710.0 SAM 29000 working Andrews (Mystic Star) at 0050. (Baker-OH)

5711.0 DoD Cape at 1909 working King 1 for shuttle launch. (Baker-OH)

6287.5 ORJH-Belgian Naval vessel *Godetia* working OSN-Ostend Naval Radio in CW at 0745. (Hood-UK)

6382.2 EAD2-Madrid Radio, Spain, with CW marker at 0224. (Sue Wilden-Columbus, IN)

6442.4 FUM-French Navy, Papeete, Tahiti, with 72 baud RTTY test tape at 1610. (Robert Hall-Capetown, RSA)

6462.1 FUM-French Navy Papeete, Tahiti, with 75 baud RTTY RYs at 0950. (Hetherington-FL)

6502.0 TBB6-Turkish Naval Radio, Anakara, Turkey, with extensive CW marker at 0050. (Roger Parmenter-Cape Cod, MA)

6730.0 NW01 working Admirable here and on 5700 (S-381) passing 'traffic' — a 26 character EAM at 0448. (Haverlah-TX)

6734.0 Portishead LDOC working Speedbird 2740 at 1828, moved to 5610 due to bad conditions. (Boender-Neth)

6735.0 Mike calling India on the USN Foxtrot Tango net at 0429. Mike had what sounded like a Dutch accent. (Haverlah-TX)

6739.0 Offutt GHFS with a 339 character EAM — Preamble SLVQCK at 0056. MacDill and others with a 197 character EAM — Preamble SLVCKA at 0322. Sentry 34 working Lajes GHFS looking for working frequencies for Croughton GHFS at 0512. The frequencies given out by Lajes were 6739, 11175, and 8992. (Haverlah-TX)

6750.0 Foxtrot Tango working Golf at 0308. (Haverlah-TX)

6751.0 Sidecar working V9A at 2109, having problems with data link setup. (Baker-OH)

6754.0 VXA-Edmonton military, Alberta, Canada, at 0525 with weather broadcast. (Baker-OH)

6761.0 Whiteman AFB radio maintenance at 0216 for a radio check, no response. Mash 84 (KC-135 tanker) working Mash Control (305th ARW, Grissom AFB, IN) at 0217. Heard Mash 84 just prior to HF comms on 252.1 MHz in refueling ops. (J.L. Metcalfe-KY)

6762.5 Aeronautical weather at 0230. British or Canadian? (Metcalfe-KY) *Not really sure, I haven't heard this one before and and my last listing for this one in my database was 11/93. 66/75 ID'ed this frequency as Papa Kilo-Larry.*

6786.0 Spanish female 5-digit number station in AM at 0700 (Wednesday), 0500 (Thursday) and 0800 (Friday). (Mazanec-OH)

6814.0 English female 5-digit number station in AM at 1917 (Monday). (Wilden-IN)

6829.0 Spanish female 5-digit number station in AM at 0400 (Monday). (Don Storck-Hemlock, MI)

6830.0 Andrews (Mystic Star) working SAM 300 and SAM 200 with phone patch traffic at 1320 and 1500 respectively. (Storck-MI)

6835.0 Repairman 67 working unid station. Results of various test performed on presumed new USN ship at 1308. (Riddell-NY)

6993.0 Andrews (Mystic Star) working Air Force Two at 0110. (Haverlah-TX)

7635.0 Shark 19 working Barracuda 04 with position/speed contact information then into Spanish with switch to possible "Canal Seis" at 1215. Heard again next day with call signs 17/19. (Riddell-NY) *Doesn't sound like the CAP to me, Harry-Larry.*

7643.3 RFLIRT-Cayenne, French Guiana, with ARQ-E3 (RTI) to RFLI at 0130. Used to be ARQ-E. (Hetherington-FL)

7646.0 DDH7-Hamburg, Germany, with 50 baud RTTY weather broadcast at 1702. (Dman-UK)

7765.0 Clearance 1 at 1824 working DoD Cape working shuttle launch. (Baker-OH)

7801.0 Nightstar 1 and 2 changed to Delta 4/5 after 1200. Other weak stations heard, RTTY test. (Riddell-NY) *I believe this is an Air Force channel, unknown use-Larry.* 9BC22-IRNA Teheran, Iran, with 50 baud RTTY English news bulletins at 1655. (Dman-UK)

7827.0 FAA-type selscan heard here in USB or 7830 in LSB at 0244. (Metcalfe-KY) *The only thing I show is SCACS W-105 on 7831-Larry.*

7862.0 Spanish female 5-digit number station in AM at 0300 (Saturday). (Mazanec-OH)

8050.2 RFQP-FF Jibouti apparently having difficulty in conversion from ARQ-M2 to ARQ-E3. Unable to snyc either mode. (Hetherington-FL)

8127.0 Israeli Forces Radio 'Galei Zahal' with USB broadcast for Israeli military forces at 2315. (Boender-Neth)

8136.0 Spanish female 5-digit number station in AM at 0500 (Sunday). (Mazanec-OH)

8178.0 P7X with 5-letter groups (120 groups) in CW at 1430. Group heading was "QRA DE P7X IIPII 101430Z GR120 BT" P7X operates here quite often. (Metcalfe-KY)

8356.5 IBJE-M/V *Tuscania* working UUI-Odessa Radio in CW at 0747 in English. (Hood-UK)

8367.0 FBQA-French aircraft carrier Foch calling St. Lys Radio several times in CW, but didn't seem to get a reply at 0750. (Hood-UK)

8473.5 WLO-Mobile Radio, AL, with CW marker at 0632. (Wilden-IN)

8570.0 WNU43-Slidell radio, LA, with CW marker at 1931. (Wilden-IN)

8968.0 Sidecar working various units at 0551. (Haverlah-TX) *Callsign confirmed as Canadian NORAD Region, Eastern SOCC by Canadian NORAD officials during our recent trip to Cheyenne Mountain-Larry.*

9013.0 Chalice Alpha working Trenton military with a phone patch to Raymond 24 (Tinker AFB) Radar Maintenance at 2246. (Haverlah-TX) Sidecar working 7MS with Link 11 voice coordination net at 0501. (Baker-OH)

9016.0 McClellan GHFS working MacDill GHFS at 0452. (Haverlah-TX) Sailsmith with a test call, "when your command is called, answer with audibity of the conference." Then called Pacific, Satcom, Ucom, Nightwatch, Atlantic, and Special Operations. Replies not heard. Then MacDill worked McClellan; again a mention of the conference at 1950. (Riddell-NY)

9017.0 NW01 working WAR46 and Washtub working Protrude at 1503. Question was asked between the tactical calls which crypto they were using, USN or USAF; answer was USAF. Lifebouy working NW01 for data check, but NW01 begs off because he is working on higher precedence traffic at 0527. (Haverlah-TX) NW01 calling Mandatory at 2120 about a wide band transmission. NW01 up at the same time on 230.650 MHz WFM with a very strong signal. Identified on WFM as 01. WFM signal dropped at 2150. (Metcalfe-KY)

9043.0 Ft. Bragg Metro working Dragon Metro, Victory Metro, then electronic comms followed at 1250. Mention of mode 1/3. (Riddell-NY)

9057.0 Ballpark working Errand Boy, and Rasputin working NW01 here and on 6730. They also tried frequency W-102, but were unsuccessful at 1708. (Haverlah-TX) Joint Star 02 working NW01 at 1930 for comm check. (Riddell-NY)

9320.0 SAM 677 working Andrews (Mystic Star) at 0304. Who is 677? (Haverlah-TX) German female 5-digit number station at 2100. (Rausch-NJ)

10001.3 MacDill GHFS with an EAM message at 2118. Could a frequency this accurate be a punch up error? (Rausch-NJ) *Most USAF aircraft have WWV 10 MHz as a preset in their HF radios so I guess anything is possible, but bizarre-Larry.*

10045.9 4XZ-Israeli Navy, Haifa, with V CW marker at 1734. (Hall-RSA)

10393.7 RFFVA-FF Paris, France, with ARQ-E3 traffic to RFFVAT at 2100. Recently changed from ARQ-M2. (Hetherington-FL)

10470.2 RFFA-FF Paris using ARQ-E3 (FDX) to RFFVAE at 2148. Used to be ARQ-M2. (Hetherington-FL)

10780.0 King 64 at 1834 working Cape Radio for radio check. (Baker-OH)

10815.7 AAA6USA-U.S. Army MARS station, Ft. Sam Houston, TX, and AAA3USA-Ft. Meade, MD, using packet mode. May be a BBS operation. (Metcalfe-KY)

11034.8 Egyptian Embassy, Amman, Jordan, with SITOR-A Arabic traffic at 1620. (Hall-RSA)

11059.0 Andrews working SAM 26000 here and on 6730 with various phone patches at 0112. (Haverlah-TX)

11125.3 Jeddah Meteo, Saudi Arabia, with 100 baud RTTY weather codes at 1550. (Hall-RSA)

11175.0 Offutt GHFS with "Enlist, Enlist, Request you echo the following" — Foxtrot message "GLO time 49 authentication JV." Like the Fairley broadcast, no echo of the message noted at 2149. Look 80 working NW01 through a MacDill phone patch, trying to work Seymour Johnson by "burning" RF17. He told the ground party he could burn RF1 through RF10 and 17. He was asked if he could burn RF24 and the reply was no, at 1833. (Haverlah-TX) Paccom 01 working McClellan/Hickam GHFS. Moved to 11181 discrete. During flight was advised that Sierra Pete is no longer in service, that Big Foot had assumed control. (Roop-CA) *This is true. NORAD has combined both western SOCCs into one with McChord staying open-Larry.*

11178.0 Architect-RAF weather VOLMET now on this frequency (ex-11200). Noted at 0533 and this should be a good propagation indicator for Europe when listening to 11175. (Haverlah-TX) Noted same at 1436. (Hood-UK) NN363-possible Dutch Navy at 0152 calling P2E, no joy. (Baker-OH)

11181.0 Hickam GHFS working McClellan GHFS in voice and data at 0446. (Haverlah-TX)

11214.0 SAM 203 working Andrews (Mystic Star) at 2236. (Baker-OH)

11217.0 NASA-2 talking with NASA-832 (NASA SR-71 aircraft) at 1636. 832 said he was going subsonic south of Boise. (Rick Roop-Sacramento, CA) *In the future also check 6712 and 9023 for NASA SR-71 activity, according to Rick Baker at WUN-Larry.*

11226.5 Link 11 data transmission noted here at 0517. (Haverlah-TX)

11229.0 NW01 working Parsonage with EAMs, etc at 0116. (Haverlah-TX)

11244.0 Washtub working Offutt GHFS with phone patch to common 339-3944 (Station ID'ed as Neon Gas) looking for TACAMO Ops at 1914. Offutt GHFS calling and working NW03 at 1657. NW03 wants a phone patch to NW01 (DSN 939-1857). Offutt GHFS also called Generic. Pinon 99 (muffled and heavy whine in background) working MacDill GHFS with various phone patches. Three hours out of Beale AFB. (Haverlah-TX) Mice 51 at 0238 working McClellan GHFS with phone patch to Victor Ops requesting status of tanker Mice 96. Requested frequency, advised 4050.0, said 96 was up on that frequency. (Baker-OH)

11450.3 RDD77-Moscow Meteo, Russia, with 50 baud RTTY weather codes. (Hall-RSA)

11466.0 Very active Mystic Star net with SAM 26000, AF1/SAM 29000, AF2, SAM 677, SAM 970 and SAM 403 on frequencies such as 11466, 11460, 11220, 8026, 6993, 6830, and 6717 at various times. (Haverlah-TX)

12067.0 Wolfman and Venom 21 concerning primary air control frequencies for a weekend exercise. Also heard Cougar 24 and Venom 01-04/11/22/30 in net over several days. May have passed 10133.0 as an alternate, but nothing heard there. (Metcalfe-KY) *Interesting, I show nothing for 10133 and the Army on 12068.5-Larry.*

12136.0 Unid station with 5-number groups in CW at 1400. (Metcalfe-KY)

12212.7 YZI234-Tanjug, Belgrade, Serbia, with 50 baud RTTY French news bulletin at 1707. (Hall-RSA)

12469.8 690SB with quick brown fox, counting and RY SG test tape using 100 baud RTTY at 0047. (Metcalfe-KY)

12569.0 KYJI-Fishing vessel *Okainiai* working LYL-Klaipeda Harbour Radio using 50 baud RTTY at 1012. (Hood-UK)

12664.5 FUM-French Navy Papeete, Tahiti, with 75 baud RTTY RYs at 1250. (Hetherington-FL)

12806.0 NKW-USN Diego Garcia, with fax chart at 1452. (Hall-RSA)

13242.0 Hickam GHFS with an all frequency request for Paccom 01 at 0326. Note the frequency. (Haverlah-TX) *Yes sir, one of the new OR bandplan frequencies-Larry.*

13341.8 MFA Cairo, Egypt, with SITOR-A Arabic traffic at 1515. (Hall-RSA)

13339.0 Jeddah LDOC, Saudi Arabia, working Saudi 532 at 1459. (Hood-UK)

13372.0 5YD-Nairobi, Kenya, with 50 baud RTTY test tape at 1625. (Dman-UK)

13375.0 English female 5-digit number station (Lincolnshire Poacher) at 1630 and 1700. (Rausch-NJ)

13480.0 RPTI-Portuguese Naval Radio with foxes/RY test tape using 50 baud RTTY at 1506. (Hood-UK)

13500.3 V5G-MFA Bucharest, Bulgaria, with ROU-FEC transmissions at 1655. (Hetherington-FL)

13521.0 MFA Warsaw, Poland, requesting unid station to move to 11125. That station sent a 5-digit group message on that frequency. All in 100 baud POL-ARQ at 1628. (Hood-UK)

14476.0 DDH8-Hamburg, Germany, with 50 baud RTTY weather transmission at 1720. (Dman-UK)

14502.0 MFA Cairo, Egypt, with SITOR-A message in Arabic at 1727. (Dman-UK)

14665.0 SPW-Warsaw, Poland, with SITOR-B traffic list at 1300. (Dman-UK)

14846.7 Zaire Banking Circuit with 48 baud RTTY transmission at 1150. (Hall-RSA)

14926.9 RFTJ-FF Dakar, Senegal, with idling ARQ-E3 signal at 1158. (Hall-RSA)

14975.5 P6Z-MFA Paris, France, with idling FEC-A transmission at 1617. (Hall-RSA)

15016.0 McClellan GHFS working Fairchild Mobile at 2040. (Gordon Levine-Anaheim, CA)

15043.0 MacDill working Geranium in voice and data on this frequency and 13242.0 at 1607. (Haverlah-TX)

15043.6 MFA Cairo, Egypt, with SITOR-A Arabic traffic at 1636. (Hall-RSA)

15673.1 UMS-Moscow, Russia, with 50 baud RTTY traffic at 1515. (Hetherington-FL)

15858.0 German Embassy in Madrid, Spain, with ARQ-E message to Bonn at 1705. (Dman-UK)

16300.0 Radio Moscow SWBC feeder in Russian at 1800. (Hall-RSA)

16692.6 UTHZ-MT *Antares* with SITOR-A traffic at 1156. (Hall-RSA)

16799.5 UUIV-Russian ship RKTS *General Petrov* with 50 baud RTTY traffic at 1207. (Hall-RSA)

16802.1 UUUB-Russian ship RKTMS *Marshall Sudets* with 50 baud RTTY traffic at 1205. (Hall-RSA)

16912.0 GYA-Royal Navy London, with fax chart at 1218. (Hall-RSA)

16915.4 FUX-French Navy, Le Port, Reunion, with 75 baud RTTY test tape at 1212. (Hall-RSA)

16928.0 UJY-Kaliningrad Radio, Russia with 50 baud RTTY traffic list at 1003. (Dman-UK)

17024.0 SAB83-Gothenburg Radio, Sweden, with SITOR-B shipping messages at 1712. (Dman-UK)

17590.3 HZN49-Jeddah Meteo, Saudi Arabia, with 96 baud RTTY weather codes at 1326. (Hall-RSA)

17976.0 King 88 with phone patch thru Thule GHFS to Rescue Ops at 1925. (Riddell-NY)

18046.1 SNN299-MFA Warsaw, Poland, with POL-ARQ transmission at 1255. (Hall-RSA)

18303.0 English female number station in AM at 1200. (Hall-RSA)

18441.2 JMJ5-Tokyo Meteo, Japan, with fax chart at 1147. (Hall-RSA)

18504.0 RFFA-MOD Paris, France, with ARQ-E3 traffic at 0945. (Dman-UK)

18506.5 MFA-Jakarta, Indonesia, with SITOR-A and RTTY diplo traffic at 1128. (Hsll-RSA)

18561.3 9BC31-IRNA Teheran, Iran, with 50 baud RTTY news bulletins in Arabic at 1135. (Hall-RSA)

18751.7 Egyptian Embassy-Rabat, Morocco, with 4-letter groups and Arabic SITOR-A traffic at 1300. (Hall-RSA)

18760.2 P6Z-MFA Paris, France, with FEC-A idling transmission at 1550. (Hall-RSA)

19049.0 RFFA-MOD Paris, France, with ARQ-E3 traffic at 0940. (Dman-UK)

19978.0 CLP67-Cuban Embassy Baghdad, Iraq, with 100 baud RTTY Iraqi news in Spanish at 1510 then Spanish messages to Habana. (Hetherington-FL)

20148.2 U.S. Army Inter-Americas military communications net with various stations from South America using FEC transmissions. (Hetherington-FL)

20157.2 Another U.S. Army sponsored Inter-Americas military communications net using FEC at 1315 and 1731. (Hetherington-FL)

Bob Kay, c/o MT, P.O. Box 98, Brasstown, N.C. 28902

Scanning TLC

Summer is over. The kids are back in school and it's time to get back to your favorite hobby—scanning! If you're a pretty typical scanning buff, you haven't seriously listened to your scanner radio since the arrival of summer. And if you haven't checked your equipment since last fall, it's time to give your equipment a little tender loving care (TLC).

Give your station the once-over before you get into fall scanning, and you'll enjoy better reception. John Myers' tidy station in Spokane, Washington, is all set to monitor!

Checking your scanning system for possible problems doesn't require any special skills. The first step is to scan a few frequencies in the VHF low band, UHF high band, and also in the 800 megahertz band. I usually search the cordless phone frequencies (46.61 to 46.97), then I search through a group of active UHF frequencies (453.0125 to 453.9875), and finally I search through the 800 megahertz world. The exact frequency ranges you choose will depend on the active frequencies in your area. The important thing to remember is to select a frequency range from each of the bands that you routinely monitor.

The monitoring ability of your scanning system can also be checked by comparing your reception results with another scanning hobbyist that lives nearby. Your local ham radio club and CB radio retailer are two excellent places to meet with fellow scanning hobbyists. When you visit with your new friends, don't forget to bring along a frequency list that can be shared and/or exchanged.

If you discover a reception problem on a particular band, don't panic. Most problems can usually be corrected without the need for special skills and tools. Here are a few hints and ideas that will help to restore your ability to hear everything that's out there to hear.

On the higher frequencies, beginning with the 800 megahertz band, your reception can be affected by the change of seasons. Summer foliage, for example, can adversely affect your ability to monitor the higher frequencies. The problem is further compounded if the foliage is wet. During the winter months, when the trees are bare, 800 megahertz reception is likely to improve. To avoid confusion, be sure to compare 800 megahertz reception reports from the same season.

Another important consideration is the age of your coax cable and antenna. Replace your coax every five years and check your antenna for corrosion and rust. It's also a good idea to remove and re-waterproof your antenna connector each year. With the connector removed, look for signs of moisture contamination in the cable and at the point where the connector attaches to the antenna.

Have you checked the accuracy of the frequencies that are stored in your scanner radio? As we all know, it's very easy to make a mistake and punch in the wrong frequency. To check the stored frequencies in your scanner radio, list each frequency on a sheet of paper. Begin with Bank #1 and continue through each remaining bank. If your scanner radio can store 400 frequencies in 10 banks, you'll have ten banks and 400 frequencies listed on separate sheets of paper. The next step is to compare the accuracy of your list with a frequency guide. My guess is that you'll find at least two frequencies in your scanner radio that were entered incorrectly. Check it out and let me know if I was right.

Splitters and coax switches are popular gadgets that can be found in nearly every listening post. What most scanner buffs don't realize is that a splitter and/or coax switch can reduce the incoming signal by as much as 3 dB. The loss of signal strength becomes especially problematic if you've attached two or more splitters or coax switches in the same line—the signal loss could be more than 6 dB! (On the other hand, as Bob Grove discovered in the July issue of *MT*, there may be *no* signal loss!) The best way to find out is to pay attention, experiment, and keep records.

If you live in the suburbs and need to boost your signal strength, don't reach for a preamp—remove the splitters and coax switches from your feed line. If your signal strength improves, you've discovered the problem.

Make a mental note to check the frequency rating of your splitters and coax switches as well. You can't monitor 900 megahertz frequencies if your add-on equipment is only rated to 800 MHz.

When you're certain that everything is working, it's time to get out your dust rag. Cleaning your listening post will restore its professional appearance and it will encourage you to devote more time to your favorite hobby. To restore the lustre to your scanner radio, apply a vinyl protectant (available in auto supply stores) to the outside case. Do not, however, apply anything to the LCD window! The best way to clean the LCD display is to use a soft camera lens brush or compressed air.

Everyone realizes that high tech scanning equipment is also high priced. To protect your investment, it makes perfect sense to check and maintain your equipment to the best of your ability. As we have learned, special skills and tools are not required. In most cases, all that's needed is a small measure of TLC.

■ Treasure Hunt

Your antenna coax cable is the most important link in your scanning system. Utilizing the wrong cable or improperly installing the wrong connector can severely limit your ability to capture radio signals. To solve the problem, I'll provide you with a custom length of RG6/U cable (up to 100') with the appropriate connectors and/or adapters installed. To win a customized cable for your listening post, simply find the answers to the following clues.

1. If you monitored 35.02 MHz what would you probably hear?
2. Images on your scanner radio are offset by 21.40, 21.60, or 21.70. True or false?
3. I ordered "CTR-8" from Grove Enterprises. What did I get?
4. If I'm listening to 121.90 MHz, what is the correct mode?
5. The Radio Shack Pro-60 has a dimmer switch. Yes or No?

As you know, RG6/U provides the lowest loss per foot at minimum cost. The small diameter of RG6-U and its flexibility make it ideally suited for your listening post. If you are our lucky winner, I'll provide zyou with a cable that's ready to install.

Send your answers to the Treasure Hunt, P.O. Box 98, Brasstown, NC 28902. The use of post cards is encouraged.

■ Frequency Exchange

Welcome to **Douglas, Georgia.** An anonymous shopper has sent in the frequencies that are used by Wal-Mart stores throughout the state:

154.57 154.60 464.475 464.52 464.975 469.475 469.525 469.975

Moving further south to the state of Alabama, we'll stop in to visit with Wendy Gibbs. Wendy lives in **Montgomery, Alabama,** but she travels throughout the state. Here are Wendy's favorite frequencies.

45.16	Draper Prison	155.01	State Police
45.98	Holman Prison	155.07	State Police
154.025	Jacksonville Univ. sec.	155.445	State Police
154.74	Andalusa Police	155.70	Alabama University
154.815	Tuscaloosa Police	453.475	Birmingham Univ. sec.
154.995	Birmingham Univ. sec.	859.4875	Lookout Mtn. sanitarium

Ray Owen lives in **Alamo, Texas**, and he has invited us to come out West to monitor his favorite frequencies.

154.19	Fire	460.40	Houston Police
154.815	Police	460.425	Houston Police
154.95	Police	460.475	Houston Police
155.37	Police	460.525	Houston Police
155.43	Police	465.15	Houston Police
155.67	Police	465.225	Houston Police

Bob Slocum's invitation arrived from **Jefferson County, Colorado,** in the shadow of the Rocky Mountains, where he monitors these targets.

154.28	Aurora fire	460.025	Aurora Police
155.25	Aurora Police	462.95	Kremmling Hospital
155.37	Aurora Police		

Allen Carson routinely listens to the scanning action in **Las Vegas, Nevada,** and his invitation included the following:

151.665	Airport Casino	458.40	Fire
151.925	Secure-a-guard	461.225	Airport Inn
152.45	Yellow cab	461.70	Caesar's Palace
153.935	Police	461.975	American Security Company
154.055	Police	462.825	Bally's Grand Hotel
154.15	Aladdin Hotel	462.975	American Ambulance
154.845	Police	463.375	Hilton Hotels
155.22	Highway Rescue	463.60	Grand Resorts
155.28	Life Flight	464.025	Las Vegas Inn
155.475	Police	464.375	Holiday Inns
157.59	Union cab	469.35	Hertz Rental Car
158.80	Police		

Since we're now flat busted after all those casinos, Russ Brock takes us back to the East Coast, and invites us to stay at his home in **Virginia Beach, Virginia.** Here are the trunked frequencies that are in use at the beach.

811.4875	814.4625	856.7125	858.7375
811.7375	814.4875	856.7375	859.4625
812.4625	814.7125	857.4625	859.4875
812.4875	814.7375	857.4875	859.7125
812.7125	815.4625	857.7125	859.7375
812.7375	815.4875	857.7375	860.4625
813.4625	815.7125	858.4625	860.4875
813.4875	815.7375	858.4875	860.7125
813.7125	856.4625	858.7125	860.7375
813.7375	856.4875		

Our next invitation is from **Newberry, South Carolina.** Since the sender wishes to remain anonymous, we'll need to do our monitoring from the side walk.

154.22	Fire	460.175	Police
154.775	Fire	460.275	Police
155.325	Rescue	465.175	Police
460.05	Police	465.275	Police

Now that we've become accustomed to the life of a beach bum, our last stop on this seasonal fall trip will be **Beaufort, South Carolina.** Dale Parks lives nearby and he says that September is a great time to stroll along the beach.

154.355	Fire	460.30	Police
155.175	Hospital	465.225	Police
155.28	EMS	465.25	Police
460.225	Police	465.275	Police
460.25	Police	465.30	Police
460.275	Police		

To invite the frequency exchange to your neck of the woods, send your favorite frequencies to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902.

Cellular Worries

A growing number of hospitals are prohibiting the use of cellular telephones by patients and visitors. The electronic signal that is transmitted by cellular phones is interfering with life-saving equipment. Hospitals have complained that cellular phones have actually caused false readings and false alarms in institutions around the country.

A spokesman for the cellular industry tried to minimize the incidents by advising hospitals to concern themselves with handling interference from all kinds of sources, including video games and wireless computer modems.

Fast Food Frequencies

Fast food monitoring may not be the most exciting aspect of scanning but it certainly has a large number of dedicated listeners. If you're hooked on fast food frequencies, here's a list that will satisfy your appetite.

Arby's	*Bob's Big Boy*	*Burger King*	*Hardee's*
30.84	30.84	30.84	30.84
31.00	154.57	31.00	31.00
154.57	457.60	154.57	35.02
457.55	467.825	170.305	151.685
		465.8875	170.305
			464.6125
			469.0125

KFC	*McDonald's*	*Taco Bell*	*Wendy's*
30.82	30.84	30.84	30.84
30.84	31.00	154.57	33.16
31.00	33.14	457.5375	33.40
33.40	33.40	457.55	49.83
154.54	33.715		44.89
467.8125	35.02		460.8875
	35.12		
	67.775		
	154.49		

Federal Monitoring

In nearly every mail bag, there's a question concerning federal monitoring. Here are a few of the top federal frequencies:

FBI	165.90, 166.825, 167.2375, 167.2625, 167.4375, 167.50, 167.525, 167.5625,
FCC	41.060, 167.05, 172.050, 172.80.
FEMA	138.225, 138.575, 139.10, 139.825, 139.45, 130.05, 140.025.
Federal Prisons	170.875, 170.925, 170.065.
Federal Protection Service	415.20, 417.20.
Secret Service	164.65, 164.80, 164.8875, 165.215, 165.375, 165.5125, 165.7875,166.5125.
White House communications	165.375, 167.7875, 169.925, 165.213, 165.025, 164.10, 162.6875, 407.925,.

Public Service Monitoring

Place your scanner radio in the search mode to discover the active police frequencies in your area. Here are a few of the most common ranges to get you started.

42.02 to 42.98	453.0125 to 453.9625
44.62 to 46.02	460.0125 to 460.5625
154.65 to 156.21	810.00 to 816.00
159.09 to 159.21	855.00 to 861.00

The above listing is not complete. To find additional public service monitoring ranges, consult your regional edition of *Police Call*, available at any Radio Shack or radio dealer.

Cordless Phones

Another frequently-asked question is what are the frequencies on which cordless phones operate. The frequencies are listed below, but you are advised that it is now illegal to monitor cordless phones in addition to cellular transmissions. The frequencies listed belong to the cordless base unit. The handset frequencies between 49.67 and 49.97 only carry one side of the conversation.

46.61 46.63 46.67 46.71 46.73 46.77 46.8346.87 46.93 46.97

The newest cordless phones have access to fifteen additional frequencies, recently allocated for cordless use. These are:
43.72 43.74 43.82 43.84 43.92 43.96 44.12 44.16 44.18 44.20 44.32 44.36 44.40 44.46 44.48

Medevac Frequencies

Did you know that you can monitor the radio communications between ambulances and hospital? It is one of the most popular listening targets because of the human drama involved. The following frequencies are active nationwide.

Frequency Pairs	
462.95 ..... 462.9625	463.075 ..... 463.0875
462.975 ..... 462.9875	463.10 ..... 463.1125
463.00 ..... 463.0125	463.125 ..... 463.1375
463.025 ..... 463.0375	463.15 ..... 463.1625
463.05 ..... 463.0625	463.175 ..... 463.1875

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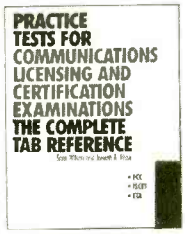

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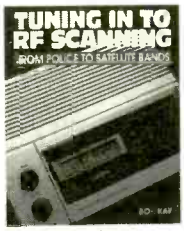

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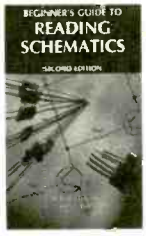

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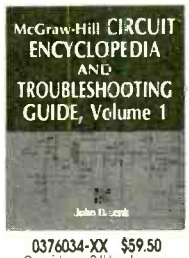

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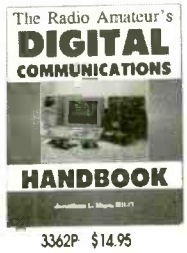

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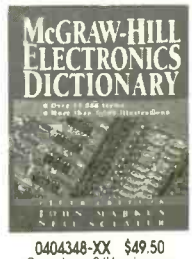

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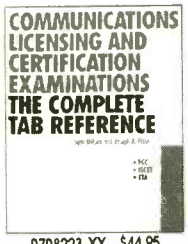

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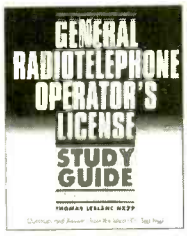

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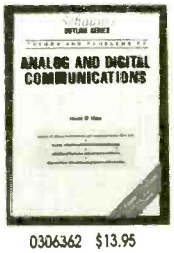

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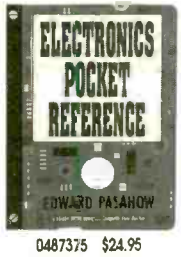

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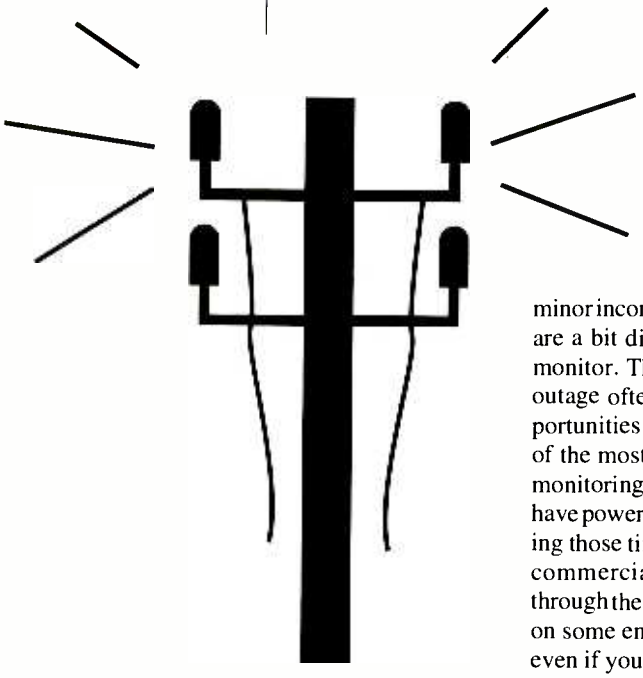
Skip Arey, WB2GHA
TJAREY@AOL.COM

Where Were You When The Lights Went Out?

Well, we are working our way out of summer, but we are still in the back end of the hurricane season. Nasty weather abounds at this time of year. More than once I have arrived home from the salt mines to discover the digital clock on the microwave blinking a row of "8"s, indicating a loss of power. Summer isn't the only time of year these blackouts occur. A hard winter can also bring ice-downed wires that take public service even longer to restore.



As long as the power isn't out for more than a few hours, most folks only experience minor inconvenience. But things are a bit different for the radio monitor. Those times of power outage often signal special opportunities to listen in on some of the most exciting stuff radio monitoring has to offer. If you have power for the receivers during those times when there's no commercial power coursing through the house, you can count on some enjoyable monitoring, even if you're still sitting in the dark.

More importantly, being able to power up the rigs at this time can also bring an extra measure of safety and security to you and yours. Knowledge is power, and the kind of information you are likely to hear on your scanner during rough weather is powerful knowledge to have. Ask anyone who has had to deal directly with a hurricane, tornado, or nor'easter.

Prior planning is the key to keeping things running when the lights go out. Begin your preparation with an inventory of your receiving equipment. Ask yourself what equipment requires AC line power? What equipment can operate off of the 12 volts supplied by your automobile or other storage battery? What equipment will operate off of standard cells, and what sizes and quantities are needed for each (e.g.. D, C, AA, AAA)? You see, you have to know what you have, to know where to start in planning for when the lights go out.

Most modern portable solid state receivers are remarkably efficient power users. Chances are, a good set of standard alkaline cells will get you through most common power failures. But we also live in the shadow of Murphy's law. If anything can go wrong, it will! So planning for emergency situations requires that we try to out think Old Man Murphy at every turn.

Take rechargeable cells for instance. You might think to yourself, "I keep my NiCds at full charge—everything should be fine." *Wrong*, Bunky. All "rechargeable" cells exhibit a certain amount of deterioration over time. Almost any over-use or over-charging contributes to this downhill slide. As luck (and Murphy) would have it, you can expect those rechargeable cells that have never given you a moment's problem to go 100% failure five minutes after any emergency situation takes place. Also, NiCds exhibit a rapid drop-off in voltage as they are used. Common alkalines have a more linear taper to their power drop, often allowing you get some more time out of a set in an emergency listening situation.

I use rechargeable NiCds most of the time; they are great for everyday service. However, when I'm coming up on rough weather, out go the Nicads and in go the fresh standard alkalines. I also have an additional set of alkaline cells for each radio in case I work through the first. So far, no local power outage has taken me into the second set.

Use your power needs inventory to stock your listening post's top desk drawer with alkaline cells to fit all your portable gear. Most cell manufacturers these days include a shelf life date on the package. If your emergency supply is getting close to the wear-out date, buy fresh supplies and let your significant other use the replaced units in his or her jogging radio or let the kids use them in their toys. Keeping those cells in a drawer does cost some pocket cash but you'll never miss a signal when the house power gets carried away with the high winds.

Okay, let's move on to the next "Murphy related" eventuality. You reach into that top desk drawer in search of your fresh alkaline cells only to find that one of your kids have raided the supply to power their "Multi-Mega-Death-Match" pocket video game. Is that the end of your listening in the dark? No way, Compadre! You've made preparations, remember. Probably all the power you are going to need can be found at the lighter jack of your family car. You have a long lasting supply of power. Further, as long as you keep gasoline in the tank to spin the alternator, this is an essentially inexhaustible power resource.

Most modern portable receiving equipment either comes with the necessary cabling to allow you to plug them into your car, or such a cable is available as a reasonably-priced option. If it's not, but your receiver has a jack for external power, you may still be in business. Several electronics suppliers, including *MT* advertisers, sell "universal" DC to DC power converters that allow you to hook almost any portable equipment to your car's lighter jack. Pay close attention to these devices before you buy them—and definitely before you try them. You must observe proper voltage levels and DC polarity to assure not harm comes to your rig when you try to power it from your car.

Being somebody who really likes to be prepared for the worst, I've wired a lighter jack with cabling so that I can connect directly to the terminals of any auto or marine battery. You don't need to go this far, but if you are involved in any emergency preparedness organization such as the Amateur Radio Emergency Service (ARES) this is something you will find a use for down the road.

Also since you're planning to have working radios during a power outage, do you have at least one flashlight for each floor of your house? Do you know what size cells these flashlights take? Did you stock up on back up cells for these flashlights? Are they located in places that will make them easy to find when the lights go out? You're going to need to see to get around your monitoring post.

Here's a tip for finding flashlights in the dark. Check at your local hardware outlet for "glow in the dark" tape. You've probably seen a dozen kid's toys that glow an eerie green after being exposed to normal light. If you can locate the tape that does the same, wrap a few turns around those emergency flashlights. You'll always find them when you need them so long as they have been sitting where household light can keep them "charged up."

Between two sets of backup alkalines and a rig for your car battery, you should be able to keep an ear open throughout just about any emergency you would be willing to sit through. So now let's take a bit of a look at what might be interesting to listen to.

■ Who's on when it's off?

Well, let's start out with the obvious, shall we? If the power is out, it might be fun to check out the local power company's frequencies. You can bet they will be hopping as they try to work along the power grid to resolve the outages that have occurred. Often these folks are out and about their business in dangerous conditions. Remember, you're inside all warm and dry while these folks are climbing around slippery and wet power lines. You'll gain a whole new respect for the folks who keep our infrastructure operating after listening to them work through a storm.

Since power outages often affect such things as traffic signals, your next set of frequencies will be your area police. Keeping traffic moving safely under such conditions can be a real headache. Your local police will have to deploy quickly to ensure folks can get through major intersections without becoming a hood ornament on somebody's tractor trailer. Since the police still have their normal non-storm related activities to attend to, you might hear them call up off-duty or auxiliary forces to help out. You might also check any assigned "mutual aid" frequencies, as nearby departments often reach out to one another during such problems. The power grid often covers several towns so working through a major "lights out" situation is going to take a great deal of cooperation.

Next on this list should be your area National Weather Service (162.40 - 162.55 MHz) frequency. This will give you up-to-the-minute information about area weather conditions. You will also hear special bulletins concerning severe weather. It's always good to know if things are going to get better or worse when you're stuck in a storm. Also if you are located in a coastal area or near an airport, you will want to plug in the marine weather (156.80 MHz) and aircraft flight service (122.00 - 122.60 MHz) frequencies for further information about local conditions.

Next you can scan your local fire and emergency services frequencies. Activity is often up on these channels as well during power outages. Often a localized power outage is due to a fire or a traffic accident, so these frequencies can be important.

Your local amateur radio 2-meter repeaters might show increased activity, especially if your area hams are organized to assist in emergencies through organizations such as ARES (mentioned above) and the Radio Amateur Civil Emergency Service (RACES). Also, if your scanner tunes low-end freqs, in many areas of the country the CB organization REACT is still alive and well. Keep their operating channels in mind if you have an active chapter.

If you don't already have your local frequencies for the above-mentioned services, they are not difficult to find. Books such as Gene Hughes' *Police Call* and the Scanner Master series available through many radio-oriented booksellers and *MT* advertisers should get you on the right track. You can also check with your area electronics outlets, especially those that sell scanners. Often these folks will have an up-to-date frequency sheet for your area.

As you're sitting there in the dark, listening in to all these emergency activities, don't become callous to the sad realities you will likely encounter. Remember to support your local volunteer emergency service organizations. They need your help to do the best job they can. Think of it as the rent you pay for listening in on all the action. Keep those flashlights handy, folks. You never know when the lights will go out next.

SHORTWAVE BROADCASTING

The Global Forum

Glenn Hauser, P.O. Box 1684-MT, Enid, OK 73702
fax: (405) 233-2948 ATT: Hauser

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; Z-95 = summer season

ALASKA KNLS, W-95 English from Sept. 24 to March 31: 0800-0900 on 6150, 1300-1400 on 7365 (Arthur Cushen, *NZ DX Times*)

ANGUILLA Dr. Gene Scott's Caribbean Beacon SW station is proceeding at a snail's pace; among the problems, public fears of RF radiation, and foot-dragging colonial administration. A Continental SW transmitter with solid-state modulator has been in storage on the island for two years. Four x 50 kW old MW transmitters to be combined for 200 kW on 1610 kHz are also awaiting installation in the building, which is nearly finished; meanwhile existing 50 kW on 1610 seems to be at greatly reduced power. Construction and delay costs on this may account for cutback at other outposts of Scott empire, KAIJ and KVOH (*World of Radio*)

AUSTRALIA ATV, the satellite service, faces funding cuts, but former ABC director David Hill says government should put its money there instead of sacred cow R. Australia with declining SW audience (R. Netherlands *Media Network*)

BOLIVIA New radio law prevents progress by proposed SIM station, but it continues producing programs, months before it can come on (Rich McVicar, HCJB *The Latest Catch*).

R. San Miguel reactivated on 4924.45-4925.lv, 0120-0256* (Ed Rausch, NJ, *W.O.R.*).

What's the unID at 0935 on 6142 with Ecuadorian music? (Dave Valko, PA, HCJB *DX Partyline*) 6142.0 at 0930-1015 from Villa Serrano, Chuquisaca Depto., belonging to Centro de Estudios Chuquisaca, seems to be named after the province of which this is the capital.

R. Bando Bolto (Emilio Pedro Povrzenic, Argentina, *Latinoamérica DX* via *Radío Nuevo Mundo*) Or is it Perú, *q.v.*?

BRAZIL Another screwup at the Brasília relay station: Switzerland's English at 0900 one day on 6180, next day resumed correct Amazon service in Portuguese here (George Thurman, TX)

CAMEROON Douala reactivated 4795 in late May (BBC Monitoring via HCJB *DXPL*)

CANADA CKZU, 6160 carries the overnight relays from BBC, RN, France, Australia, etc., which is on the CBC Radio Network 0800-1300 UT (B. Cooley, Victoria, BC, *W.O.R.*)

1995 Stupid Practices Award goes to CFRX, 6070, for inserting ID right in the middle of news; Incompetence in Frequency Selection and Lack of Imagination in Programming award to RCI for refusing to use out-of-band, nor to carry *Ideas, Best of Gzowski, The House*. Agree with gh that one Sackville SW transmitter should be dedicated to simulcasting CBL (Peter James, Portland ME, *W.O.R.*)

Royal Canadian Air Farce played old American comedy records for summer, Sat 2105, Sun 0232; *Double Exposure* is much better, really funny, and I am learning something about Canadian politics, Sun 0204 (Will Martin, St. Louis, MO. *W.O.R.*)

Final(?) summer repeat on *Quirks & Quarks*, Sept. 2 is "The Monkey Special," Sat 2305 on RCI 5960, 9755, 13670, etc. (CBC)

CHILE R. Agricultura planned to reactivate 9630 soon (RN *Radio Enlace* visiting station)

CHINA Don't you believe the CRI English schedules as announced at end of broadcast, published in their own *Messenger*, published by BBCM and various DX magazines. Some of the info appears to be one or two years out of date; nobody bothered to confirm, such as the Canadian relay at 0400 on 9560, not 0500 on 9595 or 11840 (gh) A complaint I sent CRI last December about the audio quality of the Mali relays was rewarded with a T-shirt by registered airmail, fitting not me but my little sister (Kevin Hecht, Devon, PA)

COSTA RICA [non] RFPI clones are possible among the Maori of New Zealand, the Indians of western Canada, and the Indians near Hyderabad; these are in various stages of planning, application or licensing (RFPI *Mailbag*)

CUBA DXers abroad may get QSLs for Cuban domestic radio or TV stations by sending reports to me, preferably in Spanish (Manolo de la Rosa, ICRT, Calle 23 No. 258, Vedado, Ciudad Habana 4)

[non] R. Martí announced it is simulcasting TV Martí talk shows, Tue-Sat 0800-0900 on 6030, 1180 (gh)

ECUADOR Putting HCJB on 6135 at 0700-1130 to S. Pacific drew some protests from DXers, and to clear my conscience I asked R. Santa Cruz, Bolivia if we were interfering in their own target area. They said we were so HCJB will move away (Rich McVicar, *Fine Tuning*) Replacement is 5900 (HCJB *The Latest Catch*) Which I picked (Arthur Cushen, NZ)

A verie-letter from Escuelas Radiofónicas Populares del Ecuador, Riobamba, says it was created in 1962, dedicated to rescuing the culture of the indigenous people, who are involved in producing programs, mostly in Quichua; besides AM and FM, is on 5010 with 1 kW at 0900-1200 and 2200-0300 UT, from a site at the foot of Chimborazo, with a French-made TRT transmitter from the 1950s, half-wave dipole with three wires, balanced feed; signed by Juan Pérez Sarmiento, Director Ejecutivo (Ed Rausch, NJ)

Escuelas Radiofónicas

R. Buen Pastor, new station on 4830.23, best heard Sat cvc, UT Sunday When Venezuelan goes off early; loud and clear at 0212. Manager says nominal sked is 1100-1400, 2200-0100 and complains of dead area from 5 to 12 miles from site due to vertical incidence (Rich McVicar, HCJB *DXPL*)

EGYPT What's the Arab with Koran on 11785.2 at 0305-0330, 2030-2123*? (Brian Alexander, PA) A R. Cairo domestic service not // any other frequency checked, blocked by DW until 0355 and clear until NHK at 0430 (Ed Rausch, NJ, *W.O.R.*) R. Cairo doesn't have to transmit dirty, distorted audio; Arabic to us evenings on 12050 is clean as can be, contrary to gritty and undecipherable English on 9900, 9475 (Randy Stewart, MO, *W.O.R.*) R. Cairo normally has poor modulation, garbled, uneven levels and muddy, but once on 9475 at 0300 in English it had surprisingly good audio! (Bob Thomas, CT)

FRANCE A strike by audio-visual workers over pay and working conditions disrupted RFI the last week of June. For the English hour at 1200 on 13625, sometimes music, or abbreviated English news; for two days ran *both* English and French at same time from two different sites, topping their previous non-synchronization problem (via George Thurman, Martin Gallas, Bob Thomas)

GERMANY Besides the new 800 number last month, DW now has a US address: PO Box 50641, Washington, DC 20091-0641 (Jim Moats, OH) *Science & Technology*, UT Fri. Sept. 8 at 0330 reports from the Berlin World Fair for Consumer Electronics (DW radio *tune-in* viaMoats, Diane Mauer)

[non] AWR announces a 25th-anniversary QSL design contest, which may reflect the theme "Lift Up the Trumpet." Send completed art

for cards to be 4 by 6 inches by Sept. 15 receipt deadline to: AWR QSL Contest, Adventist World Radio, PO Box 100252, 64202 Darmstadt, Germany. Grand prize is a Sony SW-100 portable SW radio; if other designs are used, 1996 *WRTH* (AWR Newsletter via Ed Rausch)

GREECE For the solstice, VOG left 6260 for 9425, but too close to WSHB, so shifted to 9420 at 0000-0350, // 9935, 11645; but now it's only 5 kHz from Bulgaria on 9415. Makedonias station extended sked for benefit of N. America, so it's now: 0500-2150 on 11595, 0500-2205 on 9395, 0500-1000 on 9935, 1600-2205 on 7430 (John Babbis, Silver Spring, MD)

GUAM *Wavescan* on KSDA, 11980, vanished from Sat & Sun 2300, but one week started Sun at 2319, appending DX news from Finn Krone but not in his voice (gh) At the dedication for its third 100 kW SW transmitter in May, SDA Elder R. Folkenberg announced a fourth would be on air at KSDA by yearend (AWR Europe via BBCM)

HUNGARY R. Budapest's three different 3-minute DX segments, usually the last feature on the broadcasts, were monitored precisely one week in June, UT days: *DX News*, Tue 0255, Fri 0122; *DX Tips*, Wed 0255, Sat 0117; *DX World*, Thu 0253, Sun 0123; both 6000 and 9835 suffer QRM de Havana (John Norfolk, OK)

INDONESIA RRI Ujung Pandang to reactivate 4719 later in 1995; on 4753 has 10-minute *International Mailbox* around 1430 Mondays and Fridays in Indonesian, Japanese, and English (Willi Passman, *Australian DX News*) RRI Yogyakarta seems to have moved the 7098.5 transmitter to 5059.12, not a drift from 5046.48 which is also used at separate times: 5059.12 at *1200-1515*; 5046.48 at 0930-1155*, *1515-1710* (Takayuki Inoue Nozaki, Japan, *Relámpago DX* via *Play DX*)

ISRAEL Israel Radio to scrap 1000-1030 English but extend 1900-1910 to half an hour; reviewing plans for all foreign languages, and more changes in Sept. (RN*MN*) A few days later than scheduled, 1900 confirmed until 1930, news but no features since the latter staff had been fired; 1930 French, 1950-2000* Spanish, best on 11603, also 15640, 11675, 11588, 9435, 7465; these would all have shifted in August one hour later with end of DST (gh)

Galei Tshal, Israel Defense Forces Radio, back on SW after a sesquidecade, 8127 USB in Hebrew including relay of Kol Israel news with its ID confusing DXers, as early as 1750, as late as 0800; maybe testing ute transmitter? (Chris Greenway, BBCM via RN*MN*, and HCJB *TLC*) Heard with USB + carrier from 2335 past 0200, peaking at 0100 (Ed Rausch, NJ, HCJB DX*PL*)

LEBANON V. of Lebanon, Phalangist, 6549.4 from 0255 *Col. Bogey March* and *Bridge on the River Kwai* versions of same music, anthem, into Arabic (Alan Roberts, PQ, *W.O.R.*)

LITHUANIA The only SWBC transmitter here, 9710, has been closed for financial reasons, affecting both domestic and external broadcasts; the latter continue on MW 666 and via Russia on SW (Chris Greenway, BBCM, RN*MN*) But still heard on 9709.8 from 1055, sounding like unwell transmitter (Alan Davies, England, SWL Interest Group, Internet via HCJB *DXPL*)

MALAWI Minister of broadcasting Hon. Brown Mpinganjira says the government will provide MBC with new HF transmitters (MBC via BBCM)

MOZAMBIQUE R. Moz, reactivated on 3210.3 heard by various members between 1820 and 2128 (Anker Peterson, DSWCI, HCJB *TLC*) and Em. Interprov. Maputo on new 5928.4 around 0545 in local languages (Vashek Korzinck, RSA, HCJB *TLC*)

NAMIBIA New 4930 in local languages, Afrikaans on 4965 around 1400 (GodfreyClemiston, RSA, HCJB *TLC*)

NEW ZEALAND ZLXA, Radio Reading Service, Levin, extended to 1200*, announced Mon.-Fri. 0230-1200, Sat 2030-0500, Sun 0600-0900, on 1602, 3935; 7290 mentioned (but not with times) though has been closing at 0800 or 0900; newest transmitter on 5960 is undergoing repair (David Martin, *OzDX* via *DX Ontario*)

NIGER Voix du Sahel, Niamey, is multilingual at 0430-0659 on 5020, 0659-1100 on 7155, 1100-1400 on 9705, 7155; 1700-2203* on 7155, 5020; English news unconfirmed Sun. 2000-2030 (BBCM)

PAPUA NEW GUINEA Tentative new station, R. New Britain heard at 1015 on 3325. May be new station for Bougainville from Rabaul, replacing R. North Solomons on this frequency, strong signal with news, PNG timechecks (John Kecskes, Australia, SWLIG via HCJB *TLC*)

PERU At first thought to be a new name for Estación Yurimaguas, on 6239, Radio Superior is a different station, at Naranjo, Rioja province; 0300 music show is Tropicalísimo with lots of local ads, so La Voz de Naranjos, 4300, now has competition (Christer Brunström, Ecuador, HCJB *TLC*) On 7050.36, R. la Voz de Santa Cruz at 0202 with 17-minute adstring, ID, deep fades from very good to fair (Rich McVicar, *ibid.*)

R. Atlántida, Iquitos, nominal 4790, heard strong but distorted at 2315-2330 on 4610; next day 0950-1015 on 4605 (Fernando Viloria, Venezuela, *W.O.R.*)

[cf. BOLIVIA] 6142.0 unID turned out to be R. Concordia, La Emisora de Arequipa, at 2225-2258 (Jean-Pierre Penaud, France, *Play-DX*)

La Voz de la Amistad, Trujillo, on 4000.07, UT Sunday 0324-0510*, echo IDs for 1450 only, not SW but this does not compute to be a harmonic; also at 1118 on 4000.1. Exciting and confusing situation on 5770.77 until 0207*, IDs both as R. Horizonte and R. Nuevo Horizonte, saludos from Rioja, frequency as "5772 in 53 meter band;" then ID mentioned Chiclayo and played R. Horizonte song at sign-off; maybe ex-4505, but two days later on exactly 5770.77 at 1204 a completely different ID like "Estación Fulidor(?)" (Rich McVicar, HCJB *TLC*)

PHILIPPINES In the continuing Christian missionary campaign for "World by 2000" FEBC has added languages we've never heard of, let alone heard—but the latter may be possible at times (gh) On 15465 at 0130-0145 Mon.-Fri. in Meitei, Sat./Sun. in Kuki; 0145-2000 Sat./Sun. in Ao Naga; 0200-0215 Saturday in Zoukam, Sunday in Karbi [Burmese also on 15465, so perhaps spoken there]. On 11995 daily 0800-0830 in Sasak preceding Javanese; 1000-1030 Minangnese; 1045-1100 in Khmu; on 15095 1045-1115 in Aceh; 9475 1100-1130 in Zhuang; on 9795 1345-1400 in Mien; 11650 Sat./Sun. 2300-2315 in Akha, daily 2315-2330 in Lahu, 2330-2345 daily in Wa (BBCM)

RUSSIA The site at Tbilisskaya, more commonly known as Armavir as on QSLs and *PWBR*, or Krasnodar in *WRTH*, contains 30 x 250 kW transmitters, used either singly, or doubled for 500, quadrupled for 1000 kW, with at least 60 antennas; over 1400 are employed there. Chinese-made transmitters, built in late 1950s. One of several main sites to Europe, E. N. America during USSR times along with Grigoriopol', Lvov, Simferopol', Mykolayiv; all have capability to put 1000 kW on

one or many frequencies at once (Ivan Krasnoskiy, Yerevan or Armavir, via Kevin Hecht)

I've noticed occasional problems with VOR FE transmitters, eves on 13665, 15180, 15425, 15580, etc.—gawdawful squeaks, squawks, other assorted noise instead of programming. Satellite receiver going on the fritz? When it happens it seems to affect all frequencies except those in Eurussia (e.g. 9620), as if the FE transmitters all receive audio from the same satellite downlink (Randy Stewart, MO)

R. Nadezhda, Moscow station aimed at women, is no longer on SW, heard only on AM & FM during a June survey; as recently as Feb. 1995 it was on up to 16 SW frequencies simultaneously (BBCM) Among them several in the GPR-2 schedule from St. Petersburg for Z-95 (gh)

SPAIN At least in Spanish, REE invites listeners to send reception reports via Box 88, Moscow 109044, Russia! List of programs shows a 5-minute *La Hora Canaria* M-F 2110 on broadcasts to Eu, NAm, and via Cariari.

SWEDEN Due to an 11% budget cut, R. Sweden will cut back electricity-burning SW transmitters and hopefully phase out MW and SW in favor of participating in European Digital Radio, DAB in cooperation with BBC, DW, RN, RFI (*MediaScan*)

SYRIA R. Damascus strong 2010-2210 in English on 15095, but with a loud, nasty hum somewhere around 160-170 Hz plus multiples that does a number on readability, especially since modulation is rather low; also bothered by SSB & CW utes, slop from Spain-15110 reaching all the way down here: // 12085 much weaker, but you can still hear the hum! (Randy Stewart, MO)

UNITED ARAB EMIRATES Dubai good at 1600-1640 in English on 21605, fair on 13675, 15395, 17825 (Kevin Hecht, PA)

إذاعة الامارات العربية المتحدة من أبوظبي
U.A.E. BROADCASTING FROM ABU DHABI.

UKOGBANI *BBC Worldwide* magazine has reached 19 kilosubscribers, brings in revenue for BBC unlike unprofitable *London Calling* (prelibr@by.bbc.co.uk via gallas@hilltop.ic.edu) Not much for a professional color magazine, or is that just in USA? (gh)

USA As of mid-July, VOA's budget had not been decided; Senate and House had two different plans: Senate calls for 20% cut from 1994 to 1997. House calls for additional 30% cut, i.e. $48 million less in 1996, $113 million less in 1997 which would amount to about half the 1994 budget. May not be decided for a few more months. Meanwhile, VOA has started running commercials—oops, underwriting messages, for things like Lufthansa (Chris Greenway, BBCM via BBC *Waveguide*)

In a letter to Ernst Zundel and *American Dissident Voices*, May 5, Joseph M. Costello III of WRNO Worldwide "regretfully" asked to terminate those programs to avoid FCC/Justice Dept. lawsuits, and to keep FCC from making it "virtually impossible to get new frequencies." "You've been a proud sponsor, and we'd love to keep you on." (via *Media Bypass Magazine* via Don Thornton) As we reported last month, *ADV* was subsequently allowed back on. The magazine also blamed pressure by the Anti-Defamation League for the cancellation of Pastor Pete Peters by WHRI (gh) ADV admits they have only 200 members (RFPI *FRRR*)

Peters had secretly purchased 15% interest in WINB, but since he was no longer allowed to be heard on it, owner John Norris refunded it; his real reason for dumping Main Street Media's far-right format was to avoid problems with the FCC in a 7"-dish DBS venture he is trying to launch costing $190 million (RFPI *Far Right Radio Review*) Still no sign of WINB at predicted return in July (gh) John Stocksdale at WINB tells me it may take another two months, or perhaps not until yearend (George Thurman, TX) Peters moved to WJCR, 7490 for a few weeks at 2300, then gone again as perhaps they found out what he stood for (RFPI *Far Right Radio Review*)

Radio Newyork International went on hiatus again at Junend after a two-month run on WWCR, 7435, UT Mons. 0400-0500; blamed lack of income due to late timing; will keep Kennebunk address active.

Dr. Gene Scott vanished from KVOH, evenings on 9975, replaced by other Bible programs, perhaps due to philosophical differences; probably also affecting Lebanon and Palau outlets. On his show, Scott talked about returning early from a trip, catching his girlfriend Christine Shaw in bed with another man; and now she is claiming half his assets in a palimony suit; and she threatens to kick KAIJ off the property she owns near Dallas (George Thurman, TX) KAIJ operations curtailed, one transmitter never returned after weather outage, and the other only 12 hours per day instead of 24, including evenings on 5810; DGS financial problems may also affect Anguilla plans, *q.v.* (Jim Moats, OH)

The electronics aboard a spacecraft positioned 204 megameters from Earth were disrupted by a BBC 6 MHz Spanish broadcast at 1300-1330 UT last November 15; came from Delano, complains Goddard Space Flight Center (BBC *Waveguide*) Now scheduled weekdays on 6130, 250 kW 126° (Dan Ferguson, USENET, via George Thurman, *DX Listening Digest*)

WRMI, 9955, is slaughtered in the Caribbean, weak and jammed just like northward. May have changed again in August and September, but in July Jeff White announced on *Viva Miami* that *Wavescan* was moving to Sat. 2100, 2345, Sun. 1130, last week's repeated at 1145; 1330, Mon. 0100. However, when we checked, it was not on at 2345 Sat., but started Sun. 2358. "Beggar" programs get treated with no respect (gh)

July program changes on WWCR include: *Presidential Radio Address*, Sat 1900 on 15685, 2000 on 12160, 2245 on 9475. *View from Europe*, again Sun. 0305 on 7435. *The Old Record Shop*, Mon. 0300 on 7435. *Ham Radio & More*, Mon. 0405 on 7435 as well as 0905. (WWCR)

World of Radio, revised airings, subject to change without notice on WWCR, WHRI, KWHR: Fri 2115 on 9475, 2229 on 13760, Sat 0501 on 5745 & 9495, 1630 on 15105, 6120, Sun 0930+ on 5065, Mon 0330 on 7435, 17510, Tue 1230 on 15685.

Those who read the April *Atlantic Monthly* piece on Christian Science previously referenced here should also read the letters to the editor in the July issue (Leslie Edwards, Jim Moats)

During sporadic E openings this summer, only a few broadcast auxiliaries audible on 11 meters, especially 26150: WLQR Toledo, WNBC-TV NY, WITL Lansing MI (Alan Roberts, PQ)

VANUATU R. Vanuatu on new 4960.0 // 3945 fair with local languages (John Kecskes, Australia, HCJB *TLC*) Heard at 1900, and also from fade-in 0500 to 1115* (Arthur Cushen, NZ, RN*MN*)

VATICAN VR broadcasts on SW are relayed from the enclave of Santa Maria di Galeria, about 20 miles N of Rome. During a visit, I admired the imposing array of antennas upon acres and acres of territory surrounded by a high gray stony wall. Inscribed on top of the major entrance: "Santa Sede Centro Radio Santa Maria di Galeria." This confirms that it is 100% Vatican territory. Later I received a fax from VR frequency management that 4005 ex-4010 and 6245 are from transmitters inside the Vatican Gardens in Vatican City State, about three miles from my QTH here in Rome (Giovanni Serra) VR on new out-of-band 5860 including 0500 English; Arabic at 0400 on 9825 (Arthur Cushen, RNZI *Mailbox*)

VIETNAM [non] The Russian relay of VOV in Spanish after 0300 is on 7260, unlike English before 0300 on 7250 (Kevin Hecht, BBCM)

ZAIRE R. Bukavu on new 3278 at 1844-1900 local language, French, folk music (Godfrey Clemiston, RSA via Anker Peterson, HCJB *TLC*)

Until the Next, Best of DX and 73 de Glenn!

Broadcast Loggings

SHORTWAVE BROADCASTING

Gayle Van Horn

0002 UTC on 11870
YUGOSLAVIA: Radio Yugoslavia. News in progress at tune-in. Station jingle to feature on foreign policy conference. (Jim Moats, Ravenna, OH)

0009 UTC on 13605
AUSTRALIA: Radio Australia. English news and features heard on //17750. Additional // frequencies heard at 0030; 13755, 15240, 15365, 15510, 17750, 17795, 17860. (Edward Griffin, San Francisco, CA) Sports news and *Pacific Beat* noted on 15365 at 0335. Parallels on 17860, 13605, 15240, 15415, 17750, 15510. (Sam Wright, Biloxi, MS)

0010 UTC on 4915
BRAZIL: **Radio Anhanguera**. Portuguese. ID and address quote. Commercial for Pocahontas music sound track. (Ed Rausch, Cedar Grove, NJ) Brazil's **Super Radio Roraima** heard on 4875 at 0235 with 323 SIO. (T. Banks, Dallas, TX)

0030 UTC on 15324.9
BRAZIL: **Radio Gazeta**. Two Portuguese DJs with national newscast. (Jerry Witham, Keaau, HI) Two additional Brazilian's noted as; **Radio Cancao Nova** at 1013/ 9675; **Radio Amazonia** at 1410/ 11780. (Maywoods DX Team; Loy Lee, Ed Shaw, Jerry Johnston, Chuck Everman, Joe Roitman, Jim McClure, Wayne Gregory) *Thanks guys!-ed.*

0047 UTC on 9790
FRANCE: **Radio France International**. French. American jazz music program with commentary to 0057 ID. (Sue Wilden, Columbus, IN; Griffin, CA) **RFI via World Radio Network** at 1500 on C-Band/Transponder G5/6. World news to RFI station ID, *Science Probe* promotional and program *Bottom Line* to time check. (GVH/NC)

0100 UTC on 9670
UNITED STATES: Voice of America. Signature *Yankee Doodle* interval signal to ID and Latin American news update. English *World Report* heard on 15410 at 2155. (William McGuire, Cheverly, MD) VOA feeder noted on 6873 at 0439. (Wilden, IN; Claude Turner, Chicago, IL)

0100 UTC on 15540
ECUADOR: HCJB. Time pips and ID to *Studio 9* show featuring Galapagos Island's wonders of nature. Fair to good signal. (Moats, OH; Griffin, CA; Wilden, IN) Japanese service heard on 21455 USB at 2200, English ID and QSL address at 2230. (Hanz, NJ; Turner, IL)

0105 UTC on 6120
CANADA: Radio Canada International. Report on Canadian troops in Somalia. (McGuire, MD) Music and features heard on 9755// 13670 at 0226. (Griffin, CA; Wilden, IN) Canada via Radio Japan relay on 6120 at 1120. (Bob Fraser, Cohasset, MA; Turner, IL)

0110 UTC on 4930
HONDURAS: **Radio Internacional**. Spanish. Canned jingles at tune-in. Male/female host musical ballads, several "Internacional" IDs with city and station address. Very good signal! Honduran **La Voz Evangelica** heard with religious text at 0220 on 4820. (Brian Bagwell, St. Louis, MO)

0126 UTC on 9735
PARAGUAY: Radio Nacional. Spanish. Two announcers chat on politics and take listener's phone calls. (Banks, TX) Nacional monitored also this frequency at 1016. (Maywoods DX Team, KY)

0201 UTC on 9640
BRAZIL: **Deutsche Welle** relay. Michael Lawter's news report. German service on 6160 at 0700. (Wilden, IN; McGuire, MD) **Radio Nacional do Brasil** heard on 15445 at 1200, highlighting Brazil and its people. (Turner, IL)

0218 UTC on 9820
CUBA: Radio Havana. Stories on Cuban issues to feature *Spotlight on the Americas* at 0220. (Wilden, IN) Heard on 11705 at 2130 with news of international inspection agency finds Cuba's nuclear plant safe. (Fraser, MA; Griffin,CA)

0226 UTC on 4835
GUATEMALA: Radio Tezulutlan. Male announcer in presumed Quecha local dialect, between brass instrumentals. (Frank Hillton, Charleston, SC) Marimba music program this frequency at 0302. (Maywoods DX Team, KY)

0240 UTC on 4885
COLOMBIA: Radio Ondas del Meta. Spanish. National interest items to ID. Brazilian station **Clube do Para** on frequency (4884.92) causing interference. (GVH/NC)

0335 UTC on 15170
FRENCH POLYNESIA: RFO-Tahiti. Announcer's text in Tahitian. Polynesian music with local news updates on Papeete. Frequency interference from WYFR's Portuguese service sign-on at 0400. (Loyd Van Horn, Brasstown, NC)

0349 UTC on 5810
UNITED STATES: KAIJ. Dr. Gene Scott's biblical teachings. Station ID at 0400 to musical program intermissions. (Terry Powers, La Mesa, CA) Monitored on 5810 at 0557. (Wilden, IN)

0420 UTC on 11720
BULGARIA: Radio Bulgaria. Lady host listener's letters segment. (Wilden, IN) *Today* focus on Balkan countries, on 11720 at 1925. (Fraser, MA)

0437 UTC on 9455
SLOVAKIA: Adventist World Radio. Feature Seventh Day Adventist church in India and Ghana. Church conference news to QSL address and ID Organ melody interval signal to 0459*. (GVH/NC)

0510 UTC on 4830
GABON: Afrique Numero Un. French. Lively French African pop vocals to station promotional. (Don Taylor, Green Cove Springs, FL)

0530 UTC on 7475
TUNISIA: RDTV Tunisienne. Arabic music at tune-in. Arabic text and music intros. (Michael S. Phillips, Daytona, FL) Arabic conversation on 15450 at 1630, probably RDTV. (Maywoods DX Team, KY)

0605 UTC on 4832
COSTA RICA: Radio Reloj. Spanish. ID and news updates. Pop tune, *Himno a la Alegria*. Very good signal quality. (John Hanz, Old Bridge, NJ)

0929 UTC on 2410
PAPUA NEW GUINEA: **Radio Enga**. Pidgin. Very low audio for announcer's text and local island vocals. Additional PNG's observed from 1026-1100 noted as; **NBC** 4890, **Radio East New Britain** 3385, **Radio Gulf** 3245, **Radio Madang** 3260, **Radio Manus** 3315, **Radio Morobe** 3220, **Radio New Ireland** 3905, **Radio North Solomons** 3325, **Radio Sandaun** 3205, **Radio Simbu** 3355, **Radio Western Highlands** 3375, and **Radio West New Britain** 3235. (Maywoods DX Team, KY)

0952 UTC on 6100
NEW ZEALAND: Radio New Zealand International. Comedy skits to station ID. (Maywoods DX Team, KY) Noted this frequency at 1015 with nostalgic 50's record show. Severe QRM from WSHB on 6095. (Hanz, NJ)

1035 UTC on 9525
INDONESIA: RRI-Jakarta. Indonesian. Pop music tunes to station interval signal *Song of the Coconut Islands* at 1100. Good signal quality. (Rausch, NJ) Two Indo's noted as; **RRI-Ujung Pandang** at 4753.5/ 1030; **RRI-Irian Jaya** at 1112/ 4753.5. (Maywoods DX Team, KY)

1500 UTC on 15270
JORDAN: Radio Jordan. Time pips to ID and newscast. *The Mix* music program featuring Elton John and Vanessa Williams. (Moats, OH; Carl T. Craig, Shelbyville, TN)

1543 UTC on 9910
INDIA: **All India Radio-Bangalore**. Announcer's text in presumed Hindi. **AIR-Jaipur** heard on 3345/ 1635 in Hindi. Sitar music to lady's news and voice-overs. (Witham, HI)

1640 UTC on 17735
MOROCCO: Voice of America relay. Special English for agricultural report, followed by feature on polio vaccines. Poor signal quality. (Moats, OH)

1703 UTC on 17830
ASCENSION ISLANDS: BBC World Service relay. News bulletin at tune-in, followed by *Focus on Africa* at 1705, featuring news of political conflicts in South Africa and Burundi. (Moats, OH) Play of the Week-*The Oresteia*. (Fraser, MA). Additional frequencies noted as; 1400 on 9740// 12095, 15070, 21660. 1500 on 6195// 9740. (Griffin, CA)

1727 UTC on 15105
RUSSIA: Voice of Russia. Music and news headlines. Feature on historic monastery near the Arctic Circle. Fair to good signal. (Ravenna, OH) *Moscow Yesterday and Today* heard on 11675 at 1830. *Science Engineering* heard on 11750 at 2140. (Fraser, MA; Wilden, IN) Additional VOR frequencies heard as; 1500-2000/ 15400, 2000-2100/ 11675, 2100-2400/ 11750. (Dr. Jerry Plummer, Nashville, TN)

2010 UTC on 11990
KUWAIT: Radio Kuwait. *The Silent Warrior* on Kuwait's role in the Gulf War against Iraq. (Fraser, MA)

2030 UTC on 11920
ARMENIA: Voice of Armenia. Interval signal to station sign-on. National news to update on Azerbajani border disputes. *Letterbox* show at 2047. (Hanz, NJ)

2200 UTC on 13605
UNITED ARAB EMIRATES: Radio Abu Dhabi. Sign-on into Holy Koran readings, // 11885, 11970. (Fraser, MA; Maywoods DX Team, KY)

Thanks to our contributors — Have you sent in YOUR logs?
Send to ***Gayle Van Horn****, c/o Monitoring Times.*
English broadcast unless otherwise noted.

That's the Ticket!

Are you looking for a great reference book on the radio hobby? Harry Helm's second edition of *Shortwave Listening Guidebook* is your ticket to the world, and is written in a non-technical format.

Harry's complete guide to hearing the world answers your questions on selecting the right shortwave radio, understanding propagation, antennas and accessories. Are you considering the amateur radio hobby? Harry delves into the world of "hams" as well as profiles on many of the major international broadcasters.

Do you enjoy domestic broadcast listening... or has the intrigue of utilities caught your fancy? Harry has that covered too...and pirate/clandestine radio, FM, and TV DXing.

If you're ready for your ticket to the world of radio, Harry Helm's excellent book is available through Grove Enterprises (1-800-438-8155 or 704-837-9200). *Shortwave Listening Guidebook* is a must for the beginner or experienced listener alike!

BRAZIL
Radiobras, 15445 kHz. Full data QSL letter signed by Gaby Hertha Einstoss-Correspondence Service. Reception report form and QSL form letter signed by Otavio Bonfim-Manager. Received in 40 days for an English report. Station address: P.O. Box 04/340, 70912-790, Brasilia, Federal District, Brazil. (Mark Spat, West Swanzey, NH)

DENMARK
Radio Denmark, 11850 kHz. No data color map/globe logo card unsigned. Program schedule and station info letter included. Received in 10 days for an English report on the special 1995 Copenhagen summit, and one IRC. Station address: Radiohuset, DK-1999, Frederiksberg C, Denmark. (Spat, NH)

ECUADOR
HCJB, 9745 kHz. Full data "casual conversation" card, unsigned. Received in 20 days for an English report. Station address: Casilla 17-17-690, Quito, Ecuador. (Charlie Washburn, North Perry, ME; Tom Banks, Dallas, TX)

GERMANY
Deutsche Welle, 6040 kHz. No data "40th Anniversary" card, unsigned. Received in 92 days for an English report. Station address: Postfach 10 04 44, D-50588 Cologne, Germany. (Washburn, ME; Sam Wright, Biloxi, MS)

MEDIUM WAVE
WWLG, 1360 AM kHz. Full data prepared QSL card signed by Paul Kopelhe. Received in 14 days after an English AM follow-up report (total days 236), which was addressed to the Program Director, after previous letter went unanswered. Station address: (per National Radio Club) P.O. Box 1591, Baltimore, MD 21203. (Mike Hardester, Jacksonville, NC)

WTOP, 1500 AM kHz. Full data color studio picture postcard, signed by Granville Klink Jr.-Engineering Consultant. Prepared QSL letter returned as verified. Business card, coverage map and *Orioles Fan* bumper sticker included. Received in 46 days after English AM follow-up report (total days 120). Station address: 3400 Idaho Ave., N.W., Washington, DC 20016. (GVH/NC)

KJLO, 104.1 FM MHz. No data personal letter for "K-104 FM," signed by Bill Galloway. Received in 4 days for an English AM report. Received a T-shirt, station stickers and station info sheet. Station address: P.O. Box 4808, Monroe, LA 71211. (Don Dacus, Russellville, AR)

NON-DIRECTIONAL BEACONS
HMY, 512 kHz Lexington, Oklahoma. Full data prepared QSL card signed by Kenny D. Sallee-Flight Ops Tech. Received in 7 days for an English utility report and mint stamps. Station address: Muldrow Airfield Heliport, AASF #1, Lexington, OK 73051-9549. (Hank Holbrook, Dunkirk, MD)

SH, 375 kHz Staunton, Virginia. Full data QSL letter signed by J. Myron Helms-NavAIDS Specialist. Received in 131 days for an English utility report and mint stamps. Station address: c/o Commonwealth of Virginia, Dept. of Aviation, P.O. Box 7716, 4508 South Labrum Ave., Richmond, VA. 23231. (Holbrook, MD)

U, 311 kHz Partridge Island, New Brunswick. Full data prepared QSL signed by B.J. (Bas) Carroll-Marine Communications Traffic Services. Received in 105 days for an English utility report and mint stamps. Station address: Canadian Coast Guard-Maritime Region, 45 Alderney Drive, P.O. Box 1013, Dartmouth, Nova Scotia B2Y 4K2 Canada. (Holbrook, MD)

TM, 409 kHz Tifton, Georgia. Full data QSL letter signed by Drue F. Anderson-President. Received in 27 days after second follow up utility report, and mint stamps. Station address: c/o Anderson Aviation Inc., Rt. 2 Box 378, Henry Tift Myers Airport, Tifton, GA 31794. (Holbrook, MD)

SHIP TRAFFIC
Mineral Dampier VRXT, 8237 kHz USB (Bulk Carrier). Full data prepared QSL card stamped with ship's seal, signed by Alberto Fluhr-Radio Officer. Received in 67 days for an English utility report, one IRC, one U.S. dollar, mint stamps and an SASE. Ship address: c/o Anglo-Eastern Ship Management, 20th Floor, Dominion Centre, 43-59A Queens's Road East, Wan Chai, Hong Kong. (Russ Hill, Oak Park, MI)

Star DMYG, 12266 kHz USB (General Cargo). Full data prepared QSL card stamped with ship's seal, signed by Peter Hass-Capt. Personal letter from the Capt. included. Received in 120 days for an English utility report, one IRC, one U.S. dollar, mint stamps, and an SASE. Ship address: c/o Briese Schiffahrts, GmbH, Hafenstrrasse 12, W-2950 Leer, Germany. (Hill, MI)

Zim America 8225 kHz USB (Container Carrier). Full data prepared QSL card stamped with ship's seal and signed by Igor Mitzewich. Received in 71 days for an English utility report, one IRC, one U.S. dollar, mint stamps and an SASE. Ship address: c/o Zim Israel Navigation Co. Ltd., 7-9 Pal-Yam Ave., P.O. Box 1723, Haifa 31016 Israel. (Hill, MI)

SLOVAKIA
Radio Slovakia Int'l, 5930 kHz. Full data photo postcard of studio building, unsigned. Received in 26 days for an English report, Maine postcard and one U.S. dollar. Station address: Slovensky Rozhlas, Mytna 1, 812 90 Bratislava, Slovakia. (Stanley D. Mayo, Winslow, ME)

SWAZILAND
Trans World Radio, 9500 kHz. Full data map/scenery card, signed by Mrs. L. Stavopoulas. Received in 56 days for an English report, Maine postcard and one U.S. dollar. Station address: P.O. Box 64, Manzini, Swaziland. (Mayo, ME)

THAILAND
Radio Thailand, 11855 kHz. Full data "dancers" card, unsigned. Received in 45 days for an English report, Maine postcard and one U.S. dollar. Station address: c/o External Service, 238 Vibhavadi Rangsit Highway, Huaykhwang, Bangkok 10400, Thailand. (Mayo, ME)

VATICAN CITY STATE
Radio Vatican, 7305 kHz. Full data "transmitter center/antenna" card, unsigned. Received in 16 days for an English report. Station address: 00120 Citta del Vaticano, Vatican State. (Washburn, ME; Frank Hillton, Charleston, SC)

VIETNAM
Voice of Vietnam, 7360 kHz via Tbilisskaya, Russia. Full data QSL card unsigned. Received in 45 days for an English report. Station address: Overseas Service, 58 Quan Su St., Hanoi, Vietnam. (Kevin Hecht, Devon, PA)

How to Use the Shortwave Guide

1: Convert your time to UTC.

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Daylight Savings Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Time, respectively.

Note that all dates, as well as times, are in UTC; for example, the BBC's "John Dunn Show" (0030 UTC Sunday) will be heard on Saturday evening (8:30 pm Eastern, 5:30 PM Pacific) in North America, not on Sunday.

2: Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings except for the "Newsline" listing, which begins on the next page.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The letter stands for a day of the week, as indicated below, and the four digits represent a time in UTC.

S: Sunday T: Tuesday H: Thursday A: Saturday
M: Monday W: Wednesday F: Friday

3: Find the frequencies for the program or station you want to hear.

Look at the page which corresponds to the time you will be listening. Comprehensive frequency information for English broadcasts can be found at the top half of the page. All frequencies are in kHz.

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the station name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

4: Choose the most promising frequencies for the time, location and conditions.

Not all stations can be heard and none all the time on all frequencies. To help you find the most promising frequency, we've included information on the target area of each broadcast. Frequencies beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible. Every frequency is followed by one of these target codes:

am: The Americas
na: North America
ca: Central America
sa: South America
eu: Europe
af: Africa
me: Middle East
as: Asia
au: Australia
pa: Pacific
va: various
do: domestic broadcast
om: omnidirectional

Consult the propagation charts. To further help you find the right frequency, we've included charts at the back of this section which take into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the region in which you live and find the chart for the region in which the station you want to hear is located. The chart indicates the optimum frequencies for a given time in UTC.

Hot News and Hot Spots

More SW News Compiled by Glenn Hauser

From war-torn Abkhazia, "Govorit Sukhumi" heard on 9504.7 in Abkhaz and Russian, Mon-Fri 0330-0430, Fri 0500-0520, also at 1500-1600, says Rumen Pankov, Bulgaria, via Wolfgang Büschel via *Jihad-DX*. Presumably also from Abkhazia, Barry Williams heard on 9365 Red Cross programming in simple, "kinderGerman" at 0510, also from International Committee for Defense of Human Rights, in English, German, Abkhaz, asking for letters; fair but no ID heard; via *DX Partyline*.

For Chechnya, R. Free Caucasus, proposed to broadcast from Poland, was on-again, off-again, due to Russian pressure on Poland, which decided only FM was available, while they needed SW for such a range says BBCM. Pres. Walesa finally nixed it, but latest plan was to beam service by satellite, not requiring license, for relay by a "terrestrial station in the Caucasus" (BBCM)

We suspected a typo in Tokyo when Radio Japan's *Media Roundup* gave 11270 as a frequency for R. Dnestr International in English except Fridays at 2030-2100, along with 9620, 15290, but Kevin Hecht received a QSL with identical info, despite the fact that it has really been heard only on 11750 this summer; maybe "11270" was supposed to be "11720," another Russian channel.

Hecht also got a QSL from Croatia, saying 5895 has 10 kW, and 7370 has 100, as of April, though the lower channel sounded stronger.

Voice of the Islamic Republic of Iran, heard by Hecht, announced most but not all of the higher frequencies compiled by BBC Monitoring for English hours: 1130 on 17750, 15260, 11930, 11875, 11790, 11745; 1530 on 17750, 15260, 11875; 1930 on 9022, 7260; 2130 on 6175; 0030 on 9022, 7260, 7180, 6175. V. Of Human Rights and Freedom for the People of Iran on new 9255 in Farsi 1430-1625 says Finn Krone, Wavescan via Anker Peterson, HCJB *TLC*. Also *1545 on new 15150 with English ID, into Farsi politics, jammed reports Peterson, DSWCI via HCJB *TLC*.

Voice of Eritrea, "for citizens in the homeland," has shown up on 17740 at 1600-1700, used before and after that time by Iraqi radio; reception is poor due to jamming already on the frequency, and believed not to be by Eritrea; includes Tigrigna, Arabic music, says BBCM via HCJB *DX Partyline*.

As part of a huge rally attended by tens of kilopersons, Pres. Muhammad Farah Aydid said Voice of the Somali People would henceforth be called Radio Mogadishu, Voice of the Masses of the Somali People, or in Somali, *Radiyo Mugdisho, 'Odka Sha'abka ee Jamhuriyyada Soomaaliyeed*, as monitored by BBC.

VORGAN, the UNITA station for Angola, opens on 9700 at 0500, switches to 11830 at 1100, and at 1800 adds 7100, RN *Media Network* reported on an African special.

Jim Frimmel's Program Tip

DEUTSCHE WELLE

Mercedes is developing a low-cost automobile called the *Eco-speedster*, which will sell in the $10K-$14K range. As reported in the shortwave program *German Tribune*, this is to be a small car capable of carrying two passenger and a case of beer! The Voice of Germany's *International Talking Point* will be reporting on new technologies for public transport on September 16th and 17th. The program can be heard at 0909, 1616, and 2116 Saturday, and 0416 and 0616 Sunday UTC. Photo courtesy DW *Tune In*.

MT Monitoring Team

Gayle Van Horn, Frequency Manager
North Carolina

Next Reporting Deadline
September 20, 1995

Jim Frimmel, Program Manager
Texas

Dave Datko
California

Jeff Demers
New Hampshire

Jacques d'Avignon
Propagation Forecasts
Ontario, Canada

newsline

"Newsline" is your guide to news broadcasts on the air. • All broadcasts are world news reports unless followed by an asterisk, which means the broadcast is primarily national news. • All broadcasts are daily unless otherwise noted by the day codes.

0000 UTC
(8:00 PM EDT, 5:00 PM PDT)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (south as)
Canada (North-Quebec)
China Radio Int'l
Croatian Radio
Monitor Radio Int'l [T-A]
Radio Australia
Radio New Zealand Int'l
Radio Prague
Radio Thailand
Radio Ukraine Int'l
Radio Yugoslavia [M-A]
Radio Exterior de Espana
Voice of America (am)
Voice of America (as)
Voice of America (ca)
Voice of Russia
Radio Pyongyang
0010
China Radio Int'l*
Voice of America (ca) [T-A]*
0015
Radio Cairo
0030
All India Radio
Radio Nacional de Venezuela [T-S]
Radio Netherlands Int'l
Radio New Zealand Int'l [M-F]
Radio Sweden [T-A]
Radio Thailand [T-S]
Voice of America (am) [T-S] (Special English)
Voice of America (as) (Special English)
Voice of Russia
0045
BBC (am)*
BBC (as pac)*
BBC (south as)*
0050
RAI Italy

0100 UTC
(9:00 PM EDT, 6:00 PM PDT)
BBC (am) (Newsdesk)
BBC (as pac)
BBC (south as) (Newsdesk)
Canada (North-Quebec) [S]
Croatian Radio
Deutsche Welle
FEBC (Philippines)
HCJB
KVOH [T-A]
Monitor Radio Int'l [T-A]
R Slovakia Int'l [A]*
R Slovakia Int'l [S/T-F]
Radio Australia
Radio Budapest
Radio Canada Int'l
Radio Havana Cuba [T-S]
Radio Japan
Radio Korea
Radio New Zealand Int'l
Radio Norway Int'l [M]
Radio Prague
Radio Exterior de Espana
Swiss Radio Int'l
Voice of America (am)
Voice of America (as)
Voice of America (ca)
Voice of Indonesia
Voice of Russia
Voice of Vietnam
0110
Radio Australia [M-F]*
0113
Radio Havana Cuba [T-S]*
0130
Radio Austria Int'l
Radio Havana Cuba [T-S]
Radio Netherlands Int'l
Radio Portugal Int'l [T-A]
Radio Sweden [T-A]
Voice of Greece
Voice of Russia [T-A]
0145
Radio Tirana
0155
Radio Canada Int'l [T-A]
Vatican Radio
Voice of Indonesia

0200 UTC
(10:00 PM EDT, 7:00 PM PDT)
BBC (af) (Newsday)
BBC (am) (Newsday)
BBC (as pac) (Newsday)
BBC (eu) (Newsday)
BBC (south as) (Newsday)
Canada (North-Quebec)
Croatian Radio
Deutsche Welle
Monitor Radio Int'l [T-A]
Radio Australia
Radio Canada Int'l
Radio Havana Cuba [T-S]
Radio New Zealand Int'l [M-A]
Radio Romania Int'l
RAE Argentina [T-A]
Voice of America (as)
Voice of Myanmar (Burma)
Voice of Russia
Voice of Vietnam
WHRI [T-A]
WWCR #3 [T-A]
0203
Voice of Free China
0213
Radio Havana Cuba [T-S]*
0215
Radio Cairo
Radio Nepal
0228
Radio Havana Cuba [S]
0230
Radio Austria Int'l
Radio Budapest
Radio Havana Cuba [T-A]
Radio Netherlands Int'l
Radio Pakistan
Radio Sweden [T-A]
Radio Tirana
Voice of Russia
0255
KVOH [T-A]

0300 UTC
(11:00 PM EDT, 8:00 PM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [S-F]
BBC (south as)
Canada (North-Quebec)
Channel Africa
China Radio Int'l
Croatian Radio
Deutsche Welle
Monitor Radio Int'l [T-A]
Radio Australia
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Int'l [M-A]
Radio Prague
Radio Thailand
Radio Ukraine Int'l
Voice of America (af) [A-S]
Voice of Russia
Voice of Turkey
WHRI [T-A]
WWCR #1 [S]
WWCR #3 [T-A]
0301
Voice of America (af) [M-F]*
0303
Voice of Free China
0310
China Radio Int'l*
0313
Radio Havana Cuba [T-S]*
0315
Radio Cairo
Voice of Greece [S]
0320
Radio Philipinas [M-A]
Vatican Radio
0330
BBC (eu) [A]
Radio Dubai
Radio Havana Cuba [T-S]
Radio Nacional de Venezuela [T-S]
Radio Prague
Radio Sweden [T-A]
Voice of America (af) [M-F] (Special English)
Voice of Russia
0340
BBC (af)*
Voice of Greece
0355
Radio Japan [W-M]

0400 UTC
(12:00 AM EDT, 9:00 PM PDT)
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac)
BBC (eu) [S-F] (Newsdesk)
BBC (south as) (Newsdesk)
Canada (North-Quebec)
Channel Africa
China Radio Int'l
Croatian Radio
Deutsche Welle
Monitor Radio Int'l [T-F]
Radio Australia
Radio Bulgaria
Radio Canada Int'l
Radio Havana Cuba [T-S]
Radio New Zealand Int'l [A]
Radio New Zealand Int'l [M-F]*
Radio Norway Int'l [M]
Radio Romania Int'l
Radio Tanzania
Swiss Radio Int'l
Voice of America (af)
Voice of America (me)
Voice of Israel/KOL
Voice of Russia
WYFR (Satellite Network) [T-A]
ZBC Zimbabwe
0403
Radio Pyongyang
0410
China Radio Int'l*
0413
Radio Havana Cuba [T-S]*
0425
RAI Italy
0430
BBC (af)*
BBC (eu) [A]
Radio Finland
Radio Havana Cuba [T-A]
Radio Netherlands Int'l
Radio Yugoslavia
Voice of Russia
0431
Voice of America (af) [M-F]*

0500 UTC
(1:00 AM EDT, 10:00 PM PDT)
BBC (af) (Newsday)
BBC (am) (Newsday)
BBC (as pac) (Newsday)
BBC (eu) (Newsday)
BBC (south as)
Canada (North-Quebec)
Channel Africa
China Radio Int'l
Deutsche Welle
HCJB
Monitor Radio Int'l [T-F]
Radio Australia
Radio Cameroon
Radio Canada Int'l [M-F]
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Int'l [S-F]
Radio Exterior de Espana
Swiss Radio Int'l (eu)
Voice of America (af)
Voice of America (me)
Voice of Russia
WWCR #1 [M-F]
0510
China Radio Int'l*
Radio Australia [M-F]*
0513
Radio Havana Cuba [T-S]*
0530
BBC (af)*
Radio Austria Int'l
Radio Havana Cuba [T-A]
Radio Romania Int'l
Voice of Nigeria
Voice of Russia
0555
Radio Japan [A]

0600 UTC
(2:00 AM EDT, 11:00 PM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Deutsche Welle
Monitor Radio Int'l [T-F]
Radio Australia
Radio Havana Cuba [T-S]
Radio Japan
Radio Korea
Radio New Zealand Int'l [M-A]
Radio Norway Int'l [S]
Radio Prague
Yemeni Rep. Radio
Swiss Radio Int'l
Swiss Radio Int'l (eu)
Voice of America (af) [A-S]

Voice of America (me)
Voice of Kenya
Voice of Malaysia
Voice of Russia
WWCR #1 [M]
WWCR #3 [S]
0601
Voice of America (af) [M-F]*
0603
Radio Pyongyang
0613
Radio Havana Cuba [T-S]*
0628
Radio Havana Cuba [S]
0630
BBC (af)*
Radio Austria Int'l [T-S]
Radio Havana Cuba [T-A]
Radio Vlaanderen Int'l
Yemeni Rep. Radio
Vatican Radio [H]
Voice of Nigeria [M-F]
Voice of Russia
0632
Radio Romania Int'l
0645
Radio Finland
Radio Romania Int'l
Voice of Nigeria [M-F]*
0655
Radio Japan [W-M]
Voice of Med. (Malta) [M-F]

0700 UTC
(3:00 AM EDT, 12:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
KWHR (Hawaii) [M-F]
Monitor Radio Int'l [T-F]
Papua New Guinea
Radio Australia
Radio Japan
Radio New Zealand Int'l [A]
Radio New Zealand Int'l [M-F]*
Voice of Myanmar (Burma)
Voice of Russia
WWCR #1 [M-F]
0703
Radio Pyongyang
Voice of Free China
0710
Radio Australia [M-F]*
0730
HCJB
Radio Austria Int'l [T-S]
Radio Netherlands Int'l
Radio Prague
Vatican Radio [M-F]
Voice of Greece
Voice of Russia [M-A]
0750
Radio New Zealand Int'l [M-F]*
Russia (Radio Pacific Ocean) [A]
0755
Radio Japan
Voice of Med. (Malta) [M-F]

0800 UTC
(4:00 AM EDT, 1:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
KNLS
Monitor Radio Int'l [M-A]
Radio Australia
Radio Finland
Radio Korea
Radio New Zealand Int'l
Radio Pakistan
Voice of Indonesia [A-H]
Voice of Malaysia
Voice of Russia
WWCR #1 [W-F]
0803
Radio Pyongyang
0810
Radio New Zealand Int'l [M-F]*
0830
R Slovakia Int'l
Radio Netherlands Int'l
Voice of Armenia [S]
Voice of Russia
0855
Voice of Indonesia [A-H]

0900 UTC
(5:00 AM EDT, 2:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
China Radio Int'l
Deutsche Welle
HCJB
Monitor Radio Int'l [M-A]
Papua New Guinea [M]*
Radio Australia
Radio Japan
Radio New Zealand Int'l [M-A]
Radio Vlaanderen Int'l [M-A]
Swiss Radio Int'l
Voice of Russia
WWCR #1 [H-F]
WWCR #3 [A]
0910
China Radio Int'l*
Radio Australia [M-F]*
0930
[S]
FEBC (Philippines)
Radio Austria Int'l [M-A]
Radio Netherlands Int'l
Voice of Russia
0945
Deutsche Welle [M-F]*
0955
Radio Japan

1000 UTC
(6:00 AM EDT, 3:00 AM PDT)
All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
China Radio Int'l
FEBC (Philippines) [M-F]*
Monitor Radio Int'l
Papua New Guinea
Radio Australia
Radio New Zealand Int'l [S-F]
Radio Tanzania
Swiss Radio Int'l (eu)
Voice of America (as)
Voice of America (ca)
Voice of Israel
Voice of Kenya
Voice of Russia
Voice of Vietnam
WWCR #1 [M-F]
WYFR (Satellite Network) [M-A]
1010
China Radio Int'l*
Radio New Zealand Int'l [M-F]*
1020
Radio New Zealand Int'l [H]*
Vatican Radio [M-A]
1030
Radio Dubai
Radio Netherlands Int'l
Radio Prague
Voice of Nigeria
Voice of Russia
WYFR (Satellite Network) [M-F]
1045
Voice of Nigeria [A-S]*

1100 UTC
(7:00 AM EDT, 4:00 AM PDT)
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
BBC (south as) [H-T] (Newsdesk)
Canada (North-Quebec) [A-S]
Deutsche Welle
Monitor Radio Int'l [M-A]
Papua New Guinea/NBC
Radio Australia
Radio Ghana [A-S]
Radio Japan
Radio Jordan
Radio Mozambique
Radio New Zealand Int'l (Newsdesk)
Radio Pakistan
Radio Singapore Int'l
Swiss Radio Int'l
Swiss Radio Int'l (eu)
Voice of America (as)
Voice of America (ca)
Voice of Russia
WHRI [A]
WWCR #1 [M-A]
WYFR (Satellite Network) [M-A]
1103
Radio Pyongyang
1110
Radio Australia*
1130
Radio Austria Int'l
Radio Bulgaria
Radio Finland [M-F]
Radio Korea
Radio Nacional de Venezuela [M-A]
Radio Singapore Int'l
Radio Sweden [M-F]
Voice of Asia
Voice of Russia
WYFR (Satellite Network) [M-A]
1145
Deutsche Welle [M-F]*
1155
Radio Japan [S-F]

1200 UTC
(8:00 AM EDT, 5:00 AM PDT)
BBC (af) [M-A]
BBC (am)
BBC (as pac) [M-A]
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Int'l
Monitor Radio Int'l [M-A]
Papua New Guinea/NBC
Polish Radio [A]
Polish Radio [M-F]*
Radio Australia
Radio Canada Int'l [M-F]
Radio France Int'l
Radio New Zealand Int'l [H-T]
Radio Norway Int'l [S]
Radio Singapore Int'l
Radio Tashkent
Voice of America (as)
Voice of Russia
WYFR (Satellite Network) [M-F]
1203
Radio Korea
Voice of Free China
1204
HCJB [M-F]
1210
China Radio Int'l*
1215
BBC (af) [M-A]*
BBC (eu)*
BBC (south as) [M-A]*
1230
HCJB [M-F]*
Radio Austria Int'l
Radio Bangladesh [S-M]
Radio Cairo
Radio Canada Int'l
Radio Finland [M-A]
Radio Netherlands Int'l
Radio Singapore Int'l
Radio Sweden [M-F]
Radio Vlaanderen Int'l [S]
Voice of Russia [M-A]
Voice of Turkey
Voice of Vietnam
WYFR (Satellite Network) [M-F]
1231
Radio France Int'l [T]*
1240
Voice of Greece

1300 UTC
(9:00 AM EDT, 6:00 AM PDT)
BBC (af) (Newshour)
BBC (am) (Newshour)
BBC (as pac) (Newshour)
BBC (eu) (Newshour)
BBC (south as) (Newshour)
Canada (North-Quebec) [S]
China Radio Int'l
KNLS
Monitor Radio Int'l [M-A]
Papua New Guinea/NBC
Radio Australia
Radio Canada Int'l [S]
Radio Ghana
Radio Norway Int'l [S]
Radio Romania Int'l [M-A]
Radio Singapore Int'l
Radio Tanzania [A-S]
Radio Vlaanderen Int'l [M-A]
Swiss Radio Int'l
Voice of America (as)
Voice of Kenya
Voice of Russia
WWCR #1 [A]
WYFR (Satellite Network) [M-F]
1301
Radio Romania Int'l [S]
1303
Radio Pyongyang
1310
China Radio Int'l*
Radiobrás [M-F]*
1324
HCJB [M-F]
1328
Radio Cairo
1330
All India Radio
FEBC (Philippines)
Radio Austria Int'l
Radio Canada Int'l
Radio Dubai
Radio Finland
Radio Netherlands Int'l
Radio Portugal Int'l [M-F]
Radio Singapore Int'l
Radio Sweden [M-F]
Radio Tashkent
Voice of America (as) (Special English)
Voice of Russia
Voice of Vietnam
1355
Radio Singapore Int'l

1400 UTC
(10:00 AM EDT, 7:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Int'l
Monitor Radio Int'l [M-A]
Radio Australia
Radio Cameroon
Radio Canada Int'l [S]
Radio France Int'l
Radio Ghana
Radio Japan
Radio Korea [M-A]
Voice of America (as)
Voice of Russia
WWCR #1 [M-F]
1410
China Radio Int'l*
1415
Radio Nepal
1424
HCJB [M-F]
1430
FEBC (Philippines)
Radio Nacional de Venezuela [M-A]
Radio Netherlands Int'l
Radio Romania Int'l [T-S]
RTM Morocco [S]
Voice of Myanmar (Burma)
Voice of Russia
WYFR (Satellite Network) [M-F]
1431
Radio France Int'l [T]*
Radio Romania Int'l [M]
1440
FEBC (Philippines) [M-F]*
1445
All India Radio
Voice of Myanmar (Burma)
1455
Radio Japan [A]
Voice of Med. (Malta) [M-F]

1500 UTC
(11:00 AM EDT, 8:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac) [A-S]
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
Channel Africa
China Radio Int'l
Monitor Radio Int'l [M-A]
Radio Australia
Radio Canada Int'l [S]
Radio Japan
Radio Jordan
Radio Omdurman
Estonian Radio [M-F]
Swiss Radio Int'l
Swiss Radio Int'l (eu)
Voice of America (as)
Voice of America (me)
Voice of Russia
WWCR #1 [M-F]
WYFR (Satellite Network) [A]
1503
Radio Pyongyang
1510
China Radio Int'l*

1525
Radio Veritas [T-F]
1528
BBC (af) [M]*
1530
All India Radio*
FEBA (Seychelles)
FEBC (Philippines)
Radio Austria Int'l
Radio Finland
Radio Netherlands Int'l
Voice of Nigeria [M-H]
Voice of Russia
1540
Radio Veritas [A-M]
1550
Voice of Med. (Malta) [F]
1555
Radio Japan [A]
Radio Veritas [A-M]
Voice of Med. (Malta) [M-H]

1600 UTC
(12:00 PM EDT, 9:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A]
Channel Africa
China Radio Int'l
Deutsche Welle
Monitor Radio Int'l [M-A]
Radio Australia
Radio France Int'l
Radio Jordan
Radio Korea
Radio Norway Int'l [S]
Radio Pakistan
Radio Prague
Radio Tanzania
Radio Tirana
Voice of America (af) [A-S]
Voice of America (as)
Voice of America (me)
Radio Ethiopia
Voice of Kenya
Voice of Russia
Voice of Vietnam
WRNO [M-F]
WYFR (Satellite Network) [M-A]
1604
HCJB [M-F]
1610
China Radio Int'l*
1612
Vatican Radio
1615
Radio Sweden
Vatican Radio
1630
Channel Africa [F]*
HCJB [M-F]*
Radio Canada Int'l
Radio Dubai
Voice of America (af) [M-F]*
Voice of America (as) (Special English)
Voice of America (me) (Special English)
Radio Ethiopia
Voice of Russia [S-F]
1638
Deutsche Welle [M-F]*
1645
BBC (am) [M-F]*
BBC (as pac) [M-F]*
Radio Canada Int'l [M-F]

1700 UTC
(1:00 PM EDT, 10:00 AM PDT)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A]
China Radio Int'l
HCJB
Monitor Radio Int'l [M-A]
Polish Radio [A]
Polish Radio [M-F]*
Radio Australia
Radio France Int'l
Radio Japan
Radio New Zealand Int'l [M-F]*
Radio Pakistan
Radio Prague
Swiss Radio Int'l
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Russia
WWCR #3 [A]
1703
Radio Pyongyang
1710
China Radio Int'l*
Radio Australia*
1725
Radio New Zealand Int'l [F]*
1730
Radio Austria Int'l
Radio Netherlands Int'l
Radio Romania Int'l
Radio Sweden [M-F]
Voice of Russia
1740
BBC (af) [W-M]*
1745
Voice of Armenia [M-F]
1755
Radio New Zealand Int'l [M-W]*
1758
BBC (af) [W]*

1800 UTC
(2:00 PM EDT, 11:00 AM PDT)
All India Radio
BBC (af) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
BBC (south as) (Newsdesk)
Monitor Radio Int'l [M-A]
Radio Australia
Radio Cameroon
Radio Mozambique
Radio New Zealand Int'l [M-F]*
Radio Norway Int'l [S]
Radio Omdurman
Radio Tanzania
Radio Vlaanderen Int'l
Yemeni Rep. Radio
Voice of America (af) [A-S]
Voice of America (af) [M-F]*
Voice of America (me)
Voice of Kenya
Voice of Russia
Voice of Vietnam
WHRI [M-F]
WWCR #1 [S-F]
WWCR #3 [M-A]
1830
BBC (af) [A-S]*
R Slovakia Int'l
Radio Bangladesh
Radio Kuwait
Radio Nacional de Venezuela [M-A]
Radio Netherlands Int'l
Radio Tirana
Yemeni Rep. Radio
Radio Yugoslavia
Voice of America (af) [A-S] (Special English)
Voice of America (me) (Special English)
Voice of Russia
1840
Voice of Greece [M-A]
1855
Radio New Zealand Int'l [M-H]*
1858
BBC (af) [M-F]*

1900 UTC
(3:00 PM EDT, 12:00 PM PDT)
All India Radio
BBC (af)
BBC (as pac) (Newshour)
BBC (eu) (Newshour)
China Radio Int'l
Deutsche Welle
Monitor Radio Int'l [M-A]
Radio Australia
Radio Budapest
Radio Bulgaria
Radio Japan
Radio Korea
Radio New Zealand Int'l
Radio Portugal Int'l [M-F]
Radio Romania Int'l [T-S]
Swiss Radio Int'l (eu)
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Israel
Voice of Russia
Voice of Vietnam
WHRI [M-F]
WWCR #3 [S-H]
1901
Radio Romania Int'l [M]
1910
China Radio Int'l*
Radio Australia [M-F]*
Radiobrás [M-F]*
1925
Deutsche Welle [M]*
1930
Deutsche Welle [T-F]*
Polish Radio [A-S]
Polish Radio [M-F]*
Radio Austria Int'l
Radio Finland
Radio Netherlands Int'l
1935
RAI Italy

2000 UTC
(4:00 PM EDT, 1:00 PM PDT)
BBC (af) (Newshour)
BBC (am)
BBC (as pac) [A]
BBC (eu)
BBC (eu) [S-F]*
China Radio Int'l
Deutsche Welle
KVOH [A-S]
Monitor Radio Int'l [M-A]
Radio Australia
Radio Canada Int'l
Radio New Zealand Int'l
Radio Prague
Swiss Radio Int'l
Voice of America (af) [A-S]
Voice of America (af) [M-F]*
Voice of America (me)
Voice of Greece [M-A]
Voice of Indonesia
Voice of Nigeria [M-F]
Voice of Russia
Voice of Turkey
WHRI [M-F]
WWCR #3 [S]
2003
Radio Pyongyang
2007
Radio Damascus [M-F]
2010
China Radio Int'l*
Radio New Zealand Int'l [S-H]*
2025
RAI Italy
2030
Radio Netherlands Int'l
Radio Latvia
Radio Sweden [M-F]
Radio Thailand
Voice of Russia
Voice of Vietnam
2055
Radio Canada Int'l [M-F]
Voice of Indonesia [M]
2057
Radio Kuwait

2100 UTC
(5:00 PM EDT, 5:00 PM PDT)
All India Radio
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
Canada (North-Quebec) [A-S]
China Radio Int'l
Deutsche Welle
KVOH [S]
Monitor Radio Int'l [M-A]
Radio Australia
Radio Budapest
Radio Bulgaria
Radio Cameroon
Radio Canada Int'l
Radio Damascus [F]
Radio Havana Cuba [M-A]
Radio Japan
Radio New Zealand Int'l [A-H]
Radio Romania Int'l
Radio Ukraine Int'l
Radio Vlaanderen Int'l [S-F]
Radio Yugoslavia
Radio Exterior de Espana
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Russia
WWCR #1 [M-F]
WWCR #3 [M-A]
2110
China Radio Int'l*
Radio Damascus [S-M]
Radio New Zealand Int'l [M-H]*
2112
Radio Damascus [F]
2115
BBC (af)*
BBC (eu)*
Radio Damascus [T]
2120
Radio Cairo
2130
Radio Cairo
Radio Finland
Radio Havana Cuba [M-A]*
Radio Nacional de Venezuela [M-A]
Radio Sweden [M-F]
Voice of Russia [M-F]
2145
Radio Damascus [W]
Radio Korea

2200 UTC
(6:00 PM EDT, 3:00 PM PDT)
All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
Canada (North-Quebec) [S]
China Radio Int'l
Croatian Radio
Monitor Radio Int'l [M-A]
Radio Australia
Radio Canada Int'l
Radio Havana Cuba [M-A]
Radio Korea
Radio New Zealand Int'l [A-H]
RAI Italy
Radio Exterior de Espana
Voice of America (as)
Voice of Armenia
Voice of Russia
Voice of Turkey
WHRI [M-F]
2203
Voice of Free China
2210
China Radio Int'l*
2215
Radio Cairo
2230
Radio Canada Int'l [A]
Radio Finland
Voice of America (as) (Special English)
Voice of Russia
2240
Radio Cairo
Voice of Greece [S-F]
2245
Voice of OAS[M-F]*

2300 UTC
(7:00 PM EDT, 4:00 PM PDT)
All India Radio
BBC (af)
BBC (am) [S-F]
BBC (as pac)
BBC (eu)
Canada (North-Quebec) [A]
Croatian Radio
Deutsche Welle
KWHR (Hawaii) [M-F]
Monitor Radio Int'l [M-A]
Radio Australia
Radio Bulgaria
Radio Canada Int'l [A-S]
Radio Japan
Radio New Zealand Int'l [A-H]
Radio Vilnius
Voice of America (as)
Voice of Russia
WHRI [M-F]
WWCR #3 [S]
2303
Radio Pyongyang
2315
Radio Cairo
2330
Radio Netherlands Int'l
Radio Vlaanderen Int'l
Voice of Russia
Voice of Vietnam
2335
Voice of Greece [S-F]

Bob's Bargain Bin

Most equipment in **Bob's Bargain Bin** has only slight cosmetic damage. **All equipment comes with a limited warranty and some have the original manufacturer's warranty. UPS ground shipping is free with the purchase of any item.** Quantities limited.

ACC118D	STORAGE POUCH/ INNOVA POWER PACK	9.95
ACC145D	POCKET BANKPACK 100A	7.95
ACC146D	POCKET BANKPACK 100B	10.95
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BOK43D	'94 GUIDE TO SHORTWAVE PROGRAMS	14.95
BOK59D	PROPAGATION PROGRAMS GUIDE	5.95
CTR06LD	OPTO 3000A FREQUENCY COUNTER	299.95
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SCN08	BEARCAT 855-XLT	169.95
SCN17D	PRO-43 (NON-RESTORABLE)	293.95
SCN31	PRO-62	229.95
UACC164	SCAN-STAR COMMERCIAL	109.95
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UACC40A	MFJ-1289 HI-RES. ENHANCER 5 1/4"	31.95
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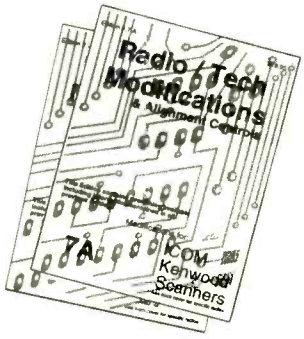
UACC44	MFJ-5026 KENWOOD HT	6.95
UACC45	MFJ-5024 CABLE	6.95
UACC46	MFJ-5086 CABLE	6.95
UACC61	MFJ-1290 AMIGA ADAPTER	29.95
UACC95	AC ADAPTER, 1.2 VOLT	5.95
UANT01	SCANNER BEAM ANTENNA	45.95
UANT02	SKYWIRE ANTENNA	29.95
UANT09	WIDEBAND DISCONE ANTENNA	80.95
UANT21	SELECT-A-TENNA	59.95
UBOK10B	RADIO TECH MOD VOL. 6B	15.95
UBOK22	1994 POLICE CALL BOOK, VOL. 2	5.95
UBOK23	1994 POLICE CALL BOOK, VOL. 3	5.95
UBOK25	1994 POLICE CALL BOOK, VOL. 5	5.95
UBOK29	1994 POLICE CALL BOOK, VOL. 9	5.95
UBOK42	HIDDEN SIGNALS ON SATELLITE TV	14.95
UBOK50	3D. ED. WORLD HAM NET DIRECTORY	9.95
UCHT01	COLOR WALL FREQUENCY CHART	6.95
UCPL63B	COUPLER, AM/FM TO SCANNER BNC	9.95

UCTR08	OPTO FREQUENCY SCOUT, VERSION 2	349.95
UDEM01	SOMERSET DEMODULATOR M100	150.95
UDEM01B	SOMERSET DEMOD. M100B (W/ BAT.)	170.95
UDEM02	SOMERSET DEMODULATOR M200	220.95
UGP22	ICOM GPS	489.95
UPHN03	UNIDEN EXP-9100 CORDLESS PHONE	259.95
UPWR02	INNOVA POWER PACK	40.95
URCV09S	SANGEAN ATS-818 (NO TAPE DECK)	189.95
URCV10	SONY ICF-SW-77	449.95
URCV11	SONY SW7600G (NO WHEEL ANTENNA)	184.95
URCV19	DRAKE SW-8	565.95
USCN14	ICOM R-100	639.95
USCN15-C	ICOM R-7100 (BLOCKED)	1279.95
USCN16	PRO-2026	189.95
USCN23	SPORTCAT 150-XLT	179.95
USCN24	BEARCAT 220-XLT	209.95
USCN28	PRO-2035	359.95
USCN29	BEARCAT 3000-XLT	379.95
USCN30	BEARCAT 9000-XLT	375.95
USFT02	SCAN-CAT GOLD	89.95
USPK13	GROVE SOUND ENHANCER	229.95
UVID100	9" CTR MONITOR	89.95
UVID200	9" CTR MONITOR	109.95



Trade—Ins 90—Day Warranty.

TIN01	BEARCAT 100-XLT	149.95
TIN04	PRO-2035 (LIKE NEW)	395.95
TIN05	PRO-2035	385.95
TIN08	ICOM R-100	599.95
TIN14	PRO-2035	359.95
TIN16	SONY SW-55	289.95
TIN17	PRO-62	199.95
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TIN26	KENWOOD R-5000 W/ACCESSORIES	899.95
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TIN28	SONY SW-7600 W/AC POWER SUPPLY	125.95
TIN31	ICOM R-72	594.95
TIN32	KENWOOD R-5000	648.95
TIN33	DRAKE R8	898.95
TIN37	BEARCAT 100-XLT	178.95
TIN40	PRO-43 (CELLULAR RESTORED)	269.95

Grove Enterprises

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(800) 438-8155 US & Canada Only;
(704) 837-9200; FAX (704) 837-2216

0000 UTC SHORTWAVE GUIDE 8:00 PM EDT 5:00 PM PDT

FREQUENCIES

0000-0030	Australia, Radio	9610as	13605pa	13745as	17750as
0000-0100 vl	Australia, VL8A Alice Spg	4835do			
0000-0100 vl	Australia, VL8K Katherine	5025do			
0000-0100 vl	Australia, VL8T Tent Crk	4910do			
0000-0015	Cambodia, Natl Voice of	11940as			
0000-0100	Canada, CBC N Quebec Svc	9625do			
0000-0100	Canada, CFCX Montreal	6005do			
0000-0100	Canada, CFRX Toronto	6070do			
0000-0100	Canada, CFVP Calgary	6030do			
0000-0100	Canada, CHNX Halifax	6130do			
0000-0100	Canada, CKZN St John's	6160do			
0000-0100	Canada, CKZU Vancouver	6160do			
0000-0100	China, China Radio Intl	9710na	11715na		
0000-0100	Costa Rica, AWR Alajuela	5030am	6150am	7375am	9725am
		13750am			
0000-0010	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0000-0027	Czech Rep, Radio Prague	5930na	7345na		
0000-0030	Egypt, Radio Cairo	9900na			
0000-0100	Ghana, Ghana Broadc Corp	3366do	4915do		
0000-0045	India, All India Radio	9705as	9950as	11745as	13750as
		15145as			
0000-0015 f/vl	Italy, IRRS Milan	7125va			
0000-0100	Lebanon, Voice of Hope	6280me			
0000-0100	Lebanon, Voice of Hope	6280me			
0000-0100	Lebanon, Wings of Hope	9960va			
0000-0004	Lithuania, Radio Vilnius	7150na			
0000-0100	Malaysia, Radio	7295do			
0000-0100	Malaysia, RTM/Kota Kinab	5980do			
0000-0100	Malaysia, RTM/Kuching	7160do			
0000-0100	Netherlands, Radio	6020na	6165na	9845na	
0000-0100	New Zealand, R NZ Intl	15115pa			
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	
0000-0100	Palau, KHBN/Voice of Hope	15140as			
0000-0100 vl	Papua New Guinea, NBC	4890do	9675do		
0000-0100	Philippines, FEBC/R Intl	15450as			
0000-0100	Russia, Voice of	7125na	7260na	9530na	9620na
		9720na	9750na	11730na	11750na
0000-0100	Spain, R Exterior Espana	9540na			
0000-0030	Thailand, Radio	9655as	9680af	11905af	
0000-0100	Ukraine, R Ukraine Intl	9685na	9750na	9835na	9860na
		11610na	11780na	11875na	11950na
0000-0030	Ukraine, R Ukraine Intl	4825na			
0000-0100	United Kingdom,BBC London	5965as	5970sa	5975va	6175na
		6195as	7325va	9410as	9590va
		9915sa	11750sa	11955as	15280as
		15360as			
0000-0030	United Kingdom,BBC London	7110as	7180as	9580as	11945as
0000-0100	USA, KAIJ Dallas TX	5810am			
0000-0100	USA, KTBN Salt Lk City UT	15590am			
0000-0100	USA, KVOH Los Angeles CA	17775am			
0000-0100	USA, KWHR Naalehu HI	17510au			
0000-0100	USA, Monitor Radio Intl	7535am	9430ca		
0000-0100	USA, VOA Washington DC	5995am	6130am	7215as	7405am
		9455am	9770as	9775am	1695am
		11760as	3740am	15185au	15205a
		15290as	17735as	17820a	
0000-0100	USA, WEWN Birmingham AL	5825eu	7425na	15375eu	
0000-0100	USA, WHRI Noblesville IN	5745am	17510am		
0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0100	USA, WRMI/R Miami Intl	9955am			
0000-0030 twhfa	USA, WRMI/R Miami Intl	9955am			
0000-0100	USA, WRNO New Orleans LA	7355am			
0000-0100	USA, WVHA Green Bush ME	9852eu			
0000-0100	USA, WWCR Nashville TN	5065am	9475am	13845am	
0000-0045	USA, WYFR Okeechobee FL	6085na			
0000-0030 mtwhfa	Yugoslavia, Radio	9580na	11870na		
0015-0030 sm	USA, VOA Washington DC	11835am	15155am		
0030-0100	Australia, Radio	9580pa	9660pa	11795as	13605pa
		13755as	15240pa	15365pa	15415as	15510as
		17795pa	17860pa		
0030-0100	Ecuador, HCJB Quito	9745am	15540am	21455am	
0030-0100	Iran, VOIRI Tehran	6175na	7180na	7260na	9022na
0030-0100	Netherlands, Radio	5905as	7305as		
0030-0100	Sri Lanka, SLBC Colombo	15425as			
0030-0100	Sweden, Radio	6065sa	9810sa		
0030-0100	Thailand, Radio	9655as	11905as		
0045-0100	USA, WYFR Okeechobee FL	6065na			
0050-0100	Italy, RAI Rome	9645na	11800na		

SELECTED PROGRAMS

Sundays

0000 WYFR (Satellite Net): Patterns in Music. Musical essays based on scripture.
0005 BBC (south as): Science and Technology. The Laws of Nature. See S 0350.
0010 Radio New Zealand Int I: Focus on Politics. Developments on the New Zealand political scene.
0020 China Radio Int'l: Travel Talk. An armchair guided tour of scenic spots in Chinese provinces.
0025 Radio New Zealand Int I: NZ Long Range Weather Forecast. Five-day weather forecast with warnings for mariners.
0029 China Radio Int'l: The Cooking Show. Chinese recipes and cooking tips direct from Beijing.
0030 Radio New Zealand Int I: Insight '95. New Zealand's relationships with other countries of the Asia/Pacific region (Nat'l Radio).
0035 China Radio Int'l: Music from China. Chinese music from traditional to pop to annual music festivals.

Mondays

0000 Costa Rica (AWR): Your Radio Doctor. A public service program presented in the interest of health.
0000 WYFR: The Open Forum. See S 0605.
0013 China Radio Int'l: Press Clippings. See S 1213.
0015 Costa Rica (AWR): Music. Recorded selections of Christian music.
0020 China Radio Int'l: China Scrapbook. See S 1220.
0025 China Radio Int'l: Music Album. See S 1225.
0030 BBC (af/eu/as pac): Popular Music. Live from the Archive. See S 0445.
0035 Radio New Zealand Int I: NZ Long Range Weather Forecast. See S 0025.
0040 China Radio Int'l: Listeners' Letterbox. See S 1240.
0040 Radio New Zealand Int I: Rural Report. Farming and agricultural news.
0055 Radio New Zealand Int I: International Business News. Five minutes of commercial news.

Tuesdays

0000 Costa Rica (AWR): Focus on God's Love. Music and an inspirational message.
0000 WYFR (Satellite Net): Family Bible Reading Fellowship. See S 0500.
0012 Costa Rica (AWR): Heart Song. Music to waken your day.
0019 China Radio Int'l: China's Open Windows (biweekly). See M 1219.
0019 China Radio Int'l: The Business Show (biweekly). See M 1219.
0028 Costa Rica (AWR): It is Written. See M 1200.
0030 BBC (as pac): Background Current Affairs Feature. History Today. See T 0530.
0030 WYFR (Satellite Net): The Family Bible Study. See M 0520.
0035 Radio New Zealand Int I: NZ Long Range Weather Forecast. See S 0025.
0040 China Radio Int'l: Learn to Speak Chinese. See M 1240.
0040 Radio New Zealand Int I: Rural Report. See M 0040.
0055 Radio New Zealand Int I: International Business News. See M 0055.

Wednesdays

0000 Costa Rica (AWR): Newsminutes. A brief wrap-up of current events in Costa Rica.
0000 WYFR (Satellite Net): Family Bible Reading Fellowship. See S 0500.
0005 BBC (am): General Feature. A Small Matter of Taste. See T 1505.
0012 China Radio Int'l: News Analysis. See T 1212.
0019 China Radio Int'l: Current Affairs. See T 1219.
0025 Costa Rica (AWR): Your Radio Doctor. See M 0000.
0030 BBC (af/am/as pac/eu): Background Current Affairs Feature. History Today. See T 0530.
0030 BBC (am): Popular Music. What is Jazz? (6th,13th). See T 0615.
0030 WYFR (Satellite Net): The Family Bible Study. See M 0520.
0035 China Radio Int'l: Orient Arena. See T 1235.
0035 Radio New Zealand Int I: NZ Long Range Weather Forecast. See S 0025.
0040 China Radio Int'l: Listeners' Letterbox. See S 1240.
0040 Costa Rica (AWR): This Quiet Moment. Christian messages, song, and Bible trivia.
0040 Radio New Zealand Int I: Rural Report. See M 0040.
0055 Radio New Zealand Int I: International Business News. See M 0055.

Thursdays

0000 Costa Rica (AWR): Your Radio Doctor. See M 0000.
0000 WYFR (Satellite Net): Family Bible Reading Fellowship. See S 0500.
0015 BBC (south as) General Feature. Pick of the World. See M 0630.
0019 China Radio Int'l: Current Affairs. See T 1219.
0030 WYFR (Satellite Net): The Family Bible Study. See M 0520.
0033 China Radio Int'l: Profile. See W 1233.
0035 Radio New Zealand Int I: NZ Long Range Weather Forecast. See S 0025.
0040 China Radio Int'l: Learn to Speak Chinese. See M 1240.
0040 Radio New Zealand Int I: Rural Report. See M 0040.
0055 Radio New Zealand Int I: International Business News. See M 0055.

Fridays

0000 Costa Rica (AWR): Newsminutes. See W 0000.
0000 WYFR (Satellite Net): Family Bible Reading Fellowship. See S 0500.
0002 Costa Rica (AWR): Music. See M 0015.
0005 BBC (south as): Science and Technology (1st,8th). A World of Its Own. See F 0005.
0005 Costa Rica (AWR): Focus on God's Love. See T 0000.
0015 Costa Rica (AWR): Heart Song. See T 0012.
0019 China Radio Int'l: Current Affairs. See T 1219.
0030 Costa Rica (AWR): It is Written. See M 1200.
0030 WYFR (Satellite Net): The Family Bible Study. See M 0520.
0032 China Radio Int'l: Focus. See H 1232.
0035 Radio New Zealand Int I: NZ Long Range Weather Forecast. See S 0025.
0040 Radio New Zealand Int I: Rural Report. See M 0040.
0041 China Radio Int'l: Culture in China. See H 1241.
0055 Radio New Zealand Int I: International Business News. See M 0055.

Saturdays

0000 Costa Rica (AWR): Voice of Prophecy. See S 1230.
0000 WYFR (Satellite Net): Family Bible Reading Fellowship. See S 0500.
0012 Radio New Zealand Int I: Money Matters. See M 0105.
0020 China Radio Int'l: Current Affairs. See T 1219.
0025 Radio New Zealand Int I: NZ Long Range Weather Forecast. See S 0025.
0030 Costa Rica (AWR): It is Written. See M 1200.
0030 WYFR (Satellite Net): The Family Bible Study. See M 0520.
0035 China Radio Int'l: Life in China. See F 1235.
0041 China Radio Int'l: China in Action (biweekly). See F 1241.
0041 China Radio Int'l: World in Action (biweekly). See F 1241.
0047 China Radio Int'l: In the Third World. See F 1247.

FREQUENCIES

0100-0200	Australia, AF Radio	13535as				
0100-0200	Australia, Radio	9580pa	9660pa	13605pa	13745as	
		13755as	15240pa	15245as	15365pa	
		15415as	15510as	17715as	17750as	
		17795pa	17860pa	17880as		
0100-0200 vl	Australia, VL8A Alice Spg	4835do				
0100-0200 vl	Australia, VL8K Katherine	5025do				
0100-0200 vl	Australia, VL8T Tent Crk	4910do				
0100-0200	Canada, CBC N Quebec Svc	9625do				
0100-0200	Canada, CFCX Montreal	6005do				
0100-0200	Canada, CFRX Toronto	6070do				
0100-0200	Canada, CFVP Calgary	6030do				
0100-0200	Canada, CHNX Halifax	6130do				
0100-0200	Canada, CKZN St John's	6160do				
0100-0200	Canada, CKZU Vancouver	6160do				
0100-0200	Canada, RCI Montreal	6120am	9535am	9755am	11940am	
		13670am				
0100-0130	Costa Rica, AWR Alajuela	5030ca	6150sa	7375am	13750am	
0100-0200	Costa Rica, R Peace Intl	7385am	9400am			
0100-0110	Croatia, Croatian Radio	5895eu	7370eu	13830eu		
0100-0200	Cuba, Radio Havana Cuba	6000na	9830na			
0100-0127	Czech Rep, Radio Prague	7345na	9405na			
0100-0200	Ecuador, HCJB Quito	9745am	15540am	21455am		
0100-0150	Germany, Deutsche Welle	6040na	6085na	6110na	6145na	
		9555na	9640na	11740na	11865na	
0100-0200	Guatemala, Radio Cultural	3300do				
0100-0130	Hungary, Radio Budapest	6000na	9835na	11910na		
0100-0130	Iran, VOIRI Tehran	6175na	7180na	7260na	9022na	
0100-0115	Italy, RAI Rome	9645na	11800na			
0100-0200	Japan, NHK/Radio	5960na	9680as	11840as	11860as	
		11900as	11910as	17810as	17845as	
0100-0200	Lebanon, Wings of Hope	9960va				
0100-0200 smtwh	Malaysia, Radio	7295do				
0100-0125	Moldova, R Moldova Intl	9540na				
0100-0200	Netherlands, Radio	5905as	7305as			
0100-0125	Netherlands, Radio	6020na	6165na	9845na		
0100-0200	New Zealand, R NZ Intl	15115pa				
0100-0130 m	Norway, Radio Norway Intl	7480na	9560na			
0100-0200 vl	Papua New Guinea, NBC	4890do	9675do			
0100-0200	Philippines, FEBC/R Intl	15450as				
0100-0200	Russia, Voice of	9530na	9620na	11750na	12050na	
		13645na	13665na	15180na	15425na	
		15580as				
0100-0200	Slovakia, AWR	9465as				
0100-0127	Slovakia, R Slovakia Intl	5930na	7300na	9440sa		
0100-0200	South Korea, R Korea Intl	7550eu	11810na	15575sa		
0100-0200	Spain, R Exterior Espana	9540na				
0100-0200	Sri Lanka, SLBC Colombo	15425as				
0100-0130	Switzerland, Swiss R Intl	5890na	6135na	9885na	9905na	
0100-0200	United Kingdom,BBC London	5970sa	5975va	6175na	6195as	
		7325va	9410as	9590va	9605as	
		9915sa	11750sa	11955as	15360as	
0100-0200	USA, KAIJ Dallas TX	5810am				
0100-0200	USA, KTBN Salt Lk City UT	7510am				
0100-0200	USA, KVOH Los Angeles CA	17775am				
0100-0200	USA, KWHR Naalehu HI	17510au				
0100-0200	USA, Monitor Radio Intl	7535na	9430am			
0100-0200	USA, VOA Washington DC	5995am	6130am	7405am	9455am	
		9775am	13740am	15170as	15205am	
		15250as	17740as	21550as		
0100-0200	USA, WEWN Birmingham AL	5825eu	7425na			
0100-0200	USA, WHRI Noblesville IN	5745am	17510am			
0100-0200	USA, WJCR Upton KY	7490na	13595na			
0100-0200	USA, WRNO New Orleans LA	7355am				
0100-0200	USA, WVHA Green Bush ME	9852eu				
0100-0200	USA, WWCR Nashville TN	5065am	7435am	13845am		
0100-0200	USA, WYFR Okeechobee FL	6065na	9505na			
0100-0130	Vietnam, Voice of	7250na	9840na	15010na		
0130-0200	Austria, R Austria Intl	9655na				
0130-0150	Greece, Voice of	9420na	9935na	11645na		
0130-0200	Netherlands, Radio	9860as				
0130-0200 twhfa	Portugal, Radio	6175na	9570na			
0130-0200	Sweden, Radio	9695au				
0140-0200	Vatican State, Vatican R	9650as	11935as			
0145-0200	Albania, R Tirana Intl	6145na	7160na			

SELECTED PROGRAMS

Sundays
0100 WYFR (Satellite Net): School of the Bible Hour. Bible teaching and quiz.
0119 Radio Havana Cuba: Feature Report. In-depth coverage of a news item from another country of the hemisphere.
0136 Radio Havana Cuba: Feature Report. See S 0119.

Mondays
0100 Radio Havana Cuba: Sunday Edition. RHC's two-hour magazine of features, reports, and music.
0100 WYFR: Music. See S 1134.
0105 Radio New Zealand Int l: Correspondence School. No information available.
0108 WYFR: School of the Bible Hour. See S 0100.
0114 Radio Havana Cuba: The Mailbag Show. Listener letters and E-mail are reviewed and answered.
0130 Radio New Zealand Int l: In Touch with New Zealand. Wayne Mowat hosts this variety program.
0131 Radio Havana Cuba: The Jazz Place. A half-hour of the best of Cuban jazz.
0145 WYFR: Guidelines. See S 1550.

Tuesdays
0100 WYFR (Satellite Net): Echoes. Repeats of sermons from the Family Radio archives.
0105 Radio New Zealand Int l: Correspondence School. See M 0105.
0118 Radio Havana Cuba: Spotlight on the Americas. Comments by the RHC editorial desk.
0130 Radio New Zealand Int l: In Touch with New Zealand. See M 0130.
0136 Radio Havana Cuba: Feature Report. See S 0119.
0148 Radio Portugal Int'l: Visitors' Notebook. Tourist attractions and events in Portugal.

Wednesdays
0100 WYFR (Satellite Net): Echoes. See T 0100.
0105 Radio New Zealand Int l: Correspondence School. See M 0105.
0118 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0130 BBC (af/as pac/eu): Classical Music. Masterclass. See M 1230.
0130 Radio New Zealand Int l: In Touch with New Zealand. See M 0130.
0135 Radio Havana Cuba: DXers Unlimited. See S 0234.
0145 Radio Portugal Int'l: Musical Kaleidoscope. A variety of music for listening.
0150 Radio Havana Cuba: Feature Report. See S 0119.

Thursdays
0100 WYFR (Satellite Net): Echoes. See T 0100.
0105 Radio New Zealand Int l: Correspondence School. See M 0105.
0118 Radio Havana Cuba: USA Report. Events such as strikes, crime, and unrest are played up.
0130 Radio New Zealand Int l: In Touch with New Zealand. See M 0130.
0135 BBC (af/as pac/eu): Science and Technology. The Laws of Nature. See S 0350.
0136 Radio Havana Cuba: Feature Report. See S 0119.
0144 Radio Portugal Int'l: Challenge of the '90s. The past, present, and future of Portugal.

Fridays
0100 WYFR (Satellite Net): Echoes. See T 0100.
0105 Radio New Zealand Int l: Correspondence School. See M 0105.
0115 BBC (af/as pac/eu/south as): Background Current Affairs Feature. Islam: Faith and Power. See H 1615.
0119 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0130 Radio New Zealand Int l: In Touch with New Zealand. See M 0130.
0135 Radio Havana Cuba: Feature Report. See S 0119.
0146 Radio Portugal Int'l: Spotlight on Portugal. Focus on the cities, towns, and regions of Portugal.

Saturdays
0100 WYFR (Satellite Net): Echoes. See T 0100.
0116 Radio Havana Cuba: Feature Report. See S 0119.
0135 Radio Havana Cuba: Feature Report. See S 0119.
0146 Radio Portugal Int'l: Collector's Corner (triweekly). At look at stamps, coins and other collectibles.
0146 Radio Portugal Int'l: Listeners Mailbag (triweekly). Listener letters are read and questions answered.
0146 Radio Portugal Int'l: Radio Portugal DX (triweekly). Shortwave radio listening tips.

THANK YOU ...

Additional contributors to this month's Shortwave Guide: John Babbis, Silver Spring, MD; Carl Craig, Shelbyville, TN; Paul R. Donegan, Glendale, CA; Bob Fraser, Cohasset, MA; Edward Griffin, San Francisco, CA; Frank Hillton, Charleston, SC; Jennifer Hull, New York, NY; Jim Moats, Ravenna, OH; Dr. Jerry Plummer, Nashville, TN; Edmund H. Savage, Mt. Home, AR; Loyd Van Horn, Brasstown, NC; Alden Wires Jr., East Point, GA; Sam Wright, Biloxi, MS; NASWA *Journal*; *Fine Tuning*; BBCMS; BBC *Worldwide*; BBC *Summary of World Broadcasts*; World DX Club; Grove Enterprises BBS; Internet Shortwave Newsgroup via Larry Van Horn.

0200 UTC SHORTWAVE GUIDE 10:00 PM EDT 7:00 PM PDT

FREQUENCIES

0200-0300 twhfa	Argentina, RAE	11710am			
0200-0300	Australia, Radio	9580pa	9660pa	13605pa	15240pa
		15365pa	15415as	15510as	17715as
		17750as	17795pa	17860pa	
0200-0300 vl	Australia, VL8A Alice Spg	4835do			
0200-0300 vl	Australia, VL8K Katherine	5025do			
0200-0300 vl	Australia, VL8T Tent Crk	4910do			
0200-0300 vl	Canada, CBC N Quebec Svc	9625do			
0200-0300	Canada, CFCX Montreal	6005do			
0200-0300	Canada, CFRX Toronto	6070do			
0200-0300	Canada, CFVP Calgary	6030do			
0200-0300	Canada, CHNX Halifax	6130do			
0200-0300	Canada, CKZN St John's	6160do			
0200-0300	Canada, CKZU Vancouver	6160do			
0200-0300	Canada, RCI Montreal	6120na	9535am	9755am	11940am
		13670am			
0200-0300	Costa Rica, R Peace Intl	7385am	9400am		
0200-0210	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0200-0300	Cuba, Radio Havana Cuba	6000na	9820na	9830na	
0200-0300	Ecuador, HCJB Quito	9745am	15540am	21455am	
0200-0300	Egypt, Radio Cairo	9475na			
0200-0250	Germany, Deutsche Welle	7285as	9615as	9640as	9690as
		11945as	11965as	12045as	
0200-0300	Kenya, Kenya Broadc Corp	4885do	4935do		
0200-0300 smtwh	Malaysia, Radio	7295do			
0200-0230	Myanmar, Radio	5990do			
0200-0230	Netherlands, Radio	5905as	7305as	9860as	11655as
0200-0300	New Zealand, R NZ Intl	15115pa			
0200-0300 vl	Papua New Guinea, NBC	4890do	9675do		
0200-0300	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0200-0300	Russia, Voice of	9530af	9620na	11750na	11805na
		12050na	13645as	13665na	13790na
		15180na	15425na	15580as	
0200-0230	Sri Lanka, SLBC Colombo	15425as			
0200-0300	Taiwan, VO Free China	5950na	7130as	9680na	11740ca
		11825as	15345as		
0200-0300	United Kingdom,BBC London	5970sa	5975va	6135af	6175na
		6195eu	7325va	9410va	9605as
		9760as	9915sa	11955as	15360as
0200-0300	USA, KAIJ Dallas TX	5810am			
0200-0300	USA, KTBN Salt Lk City UT	7510am			
0200-0230	USA, KVOH Los Angeles CA	17775am			
0200-0300	USA, KWHR Naalehu HI	17510au			
0200-0300	USA, Monitor Radio Intl	5850na	9430am		
0200-0300	USA, VOA Washington DC	6130sa	7115as	7205as	7215as
		9455sa	9740as	11705as	15250as
		17740as	21550as		
0200-0230 twhfa	USA, VOA Washington DC	5995am	7405am	9775am	11580am
		13740am	15120am	15205am	
0200-0300	USA, WEWN Birmingham AL	7425na			
0200-0300	USA, WHRI Noblesville IN	5745am	17510am		
0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0300	USA, WRNO New Orleans LA	7355am			
0200-0300 thas	USA, WVHA Green Bush ME	7465eu			
0200-0300	USA, WWCR Nashville TN	5065am	5935am	7435am	
0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0200-0230	Vietnam, Voice of	7250na	9840na	15010na	
0230-0300	Albania, R Tirana Intl	6145na	7160na		
0230-0300	Austria, R Austria Intl	9655na	9870sa	13730sa	
0230-0300	Hungary, Radio Budapest	6000na	9835na	11910na	
0230-0245	Pakistan, Radio	7290as	15190as	17705as	17725as
		21730as			
0230-0300	Philippines, R Pilipinas	17760me	17865me	21580me	
0230-0300	Sweden, Radio	7120na	9850na		
0250-0300	Vatican State, Vatican R	7305na	9605na		

SELECTED PROGRAMS

Sundays

0200 Radio New Zealand Int I: National Radio or Sport. Regular programming is preempted for sports events.
0200 WYFR (Satellite Net): The Quiet Hours. Easy listening music on the spiritual side.
0215 Voice of Free China: The Adventures of Taiwan. NEW! A young couple's escapades in Taiwan.
0217 Radio Havana Cuba: Feature Report. See S 0119.
0230 BBC (am): Classical Music. Masterclass. See M 1230.
0234 Radio Havana Cuba: DXers Unlimited. Arnie Coro discusses the technical aspects of shortwave listening.
0235 Voice of Free China: Mailbag Time. Letters from listeners and music requests.
0247 Voice of Free China: Let's Learn Chinese. Chinese lessons with commentary and translation in English.

Mondays

0200 Radio Havana Cuba: Sunday Edition (from 0100). The second hour of RHC's two-hour magazine of features, reports, and music.
0200 WYFR: Family Bible Reading Fellowship. See S 0500.
0205 Radio New Zealand Int I: In Touch with New Zealand. See M 0130.
0215 Voice of Free China: Jade Bells and Bamboo Pipes. Chinese folk and temple music.
0230 Radio Havana Cuba: Breakthrough. See S 2330.
0231 WYFR: Music. See S 1134.
0235 Radio Havana Cuba: From Havana. A showcase of Cuban music.
0239 WYFR: Daily Grace. See S 1239.
0247 Voice of Free China: Let's Learn Chinese. See S 0247.
0249 WYFR: Family Radio Worldwide. See S 1249.

Tuesdays

0200 WYFR (Satellite Net): The Open Forum. See S 0605.
0205 Radio New Zealand Int I: In Touch with New Zealand. See M 0130.
0213 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0215 Voice of Free China: Kaleidoscope. Spotlight on life in Taiwan.
0230 BBC (af/as pac/eu/south as): Light Entertainment. Just a Minute (5th,12th,19th). See S 1530.
0232 Voice of Free China: Taiwan Economic Journal. Focus on a topic dealing with business
0233 Radio Havana Cuba: Timeout. Five minutes of Cuban sports coverage.
0239 Radio Havana Cuba: Feature Report. See S 0119.
0247 Voice of Free China: Let's Learn Chinese. See S 0247.

Wednesdays

0200 WYFR (Satellite Net): The Open Forum. See S 0605.
0205 Radio New Zealand Int I: In Touch with New Zealand. See M 0130.
0215 Voice of Free China: Music Box. Some of the popular music of Taiwan.
0217 Radio Havana Cuba: Feature Report. See S 0119.
0236 Radio Havana Cuba: Timeout. See T 0233.
0241 Radio Havana Cuba: Feature Report. See S 0119.
0251 Voice of Free China: Let's Learn Chinese. See S 0247.

Thursdays

0200 WYFR (Satellite Net): The Open Forum. See S 0605.
0205 Radio New Zealand Int I: In Touch with New Zealand. See M 0130.
0215 Voice of Free China: Perspectives. Issues facing the lives and conversations of Taiwanese people.
0218 Radio Havana Cuba: Feature Report. See S 0119.
0232 Voice of Free China: Journey into Chinese Culture. Conversation about a particular cultural activity in Taiwan.
0235 Radio Havana Cuba: Timeout. See T 0233.
0252 Voice of Free China: Let's Learn Chinese. See S 0247.

Fridays

0200 WYFR (Satellite Net): The Open Forum. See S 0605.
0205 Radio New Zealand Int I: In Touch with New Zealand. See M 0130.
0215 Voice of Free China: Confrontation. Two points of view on a controversial topic.
0217 Radio Havana Cuba: Feature Report. See S 0119.
0235 Voice of Free China: New Record Time. The latest releases of the popular music of Taiwan.
0236 Radio Havana Cuba: Timeout. See T 0233.
0241 Radio Havana Cuba: Cuba Today. See T 0640.
0247 Voice of Free China: Let's Learn Chinese. See S 0247.

Saturdays

0200 WYFR (Satellite Net): The Open Forum. See S 0605.
0215 Voice of Free China: Reflections. The best of Chinese literature.
0220 Radio Havana Cuba: Latin America Newsline. News from the countries of Central and South America.
0235 Radio Havana Cuba: Timeout. See T 0233.
0240 Radio Havana Cuba: Feature Report. See S 0119.
0249 Voice of Free China: Let's Learn Chinese. See S 0247.

HAUSER'S HIGHLIGHTS
PAKISTAN: R. PAKISTAN

J-95 English until 2 Sept:

Time UT	Freqs
0230-0245	7290, 15190, 17705,17725, 21730
0800-0847 & 1100-1120	15625, 17900
1600-1630	7425, 9485, 11570, 11710,13590, 15555
1700-1800	7485, 11570

As of April, features at 0810 & 1722:

Sat *Renowned Muslim Scientist*;
Sun *Pakistani Literature*;
Mon *Picturesque Pakistan*;
Tue *Pak Press Round-up*;
Wed *Facts about Pak*;
Thu *From our Archives*;
Fri *World Media & Kashmir Issue*;

followed respectively by music at 0820, 1732; *Kafi, Film Songs, Mix Melodies, Ghazals, Studio Recordings, Geet, Qawwali*
(via Gigi Lytle, TX)

FREQUENCIES

0300-0400	Australia, Radio	958Cpa	9660pa	13605pa	15240pa
		15245as	15365pa	15510as	17750pa
		17795pa	17860pa		
0300-0400 vl	Australia, VL8A Alice Spg	4835do			
0300-0400 vl	Australia, VL8K Katherine	5025do			
0300-0400 vl	Australia, VL8T Tent Crk	4910do			
0300-0400	Bahrain, Radio	6010do			
0300-0400	Botswana, Radio	4830af	7255af		
0300-0400 vl	Canada, CBC N Quebec Svc	9625do			
0300-0400	Canada, CFCX Montreal	6005do			
0300-0400	Canada, CFRX Toronto	6070do			
0300-0400	Canada, CFVP Calgary	6030do			
0300-0400	Canada, CHNX Halifax	6130do			
0300-0400	Canada, CKZN St John's	6160do			
0300-0400	Canada, CKZU Vancouver	6160do			
0300-0400	China, China Radio Intl	9690na	9710na	11715na	
0300-0400	Costa Rica, R Peace Intl	7385am	9400am		
0300-0400 vl	Costa Rica,Faro del Carib	5055do			
0300-0310	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0300-0400	Cuba, Radio Havana Cuba	6000na	9820na	9830na	
0300-0327	Czech Rep, Radio Prague	5930na	7345na		
0300-0400	Ecuador, HCJB Quito	9745am	15540am	21455am	
0300-0330	Egypt, Radio Cairo	9475na			
0300-0350	Germany, Deutsche Welle	6085na	6185na	9535na	9615na
		9640na	11750na		
0300-0400	Guatemala, Radio Cultural	3300do			
0300-0400	Japan, NHK/Radio	9680na	11840as	17810as	
0300-0330	Japan, NHK/Radio	11885na	11895ca	15230na	
0300-0400	Kenya, Kenya Broadc Corp	4885do	4935do		
0300-0400 smtwh	Malaysia, Radio	7295do			
0300-0330	Mongolia, R Ulan Bator	9960na	12000na		
0300-0325	Netherlands, Radio	9860as	11655as		
0300-0400	New Zealand, R NZ Intl	15115pa			
0300-0400 vl	Papua New Guinea, NBC	4890do	9675do		
0300-0330	Philippines, R Pilipinas	17760me	17865me	21580me	
0300-0400	Russia, Voice of	9620na	9665na	12050na	13605na
		13645na	13665na	15180na	15425na
		15580na			
0300-0400	S Africa, Channel Africa	3220af	5955af		
0300-0400	Taiwan, VO Free China	5950na	9680na	11745as	11825as
		15345as			
0300-0330	Thailand, Radio	9655na	11890na	11905na	
0300-0400	Turkey, Voice of	9445na			
0300-0400	Ukraine, R Ukraine Intl	7405na	9685na	9835na	9860na
		11875na			
0300-0330	United Kingdom,BBC London	5970sa	6135af	7325va	9760as
		9915sa	15360as	15380as	
0300-0400	United Kingdom,BBC London	3255af	5975va	6005af	6175na
		6180eu	6190af	6195eu	9410va
		9600af	9605as	11760me	12095af
		15310as			
0300-0400	USA, KAIJ Dallas TX	5810am			
0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	USA, KVOH Los Angeles CA	9975am			
0300-0400	USA, KWHR Naalehu HI	17510au			
0300-0400	USA, Monitor Radio Intl	5850na	7535af		
0300-0400	USA, VOA Washington DC	6035af	7105af	7280af	7340af
		7405af	9575af	9885af	
0300-0400	USA, WEWN Birmingham AL	7425na			
0300-0400	USA, WHRI Noblesville IN	5745am	9495am	17510am	
0300-0400	USA, WJCR Upton KY	7490na	13595na		
0300-0400	USA, WRNO New Orleans LA	7395am			
0300-0400 tha	USA, WVHA Green Bush ME	7465eu			
0300-0400	USA, WWCR Nashville TN	5065am	5935am	7435am	
0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0315	Vatican State, Vatican R	7305na	9605na		
0300-0400	Zimbabwe, ZBC/Radio 3	3306do	3396do	4828do	
0315-0330 s	Greece, Voice of	9420na	9935na	11645na	
0320-0350	Vatican State, Vatican R	7360af	9660af		
0330-0357	Czech Rep, Radio Prague	9480as			
0330-0400	Sweden, Radio	7120na	9850na		
0330-0400	Tanzania, Radio	5050af			
0330-0400	UAE, Radio Dubai	11945na	13675na	15400na	21485na
0330-0400	United Kingdom,BBC London	9610af	11730af	11955as	15280as
0340-0350	Greece, Voice of	9420na	9935na	11645na	
0345-0400	Tajikistan, Radio	7245as			

SELECTED PROGRAMS

Sundays

0300 Radio New Zealand Int l: National Radio or Sport. See S 0200.
0300 WYFR (Satellite Net): The Quiet Hours. See S 0200.
0319 Radio Havana Cuba: Feature Report. See S 0119.
0320 China Radio Int'l: Travel Talk. See S 0020.
0329 China Radio Int'l: The Cooking Show. See S 0029.
0330 BBC (as pac): Popular Music. The Ed Stewart Show. See A 2330.
0335 China Radio Int'l: Music from China. See S 0035.
0336 Radio Havana Cuba: Feature Report. See S 0119.
0350 BBC (am): Science and Technology. The Laws of Nature. NEW! Alun Lewis takes a wry look at the laws that govern our lives.

Mondays

0300 Radio Havana Cuba: Sunday Edition. See M 0100.
0306 Radio New Zealand Int l: In Touch with New Zealand. See M 0130.
0308 WYFR: The Open Forum. See S 0605.
0313 China Radio Int'l: Press Clippings. See S 1213.
0314 Radio Havana Cuba: The Mailbag Show. See M 0114.
0320 China Radio Int'l: China Scrapbook. See S 1220.
0325 China Radio Int'l: Music Album. See S 1225.
0330 BBC (am): Quiz. Brain of Britain. See A 1230.
0331 Radio Havana Cuba: The Jazz Place. See M 0131.
0334 WYFR: Music. See S 1134.
0340 China Radio Int'l: Listeners' Letterbox. See S 1240.
0348 WYFR: Leading Little Ones to God. See S 1148.

Tuesdays

0300 WYFR (Satellite Net): The Open Forum. See S 0605.
0306 Radio New Zealand Int l: In Touch with New Zealand. See M 0130.
0318 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0319 China Radio Int'l: China's Open Windows (biweekly). See M 1219.
0319 China Radio Int'l: The Business Show (biweekly). See M 1219.
0330 WYFR (Satellite Net): The End of the Day. Discover life with meaning through music.
0336 Radio Havana Cuba: Feature Report. See S 0119
0340 China Radio Int'l: Learn to Speak Chinese. See M 1240.

Wednesdays

0300 WYFR (Satellite Net): The Open Forum. See S 0605.
0306 Radio New Zealand Int l: In Touch with New Zealand. See M 0130.
0312 China Radio Int'l: News Analysis. See T 1212.
0318 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0319 China Radio Int'l: Current Affairs. See T 1219.
0330 WYFR (Satellite Net): The End of the Day. See T 0330.
0335 China Radio Int'l: Orient Arena. See T 1235.
0335 Radio Havana Cuba: DXers Unlimited. See S 0234.
0340 China Radio Int'l: Listeners' Letterbox. See S 1240.
0345 BBC (am): Background Current Affairs Feature. History Today. See T 0530.
0350 Radio Havana Cuba: Feature Report. See S 0119.

Thursdays

0300 WYFR (Satellite Net): The Open Forum. See S 0605.
0306 Radio New Zealand Int l: In Touch with New Zealand. See M 0130.
0318 China Radio Int'l: Current Affairs. See T 1219.
0318 Radio Havana Cuba: USA Report. See H 0118.
0330 WYFR (Satellite Net): The End of the Day. See T 0330.
0333 China Radio Int'l: Profile. See W 1233.
0336 Radio Havana Cuba: Feature Report. See S 0119.
0340 China Radio Int'l: Learn to Speak Chinese. See M 1240.

Fridays

0300 WYFR (Satellite Net): The Open Forum. See S 0605.
0306 Radio New Zealand Int l: In Touch with New Zealand. See M 0130.
0319 China Radio Int'l: Current Affairs. See T 1219.
0319 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0330 WYFR (Satellite Net): The End of the Day. See T 0330.
0332 China Radio Int'l: Focus. See H 1232.
0335 Radio Havana Cuba: Feature Report. See S 0119.
0341 China Radio Int'l: Culture in China. See H 1241.

Saturdays

0300 WYFR (Satellite Net): The Open Forum. See S 0605.
0316 Radio Havana Cuba: Feature Report. See S 0119.
0320 China Radio Int'l: Current Affairs. See T 1219.
0330 WYFR (Satellite Net): The End of the Day. See T 0330.
0335 China Radio Int'l: Life in China. See F 1235.
0335 Radio Havana Cuba: Feature Report. See S 0119.
0341 China Radio Int'l: China in Action (biweekly). See F 1241.
0341 China Radio Int'l: World in Action (biweekly). See F 1241.
0347 China Radio Int'l: In the Third World. See F 1247.

Program Tip

USA: WHRI

A relatively new show to WHRI is the Jack McLamb Show with retired police officer Jack McLamb, host of the live call-in show (phone number no doubt given during the show). 0000 to 0100 UTC Tues-Sat.

0400 UTC SHORTWAVE GUIDE 12:00 PM EDT 9:00 PM PDT

FREQUENCIES

0400-0500	Australia, Radio	9580pa	9660pa	13605as	15240pa
		15365pa	15415pa	15510pa	17715pa
		17750as	17795pa	17860pa	
0400-0500 vl	Australia, VL8A Alice Spg	4835do			
0400-0500 vl	Australia, VL8K Katherine	5025do			
0400-0500 vl	Australia, VL8T Tent Crk	4910do			
0400-0500	Bahrain, Radio	6010do			
0400-0500	Bulgaria, Radio	9700na	11720na		
0400-0500	Canada, CFCX Montreal	6005do			
0400-0500	Canada, CFRX Toronto	6070do			
0400-0500	Canada, CFVP Calgary	6030do			
0400-0500	Canada, CHNX Halifax	6130do			
0400-0500	Canada, CKZN St John's	6160do			
0400-0500	Canada, CKZU Vancouver	6160do			
0400-0430	Canada, RCI Montreal	9650me	11835me	11905me	15275me
0400-0500	China, China Radio Intl	9560na	9730na	11680na	
0400-0500	Costa Rica, R Peace Intl	7385am	9400am		
0400-0410	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0400-0500	Cuba, Radio Havana Cuba	6000na	6180na	9820na	9830na
0400-0430	Ecuador, HCJB Quito	9745am	15540am	21455am	
0400-0450	Germany, Deutsche Welle	6015af	6120af	6185af	7150af
		7225af	9565af	9765af	11765af
0400-0500 twtfa	Guatemala, Radio Cultural	3300do			
0400-0415	Israel, Kol Israel	7465na	9435na		
0400-0500	Kenya, Kenya Broadc Corp	4885do	4935do		
0400-0500	Lebanon, Wings of Hope	9960va			
0400-0500 smtwh	Malaysia, Radio	7295do			
0400-0458	New Zealand, R NZ Intl	15115pa			
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as	
0400-0430 m	Norway, Radio Norway Intl	7480na			
0400-0500 vl	Papua New Guinea, NBC	4890do	9675do		
0400-0430	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0400-0500	Russia, Voice of	9620eu	9665na	12010na	12050na
		13665na	15180na	15425na	15580as
0400-0500	S Africa, Channel Africa	3220af	5955af		
0400-0427	S Africa, Trans World R	7165af			
0400-0500	Slovakia, AWR	9455af	13715me		
0400-0430	Sri Lanka, SLBC Colombo	9720as	15425as		
0400-0500	Swaziland, Swazi Radio	6155af			
0400-0430	Switzerland, Swiss R Intl	6135na	9885na	9905na	
0400-0430	Tanzania, Radio	5050af			
0400-0415	Uganda, Radio	4976do	5026do		
0400-0500	United Kingdom,BBC London	3255af	5975va	6005af	6180eu
		6190af	6195va	7160af	9410va
		9600af	9610af	11730af	11760me
		11955as	12095va	15280as	15310as
		15575me	17640af		
0400-0500	USA, KAIJ Dallas TX	5810am			
0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0500	USA, KVOH Los Angeles CA	9975am			
0400-0500	USA, KWHR Naalehu HI	17780as			
0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	USA, VOA Washington DC	3985eu	5995eu	6010eu	6040eu
		6140af	6873af	7170me	7200eu
		7340af	9885af	11965me	15205me
0400-0500	USA, WEWN Birmingham AL	7425na			
0400-0500	USA, WHRI Noblesville IN	5745am	9495am	17780am	
0400-0500	USA, WJCR Upton KY	7490na	13595na		
0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu			
0400-0500	USA, WRNO New Orleans LA	7395am			
0400-0500 s	USA, WVHA Green Bush ME	7465eu			
0400-0500	USA, WWCR Nashville TN	5065am	5935am	7435am	
0400-0445	USA, WYFR Okeechobee FL	6065na	9505na		
0400-0459	USA, WYFR Okeechobee FL	9370eu			
0400-0457	Yugoslavia, Radio	9580na	11870na		
0400-0500	Zimbabwe, ZBC/Radio 3	3306do	3396do		
0415-0440	Italy, RAI Rome	5990me	7275eu		
0425-0500	Nigeria, FRCN/Radio	3326do	4990do		
0430-0500	Australia, AF Radio	13535as			
0430-0500	Finland, YLE/Radio	15440af			
0430-0500	Netherlands, Radio	6165na	9590na		
0430-0500	Nigeria, FRCN/Voice of	7255af			
0430-0500	Swaziland, Trans World R	3200af	5055af	6070af	
0430-0500	Switzerland, Swiss R Intl	9905na			
0430-0500	USA, VOA Washington DC	7265af	7280af	7405af	9575af
		15300af			
0459-0500	New Zealand, R NZ Intl	9570pa			

SELECTED PROGRAMS

Sundays

0400 CBC (various Canadian cities). CBC Radio Overnight. See T 0400.
0400 Radio New Zealand Int l: National Radio or Sport. See S 0200.
0400 WYFR (Satellite Net): The Quiet Hours. See S 0200.
0417 Radio Havana Cuba: Feature Report. See S 0119.
0420 China Radio Int'l: Travel Talk. See S 0020.
0429 China Radio Int'l: The Cooking Show. See S 0029.
0434 Radio Havana Cuba: DXers Unlimited. See S 0234.
0435 China Radio Int'l: Music from China. See S 0035.
0445 BBC (af/eu/south as): Popular Music. Live from the Archive. Steve Wright returns with a series of lost musical gems from the BBC's own record library in London.

Mondays

0400 CBC (various Canadian cities). CBC Radio Overnight. See T 0400.
0400 Radio Havana Cuba: Sunday Edition (from 0300). See M 0200.
0400 Radio New Zealand Int l: Pacific Regional News. News about the Pacific Islands.
0400 WYFR: School of the Bible Hour. See S 0100.
0405 Radio New Zealand Int l: Calling Cook Islands. Birthday Calls, dedications, and requests for Cook Islands listeners.
0413 China Radio Int'l: Press Clippings. See S 1213.
0420 China Radio Int'l: China Scrapbook. See S 1220.
0425 China Radio Int'l: Music Album. See S 1225.
0430 Radio Havana Cuba: Breakthrough. See S 2330.
0430 Radio New Zealand Int l: Mailbox (biweekly). Transmission developments, letters from listeners, and DX news from Arthur Cushen.
0430 Radio New Zealand Int l: Travel Pacific (biweekly). A comprehensive look at tourism in the South Pacific from Air New Zealand and RNZI.
0435 Radio Havana Cuba: From Havana. See M 0235.
0440 China Radio Int'l: Listeners' Letterbox. See S 1240.

Tuesdays

0400 CBC (various Canadian cities). CBC Radio Overnight. Five minutes of CBC Radio news followed by Radio France International programming.
0400 Radio New Zealand Int l: Pacific Regional News. See M 0400.
0405 Radio New Zealand Int l: Calling Tonga. Regional news and topical programming for Tonga.
0413 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0419 China Radio Int'l: China's Open Windows (biweekly). See M 1219.
0419 China Radio Int'l: The Business Show (biweekly). See M 1219.
0430 Radio New Zealand Int l: Tagata Atu Motu. No details avaiable.
0433 Radio Havana Cuba: Timeout. See T 0233.
0439 Radio Havana Cuba: Feature Report. See S 0119.
0440 China Radio Int'l: Learn to Speak Chinese. See M 1240.

Wednesdays

0400 CBC (various Canadian cities). CBC Radio Overnight. See T 0500.
0400 Radio New Zealand Int l: Pacific Regional News. See M 0400.
0412 China Radio Int'l: News Analysis. See T 1212.
0417 Radio Havana Cuba: Feature Report. See S 0119.
0419 China Radio Int'l: Current Affairs. See T 1219.
0430 BBC (as pac): Quiz. Brain of Britain. See A 1230.
0430 Radio New Zealand Int l: Te Puna Wai Korero. See S 0530.
0435 China Radio Int'l: Orient Arena. See T 1235.
0435 China Radio Int'l: Orient Arena. See T 1235.
0436 Radio Havana Cuba: Timeout. See T 0233.
0440 China Radio Int'l: Listeners' Letterbox. See S 1240.
0441 Radio Havana Cuba: Feature Report. See S 0119.

Thursdays

0400 CBC (various Canadian cities). CBC Radio Overnight. See T 0400.
0400 Radio New Zealand Int l: Pacific Regional News. See M 0400.
0405 Radio New Zealand Int l: Calling the Solomon Islands (biweekly). A program for the Solomon Islands.
0418 China Radio Int'l: Current Affairs. See T 1219.
0418 Radio Havana Cuba: Feature Report. See S 0119.
0433 China Radio Int'l: Profile. See W 1233.
0435 Radio Havana Cuba: Timeout. See T 0233.
0440 China Radio Int'l: Learn to Speak Chinese. See M 1240.

Fridays

0400 CBC (various Canadian cities). CBC Radio Overnight. See T 0400.
0400 Radio New Zealand Int l: Pacific Regional News. See M 0400.
0405 Radio New Zealand Int l: Calling Nuie. Regional news and topical programming for Nuie.
0417 Radio Havana Cuba: Feature Report. See S 0119.
0419 China Radio Int'l: Current Affairs. See T 1219.
0430 Radio New Zealand Int l: Calling Pitcairn and Norfolk (in rotation). A program for Pitcairn and Norfolk Islands listeners.
0430 Radio New Zealand Int l: Calling Tokelau (in rotation). A program for Tokelau listeners.
0430 Radio New Zealand Int l: Feature (in rotation). Variable feature program.
0432 China Radio Int'l: Focus. See H 1232.
0436 Radio Havana Cuba: Timeout. See T 0233.
0441 China Radio Int'l: Culture in China. See H 1241.
0441 Radio Havana Cuba: Cuba Today. See T 0640.

Saturdays

0400 CBC (various Canadian cities). CBC Radio Overnight. See T 0400.
0420 China Radio Int'l: Current Affairs. See T 1219.
0420 Radio Havana Cuba: Latin America Newsline. See A 0220.
0430 WYFR (Satellite Net): Evensong. Music for the end of the day.
0435 China Radio Int'l: Life in China. See F 1235.
0435 Radio Havana Cuba: Timeout. See T 0233.
0440 Radio Havana Cuba: Feature Report. See S 0119.
0441 China Radio Int'l: China in Action (biweekly). See F 1241.
0441 China Radio Int'l: World in Action (biweekly). See F 1241.
0447 China Radio Int'l: In the Third World. See F 1247.

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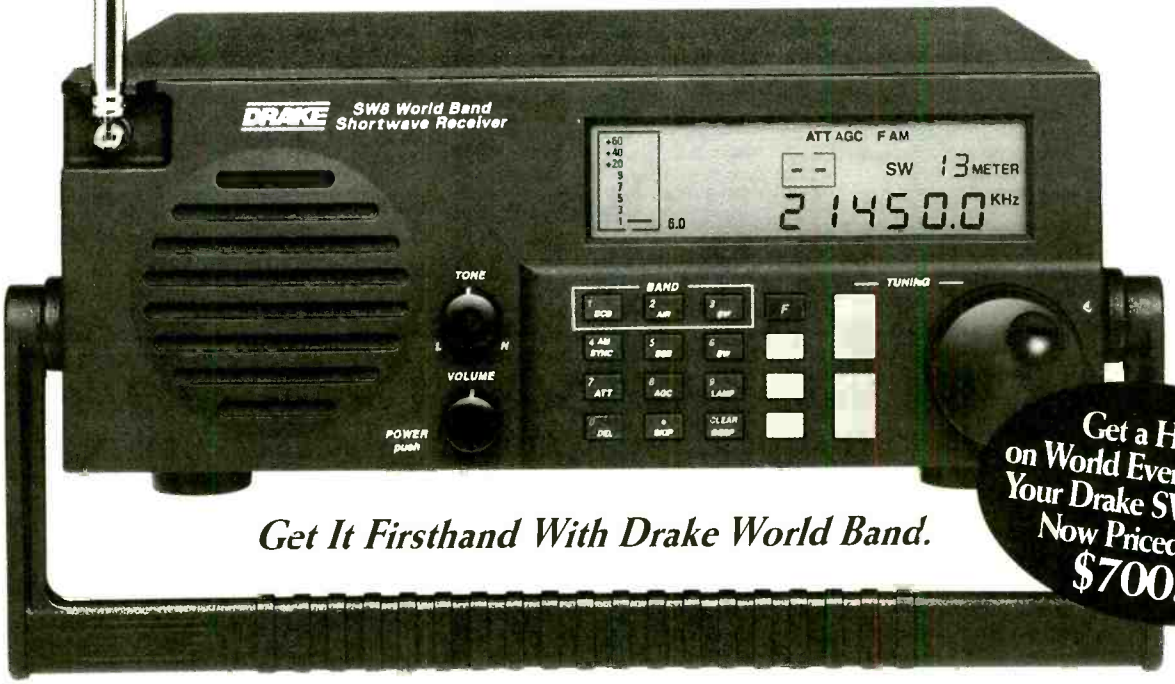

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0500 UTC SHORTWAVE GUIDE 1:00 AM EDT 10:00 PM PDT

FREQUENCIES

0500-0530	Australia, AF Radio	13535as			
0500-0600	Australia, Radio	9580pa	9660pa	13605as	15240pa
		15245as	15365pa	15415as	17715pa
		17795pa	17860pa		
0500-0600 vl	Australia, VL8A Alice Spg	4835do			
0500-0600 vl	Australia, VL8K Katherine	5025do			
0500-0600 vl	Australia, VL8T Tent Crk	4910do			
0500-0600	Bahrain, Radio	6010do			
0500-0600	Canada, CFCX Montreal	6005do			
0500-0600	Canada, CFRX Toronto	6070do			
0500-0600	Canada, CFVP Calgary	6030do			
0500-0600	Canada, CHNX Halifax	6130do			
0500-0600	Canada, CKZU Vancouver	6160do			
0500-0530 mtwhf	Canada, RCI Montreal	6050eu	7295eu	15430af	17840af
0500-0600	China, China Radio Intl	9595na			
0500-0600	Costa Rica, R Peace Intl	7385am	9400am		
0500-0510	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0500-0600	Cuba, Radio Havana Cuba	9820na	9830na		
0500-0600	Ecuador, HCJB Quito	9745am	15540am		
0500-0600 as	Eqt Guinea, R East Africa	9585af			
0500-0550	Germany, Deutsche Welle	5960na	6175na	6185na	9515na
		11705na			
0500-0600 mtwh/vl	Italy, IRRS Milan	7125va			
0500-0600	Japan, NHK/Radio	5975eu	6110na	7230eu	9680na
		11725as	11740as	11790na	11885na
		11955as	17810as		
0500-0600	Kenya, Kenya Broadc Corp	4885do	4935do		
0500-0600	Lebanon, Wings of Hope	9960va			
0500-0525	Netherlands, Radio	6165na	9590na		
0500-0600	New Zealand, R NZ Intl	9570pa			
0500-0505	Nigeria, FRCN/Radio	3326do	4990do		
0500-0600	Nigeria, FRCN/Voice of	7255af			
0500-0600 vl	Papua New Guinea, NBC	4890do	9675do		
0500-0600	Russia, AWR	9895me			
0500-0600	Russia, Voice of	12010na	12030na	12040na	12050na
		13370as	13645na	13665na	15425na
		15580na			
0500-0600	S Africa, Channel Africa	5955af	9695af		
0500-0545 f	Seychelles, FEBA Radio	15555me			
0500-0600	Spain, R Exterior Espana	9540na			
0500-0600	Swaziland, Swazi Radio	6155af			
0500-0515	Switzerland, Swiss R Intl	6165eu	9535eu		
0500-0502	Uganda, Radio	4976do			
0500-0600	United Kingdom,BBC London	3255af	5975va	6005af	6180eu
		6190af	6195va	7160af	9410va
		9600af	9640va	9740as	11760af
		11955as	12095va	15070me	15280as
		15310va	15360as	15420af	15575me
		17640af	17885af		
0500-0600	USA, KAIJ Dallas TX	5810am			
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9975am			
0500-0600	USA, KWHR Naalehu HI	17780as			
0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	USA, VOA Washington DC	5995eu	6035af	6040eu	6140af
		6873af	7170me	7285af	7405af
		9575af	9630af	11965af	12080af
		15205me	15600af		
0500-0600	USA, WHRI Noblesville IN	5745am	9495am	17780am	
0500-0600	USA, WJCR Upton KY	7490na	13595na		
0500-0600 mtwhfa	USA, WMLK Bethel PA	9465eu			
0500-0600	USA, WRNO New Orleans LA	7395am			
0500-0600	USA, WWCR Nashville TN	5065am	5935am	7435am	
0500-0600	USA, WYFR Okeechobee FL	5985na	9985eu	11580eu	
0500-0530	Vatican State, Vatican R	9660af	11625af	13765af	
0500-0520	Vatican State, Vatican R	4005eu	5860eu		
0500-0600	Zimbabwe, ZBC/Radio 3	3306do	3396do		
0505-0600	Swaziland, Trans World R	3200af	5055af	6070af	9500af
0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0530-0600	Australia, Radio	15510as	15565as	17880as	
0530-0600	Austria, R Austria Intl	6015na			
0530-0600	Georgia, Georgian Radio	11805eu			
0530-0600	Romania, R Romania Intl	11810af	15250af	15340af	17745af
		17790af			

SELECTED PROGRAMS

Sundays

0500 CBC (various Canadian cities). CBC Radio Overnight. See W 0500.
0500 WYFR: Family Bible Reading Fellowship. A Bible read-along program.
0517 WYFR: The Mailbag. Letters from around the world are read and answered.
0519 Radio Havana Cuba: Feature Report. See S 0119.
0520 China Radio Int'l: Travel Talk. See S 0020.
0529 China Radio Int'l: The Cooking Show. See S 0029.
0530 Radio New Zealand Int l: Te Reo o Te Pipiwharauroa. A program for Maori listeners.
0535 China Radio Int'l: Music from China. See S 0035.
0536 Radio Havana Cuba: Feature Report. See S 0119.
0549 WYFR: The Bible Quiz. Test your knowlege of the Bible.

Mondays

0500 CBC (various Canadian cities). CBC Radio Overnight. See W 0500.
0500 Radio Havana Cuba: Sunday Edition. See M 0100.
0500 WYFR: Family Bible Reading Fellowship. See S 0500.
0507 Radio New Zealand Int l: Checkpoint. Ninety minutes of NZ current affairs, sports news, business news, news about Australia, and English language Maori news from National Radio.
0510 BBC (south as): Popular Music. The Ed Stewart Show. See A 2330.
0513 China Radio Int'l: Press Clippings. See S 1213.
0514 Radio Havana Cuba: The Mailbag Show. See M 0114.
0520 China Radio Int'l: China Scrapbook. See S 1220.
0520 WYFR: The Family Bible Study. Harold Camping reads and interprets scripture.
0525 China Radio Int'l: Music Album. See S 1225.
0531 Radio Havana Cuba: The Jazz Place. See M 0131.
0540 China Radio Int'l: Listeners' Letterbox. See S 1240.
0549 WYFR: Family Radio Worldwide. See S 1249.

Tuesdays

0500 CBC (various Canadian cities). CBC Radio Overnight. See W 0500.
0500 WYFR: Family Bible Reading Fellowship. See S 0500.
0506 Radio New Zealand Int l: Checkpoint. See M 0507.
0518 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0518 WYFR: The Family Bible Study. See M 0520.
0519 China Radio Int'l: China's Open Windows (biweekly). See M 1219.
0519 China Radio Int'l: The Business Show (biweekly). See M 1219.
0530 BBC (af/eu): Background Current Affairs Feature. History Today. Each week of the series (until 9/12) a program is devoted to an historical event relevant to the week's news.
0536 Radio Havana Cuba: Feature Report. See S 0119.
0540 China Radio Int'l: Learn to Speak Chinese. See M 1240.
0546 WYFR: The Radio Reading Circle. See M 1246.

Wednesdays

0500 CBC (various Canadian cities). CBC Radio Overnight. Five minutes of CBC Radio news followed by Radio Netherlands International programming.
0500 WYFR: Family Bible Reading Fellowship. See S 0500.
0506 Radio New Zealand Int l: Checkpoint. See M 0507.
0512 China Radio Int'l: News Analysis. See T 1212.
0518 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0518 WYFR: The Family Bible Study. See M 0520.
0519 China Radio Int'l: Current Affairs. See T 1219.
0535 China Radio Int'l: Orient Arena. See T 1235.
0535 Radio Havana Cuba: DXers Unlimited. See S 0234.
0540 China Radio Int'l: Listeners' Letterbox. See S 1240.
0546 WYFR: The Radio Reading Circle. See M 1246.
0550 Radio Havana Cuba: Feature Report. See S 0119.

Thursdays

0500 CBC (various Canadian cities). CBC Radio Overnight. See W 0500.
0500 WYFR: Family Bible Reading Fellowship. See S 0500.
0506 Radio New Zealand Int l: Checkpoint. See M 0507.
0518 China Radio Int'l: Current Affairs. See T 1219.
0518 Radio Havana Cuba: USA Report. See H 0118.
0518 WYFR: The Family Bible Study. See M 0520.
0533 China Radio Int'l: Profile. See W 1233.
0536 Radio Havana Cuba: Feature Report. See S 0119.
0540 China Radio Int'l: Learn to Speak Chinese. See M 1240.
0545 BBC (af/eu): Popular Music. What is Jazz? (7th,14th). See T 0615.
0546 WYFR: The Radio Reading Circle. See M 1246.

Fridays

0500 CBC (various Canadian cities). CBC Radio Overnight. See W 0500.
0500 WYFR: Family Bible Reading Fellowship. See S 0500.
0506 Radio New Zealand Int l: Checkpoint. See M 0507.
0518 WYFR: The Family Bible Study. See M 0520.
0519 China Radio Int'l: Current Affairs. See T 1219.
0519 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0532 China Radio Int'l: Focus. See H 1232.
0536 Radio Havana Cuba: Feature Report. See S 0119.
0541 China Radio Int'l: Culture in China. See H 1241.
0546 WYFR: The Radio Reading Circle. See M 1246.

Saturdays

0500 CBC (various Canadian cities). CBC Radio Overnight. See W 0500.
0500 WYFR: Family Bible Reading Fellowship. See S 0500.
0506 Radio New Zealand Int l: Tagata Atu Motu. See T 0430.
0510 BBC (south as): Quiz. Brain of Britain. See A 1230.
0515 WYFR: The Family Bible Study. See M 0520.
0516 Radio Havana Cuba: Feature Report. See S 0119.
0520 China Radio Int'l: Current Affairs. See T 1219.
0530 BBC (eu): Popular Music. The Ed Stewart Show. See A 2330.
0530 Radio New Zealand Int l: Change of Pace. A light mixture of jazz, polka, and other musical forms.
0535 China Radio Int'l: Life in China. See F1235
0535 Radio Havana Cuba: Feature Report. See S0119.
0541 China Radio Int'l: China in Action (biweekly). See F 1241.
0541 China Radio Int'l: World in Action (biweekly). See F 1241.
0546 WYFR: The Radio Reading Circle. See M 1246.
0547 China Radio Int'l: In the Third World. See F 1247.

FREQUENCIES

0600-0700	Australia, Radio	11910pa	13605as	13755pa	15240pa
		15365pa	15510as	17715as	17795pa
0600-0630	Australia, Radio	9580pa	9660pa	15415pa	
0600-0700 vl	Australia, VL8A Alice Spg	4835do			
0600-0700 vl	Australia, VL8K Katherine	5025do			
0600-0700 vl	Australia, VL8T Tent Crk	4910do			
0600-0700	Bahrain, Radio	6010do			
0600-0700	Canada, CFCX Montreal	6005do			
0600-0700	Canada, CFRX Toronto	6070do			
0600-0700	Canada, CFVP Calgary	6030do			
0600-0700	Canada, CHNX Halifax	6130do			
0600-0700	Canada, CKZU Vancouver	6160do			
0600-0700	Costa Rica, R Peace Intl	7385am	9400am		
0600-0700	Cuba, Radio Havana Cuba	9820na	9830na		
0600-0630	Czech Rep, Radio Prague	7345eu	15640eu		
0600-0700	Ecuador, HCJB Quito	9745am	15540am		
0600-0700 as	Eqt Guinea, R East Africa	9585af			
0600-0650	Germany, Deutsche Welle	11915af	11960af	13790af	15185af
		15225af	17820af	17875af	21680af
0600-0615	Ghana, Ghana Broadc Corp	3316do	4915do		
0600-0700 mtwh/vl	Italy, IRRS Milan	7125va			
0600-0700	Japan, NHK/Radio	11955as	17810as		
0600-0700	Kenya, Kenya Broadc Corp	4885do	4935do		
0600-0700 vl	Kiribati, Radio	9825do			
0600-0700	Lebanon, Wings of Hope	9960va			
0600-0700 vl	Liberia, Radio ELBC	7275do			
0600-0700	Liberia, Radio ELWA	4760do			
0600-0700 asmtwh	Malaysia, Radio	7295do			
0600-0700	Malaysia, Voice of	6175as	9750as	15295as	
0600-0700 mtwhfa	Malta, V of Mediterranean	9765me			
0600-0635 s	Malta, V of Mediterranean	9765me			
0600-0700	New Zealand, R NZ Intl	9570pa			
0600-0630	Nigeria, FRCN/Radio	3326do	4990do		
0600-0700	Nigeria, FRCN/Voice of	7255af			
0600-0700	North Korea, R Pyongyang	15180as	15230as		
0600-0630 m	Norway, Radio Norway Intl	7295pa			
0600-0700 vl	Papua New Guinea, NBC	4890do	9675do		
0600-0700	Russia, Voice of	12010na	12030na	12040na	12050na
		13370as	13645na	13665na	15425na
		15560as	15580as	17570as	
0600-0700	Slovakia, AWR	7215eu	13715af		
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do		
0600-0700	South Korea, R Korea Intl	7205na	11945na		
0600-0700	Swaziland, Swazi Radio	6155af			
0600-0630	Switzerland, Swiss R Intl	6165eu	9535af	9885af	13635af
		15340af			
0600-0615 s	Uganda, Radio	4976do	7110do		
0600-0700	United Kingdom,BBC London	6005af	6180eu	6190af	6195va
		7160af	9410va	9600af	9640va
		9740as	11760me	11940af	11955as
		12095va	15070va	15280as	15310as
		15360va	15400af	15420af	15575va
	17640af	17790as	17885af		
0600-0700	USA, KAIJ Dallas TX	5810am	9815am		
0600-0700	USA, KTBN Salt Lk City UT	7510am			
0600-0700	USA, KVOH Los Angeles CA	9975am			
0600-0700	USA, KWHR Naalehu HI	17780as			
0600-0700	USA, Monitor Radio Intl	7535eu			
0600-0700	USA, VOA Washington DC	3985eu	5995eu	6035af	6040eu
		6060eu	6140af	6873eu	7170me
		7325me	7405af	9530af	11805af
		11965eu	12080af	15205me	15600af
0600-0630	USA, VOA Washington DC	6035af	7405af	9630af	9665af
		11950af	12035af	12080af	
0600-0700	USA, WEWN Birmingham AL	7425na			
0600-0700	USA, WHRI Noblesville IN	5745am	9495am	17780am	
0600-0700	USA, WJCR Upton KY	7490na	13595na		
0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0700 a	USA, WVHA Green Bush ME	7455eu			
0600-0700	USA, WWCR Nashville TN	5065am	5935am	7435am	
0600-0700	USA, WYFR Okeechobee FL	5985na	7355eu	9985eu	
0600-0645 mtwhf	Vatican State, Vatican R	4005va	5860va		
0600-0700	Zimbabwe, ZBC/Radio 3	5975do	6045do		
0605-0700	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0630-0700	Australia, Radio	5995as	6020pa	6080pa	9860pa
		15245as			
0630-0700	Austria, R Austria Intl	6015na			
0630-0655	Belgium, R Vlaanderen Int	6015eu	9925au		
0630-0700	Vatican State, Vatican R	11625af	13765af	15570af	
0631-0640	Romania, R Romania Intl	7225eu	9550eu	9665eu	11810eu
0640-0700	Monaco, Trans World Radio	7115eu			
0645-0700	Finland, YLE/Radio	6120eu	9560eu	11755af	
0645-0700	Romania, R Romania Intl	11775pa	15250pa	15335pa	17720pa
		17805pa			

SELECTED PROGRAMS

Sundays

0600 Radio New Zealand Int'l: National Radio. Programming from New Zealand's domestic radio.
0600 WYFR: Hymn Storytime. Focus on a hymn and its message.
0605 WYFR: The Open Forum. Harold Camping answers biblical questions from listeners.
0617 Radio Havana Cuba: Feature Report. See S 0119.
0630 Radio New Zealand Int'l: Pacifika Style. Interview program in Maori.
0634 Radio Havana Cuba: DXers Unlimited. See S 0234.

Mondays

0600 Radio Havana Cuba: Sunday Edition (from 0500). See M 0200.
0600 WYFR: Music. See S 1134.
0607 Radio New Zealand Int'l: Checkpoint. See M 0507.
0610 WYFR: The Open Forum. See S 0605.
0630 BBC (af/as pac/eu/south as) General Feature. Pick of the World. Reviving past glories; the best of the BBC World Service's output of music, personalities and humor.
0630 Radio Havana Cuba: Breakthrough. See S 2330.
0630 Radio New Zealand Int'l: Ears. Children's stories.
0631 WYFR: Music See S 1134.
0635 Radio Havana Cuba: From Havana. See M 0235.
0638 WYFR: Creation Moments. Revealing facts about life's beginnings.

Tuesdays

0600 WYFR: Music. See S 1134.
0607 Radio New Zealand Int'l: Checkpoint. See M 0507.
0610 WYFR: The Open Forum. See S 0605.
0615 BBC (am): Popular Music. What is Jazz? (5th, 12th). Brian Morton is joined by some of Britain's finest jazz performers who explain and demonstrate the ways in which the music is created.
0615 Radio Havana Cuba: Spotlight on the Americas. See T 0118.
0630 BBC (am) General Feature. Pick of the World. See M 0630.
0630 Radio New Zealand Int'l: Ears. See M 0630.
0631 WYFR: Music. See S 1134.
0635 Radio Havana Cuba: Timeout. See T 0233.
0638 WYFR: Creation Moments. See M 0638.
0640 Radio Havana Cuba: Cuba Today. A slice of Life in Havana.
0650 WYFR: The Basic Bible Study. Pastor Henry Van Dyke explains Bible fundamentals.

Wednesdays

0600 WYFR: Music. See S 1134.
0607 Radio New Zealand Int'l: Checkpoint. See M 0507.
0610 WYFR: The Open Forum. See S 0605.
0615 BBC (am): Popular Music. Live from the Archive. See S 0445.
0615 BBC (as pac): Background Current Affairs Feature. History Today. See T 0530.
0617 Radio Havana Cuba: Feature Report. See S 0119.
0630 Radio New Zealand Int'l: Ears. See M 0630.
0631 WYFR: Music. See S 1134.
0636 Radio Havana Cuba: Timeout. See T 0233.
0638 WYFR: Creation Moments. See M 0638.
0641 Radio Havana Cuba: Feature Report. See S 0119.
0650 WYFR: The Basic Bible Study. See T 0650.

Thursdays

0600 WYFR: Music. See S 1134.
0607 Radio New Zealand Int'l. Checkpoint. See M 0507.
0610 WYFR: The Open Forum. See S 0605.
0618 Radio Havana Cuba: Feature Report. See S 0119.
0630 Radio New Zealand Int'l: Ears. See M 0630.
0631 WYFR: Music. See S 1134.
0635 Radio Havana Cuba: Timeout. See T 0233.
0638 WYFR: Creation Moments. See M 0638.
0650 WYFR: The Basic Bible Study. See T 0650.

Fridays

0600 WYFR: Music. See S 1134.
0607 Radio New Zealand Int'l: Checkpoint. See M 0507.
0610 WYFR: The Open Forum. See S 0605.
0617 Radio Havana Cuba: Feature Report. See S 0119.
0630 Radio New Zealand Int'l: Ears. See M 0630.
0631 WYFR: Music. See S 1134.
0636 Radio Havana Cuba: Timeout. See T 0233.
0638 WYFR: Creation Moments. See M 0638.
0641 Radio Havana Cuba: Cuba Today. See T 0640.
0648 WYFR: Helps for the Family. See M 1440.

Saturdays

0600 WYFR: The Open Forum. See S 0605.
0612 Radio New Zealand Int'l: Pacific Requests. Music request and dedications.
0620 Radio Havana Cuba: Latin America Newsline. See A 0220.
0635 Radio Havana Cuba: Timeout. See T 0233.
0640 Radio Havana Cuba: Feature Report. See S 0119.
0648 WYFR: Farm Radio. Useful tips for farm families.

FREQUENCIES

0700-0800	Australia, Radio	5995pa	6020pa	6080pa	9580pa
		9710pa	9860pa	15240pa	15565as
		17695as			
0700-0730	Australia, Radio	13605as	15415as	17795as	
0700-0800 vl	Australia, VL8A Alice Spg	4835do			
0700-0800 vl	Australia, VL8K Katherine	5025do			
0700-0800 vl	Australia, VL8T Tent Crk	4910do			
0700-0800	Bahrain, Radio	6010do			
0700-0800	Canada, CFCX Montreal	6005do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica, R Peace Intl	7385am	9400am		
0700-0800	Ecuador, HCJB Quito	6135pa	11615as	15540am	
0700-0800 as	Eqt Guinea, R East Africa	9585af			
0700-0730	Georgia, Georgian Radio	11805eu			
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do		
0700-0800 mtwh/vl	Italy, IRRS Milan	7125va			
0700-0800	Japan, NHK/Radio	5975eu	7230eu	11725as	11740as
		11850as	11955as	15335me	17810me
		17815eu	21610au		
0700-0800	Kenya, Kenya Broadc Corp	4885do	4935do		
0700-0800 vl	Kiribati, Radio	9825do			
0700-0800	Lebanon, Wings of Hope	9960va			
0700-0800 vl	Liberia, Radio ELBC	7275do			
0700-0800	Liberia, Radio ELWA	4760do			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	6175as	9750as	15295as	
0700-0800	Monaco, Trans World Radio	7115eu			
0700-0730	Myanmar, Radio	5990do	9730do		
0700-0716 mtwhf	New Zealand, R NZ Intl	9570pa			
0700-0759 as	New Zealand, R NZ Intl	9570pa			
0700-0750	North Korea, R Pyongyang	15340af	17765me		
0700-0800 vl	Papua New Guinea, NBC	4890do	9675do		
0700-0800	Russia, Voice of	13370as	15560as	17570as	17590as
		17695as	17870as		
0700-0715	Sierra Leone, SLBS	3316do			
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0800	Swaziland, Swazi Radio	6155af			
0700-0800	Taiwan, VO Free China	5950na			
0700-0715 mtwtfa	Uganda, Radio	4976do	7110do		
0700-0800	United Kingdom,BBC London	6190af	9410va	9600af	9640va
		9740as	11760me	11940af	11955as
		12095va	15070va	15280as	15360va
		15400va	15575me	17640af	17790as
		17830af	17885af		
0700-0730	United Kingdom,BBC London	6005af	6180eu	6195eu	
0700-0715	United Kingdom,BBC London	7160af	11860af		
0700-0800	USA, KAIJ Dallas TX	5810am	9815am		
0700-0800	USA, KTBN Salt Lk City UT	7510am			
0700-0800	USA, KVOH Los Angeles CA	9785am			
0700-0800	USA, KWHR Naalehu HI	17780as			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	7425na	11715eu		
0700-0800	USA, WHRI Noblesville IN	5745am	9495am	17780am	
0700-0800	USA, WJCR Upton KY	7490na	13595na		
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800 a	USA, WVHA Green Bush ME	7455eu			
0700-0800	USA, WWCR Nashville TN	5065am	5935am	7435am	
0700-0745	USA, WYFR Okeechobee FL	5985na	7355eu	9985eu	
0700-0759	USA, WYFR Okeechobee FL	13695af			
0700-0800	Zimbabwe, ZBC/Radio 3	5975do	6045do		
0705-0800	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0717-0800 mtwhf	New Zealand, R NZ Intl	6100pa			
0730-0800	Australia, Radio	9660pa	17880as		
0730-0800	Austria, R Austria Intl	6155eu	13730eu		
0730-0800 mtwhfa	Austria, R Austria Intl	15410me	17870me		
0730-0757	Czech Rep, Radio Prague	15640af			
0730-0745 s	Greece, Voice of	9375au	9425eu	11645eu	
0730-0800	Netherlands, Radio	9700pa	9720au		
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	9375eu	9425eu	11645eu	
0755-0800	Guam, AWR/KTWR	15200as			

0800 UTC

0800-0900	Australia, AF Radio	15605af	18191af		
0800-0900	Australia, Radio	5995pa	6020pa	6080pa	9580pa
		9710pa	9860pa	17715as	21725as
0800-0830 vl	Australia, VL8A Alice Spg	4835do			
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0830 vl	Australia, VL8T Tent Crk	4910do			
0800-0900	Bahrain, Radio	6010do			
0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	Costa Rica, R Peace Intl	9400am			
0800-0830	Ecuador, HCJB Quito	6135pa	11615eu	15540am	
0800-0900 as	Eqt Guinea, R East Africa	9585af			
0800-0830	Finland, YLE/Radio	15115au	17820as		
0800-0805 s	Ghana, Ghana Broadc Corp	3366do			
0800-0900	Guam, TWR/KTWR	15200as			
0800-0900 mtwh/vl	Italy, IRRS Milan	7125va			
0800-0900	Kenya, Kenya Broadc Corp	4885do	4935do		
0800-0900 vl	Kiribati, Radio	9825do			
0800-0900	Lebanon, Voice of Hope	6280me			
0800-0900	Lebanon, Wings of Hope	9960va			
0800-0900 vl	Liberia, Radio ELBC	7275do			
0800-0830	Liberia, Radio ELWA	4760do			
0800-0900	Malaysia, Radio	7295do			
0800-0830	Malaysia, Voice of	6175as	9750as	15295as	
0800-0805	Monaco, Trans World Radio	7115eu			
0800-0825	Netherlands, Radio	9700pa	9720au		
0800-0900	New Zealand, R NZ Intl	6100pa			
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0830 m	Norway, Radio Norway Intl	15220me			
0800-0850	Pakistan, Radio	15625eu	17900eu		
0800-0900 vl	Papua New Guinea, NBC	4890do	9675do		
0800-0900	Russia, Voice of	9835as	11800as	11900as	13370as
		15560as	17590as	17695as	17765as
		17870as			
0800-0815	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, R Korea Intl	7550eu	13670me		
0800-0900	United Kingdom,BBC London	6190af	9410va	9740as	11760me
		11940af	11955as	12095va	15070va
		15280as	15310as	15400va	15575me
		17640va	17830af	17885af	
0800-0815	United Kingdom,BBC London	9640va			
0800-0900	USA, KAIJ Dallas TX	5810am	9815am		
0800-0900	USA, KNLS Anchor Point AK	9615as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	7535eu	15665pa		
0800-0900	USA, WEWN Birmingham AL	7425na			
0800-0900	USA, WHRI Noblesville IN	5745am	9495am	9930am	
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	5065am	5935am	7435am	
0800-0900	Zimbabwe, ZBC/Radio 4	5975do	6045do	7285do	
0805-0820 smtwhf	Monaco, Trans World Radio	7115eu			
0805-0835	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0815-0900 mtwtf	Nigeria, FRCN/Radio	3326do	4990do		
0830-0900 s	Armenia, Voice of	15170eu	15270eu		
0830-0900 vl	Australia, VL8A Alice Spg	2310do			
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900 vl	Australia, VL8T Tent Crk	2325do			
0830-0900	Netherlands, Radio	9720pa	12065pa	13700pa	
0830-0857	Slovakia, R Slovakia Intl	11990au	15640au	17485au	
0855-0900	Guam, TWR/KTWR	11830pa			

HAUSER'S HIGHLIGHTS
KALININGRAD:

GPR-2 summer schedule from this site:

Freq	Time UT	Program
6015	0200-0600	R. Nadezhda
	1430-2100	R. Nadezhda
7280	1500-1900	Voice of Russia
7310	1457-1726	Radio Netherlands
	1730-2100	Voice of Russia
7395	0527-0725	Radio Netherlands
11745	0900-1000	VOR
11965	0630-1400	R. Nadezhda

As updated April 5, until Sept 24
(via Ben Krepp, Kevin Hecht, Ed Kusalik)
But Nadezhda seems gone; See page 43.

AR 8000

The New Concept - AR8000 shocks the market. AOR made every effort to incorporate the latest technology in to this new scanner.

• SPECIFICATIONS •

- **Range:** .5 - 1900MHz usable to 100kHz
- **Modes:** AM/NFM/WFM/USB/LSB/CW
- **Stepsize:** 50Mz to 999.995kHz
- **Sensitivity(μV):** 30 to 1000MHz **SSB** .2 **AM** 1.0 **NFM** .35 **WFM** 1.0
- **Filters:** (kHz) **SSB** 4 **AM/NFM** 12 **WFM** 180
- **Memories:** 50 ch. x 20 banks=1000 total
- **Size/Wt.:** 6.1 x 2.8 x 1.6 inch. 20 oz. batt. incl.

* Cell blocked for all, but Approved agencies.

- Covers .5-1900MHz*
- Ferrite Rod antenna below 2MHz
- Only portable scanner on U.S. market to have true SSB, both LSB & USB. Others attempt SSB using a BFO, but are difficult to tune and produce poor SSB audio.
- 4 level alpha numeric LCD read out frequency, mode, signal strength, band scope spectral display, battery low, remote and more
- Computer control up/down load data, will add a new dimension to the world of scanning.
- Clone your memory banks with a friend, load 1000 memory channels in seconds

.1 - 1900MHz*

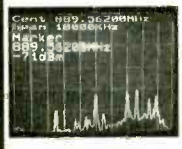
The Latest From AOR Products

Available at a Dealer Near You!

SDU 5000

NEW

The Spectral Display Unit adds a new dimension to the signal interception hobby. Imagine seeing stations above and below your receiving frequency. Usually the transmissions are short, perhaps 1 or 2 seconds. What are the chances of you being tuned to the exact frequency at the instant of transmission? Very slim. With an SDU you can watch for stations to pop up over a 10MHz window, then zero in. The SDU 5000 offers features unheard of only a year ago.



Δ Frequency coverage up to 10MHz Δ **Display** - 3.1" HQM Simple matrix color LCD Δ **Resolution:** 5 or 30kHz selectable Δ **Input:** 10.7MHz Δ 50dB Dynamic range Δ Screen refresh 2/s Δ Composite video out Δ Full computer control Δ Video output NTSC or Pal display, on TV or record on VCRΔ RS232 9600bps Δ Instant receiver set from cursor via RS232 Δ Store image on disc or your video recorder Δ Menu driven system makes SDU5000 simple to operate Δ SDU5000 is designed to work with the AR3000A (modified with a 10.7MHz output) using RS232 link with or without a computer. Other receivers with 10.7MHz IF output but digital linking may not be straight forward.

AR8000 Interface

Computer Interface for the AR8000

- Δ Low Power, powered by your serial port
- Δ No Drain on the batteries in the radio
- Δ Light weight, perfect for Laptop use
- Δ As small as a DB-25 Connector
- Δ Hi-Tech Surface mount design for reliability
- Δ 100% Shielded cable to receiver for reduced interference
- Δ PC Software included for Windows and DOS
- Δ Manual included
- Δ Detailed Programers documentation available
- Δ Designed and Manufactured in the USA
- Δ Optional 100% shield computer cable from AR8000INF to computer for reduced interference

Unlike some of the European devices sold today, this unit is smaller, lighter, and makes no power demands on your receiver. With the extra shielding and smaller size there is less chance of additional interference leaking into your radio. The AR8000INF is also the only interface that is upgradeable for use with the optional Tape recorder controller due first quarter '95.

AOR®

Electronic Distributors Co.
325 Mill Street, N.E.
Vienna, VA. 22180
Phone: 703 938 8105 FAX: 703 938 4525

AOR®

EDCO

EDCO

Exclusive North and South American Distributors.

FREQUENCIES

0900-1000	Australia, AF Radio	15605af	18191af		
0900-1000	Australia, Radio	5995as	7240as	9510as	9580pa
		9860pa	13605as	15170as	21725as
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	2325do			
0900-1000	Bahrain, Radio	6010do			
0900-0925 mtwhfa	Belgium, R Vlaanderen Int	6035eu	15545af	17595af	
0900-1000	Canada, CFCX Montreal	6005do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-1000	China, China Radio Intl	11755pa	15440pa		
0900-1000	Costa Rica, R Peace Intl	9400am			
0900-1000	Ecuador, HCJB Quito	6135pa	15540am		
0900-1000 as	Eqt Guinea, R East Africa	9585af			
0900-0950	Germany, Deutsche Welle	6160as	9565af	11715as	12055as
		15410af	17715as	17780as	21600af
		21680as			
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	3366do	4915do		
0900-1000	Guam, AWR/KSDA	9530as			
0900-0915	Guam, TWR/KTWR	15200as			
0900-1000	Guam, TWR/KTWR	11830pa			
0900-1000	Iraq, Radio Iraq Intl	13680as			
0900-1000 mtwh/vl	Italy, IRRS Milan	7125va			
0900-1000	Japan, NHK/Radio	9610as	11850au	15190as	
0900-0948 vl	Kiribati, Radio	9825do			
0900-1000	Lebanon, Voice of Hope	6280me			
0900-1000	Lebanon, Wings of Hope	9960va			
0900-1000 vl	Liberia, Radio ELBC	7275do			
0900-1000	Malaysia, Radio	7295do			
0900-0930	Netherlands, Radio	9720pa	13700pa		
0900-1000	New Zealand, R NZ Intl	6100pa			
0900-1000 mtwtf	Nigeria, FRCN/Radio	3326do	4990do		
0900-1000	Nigeria, FRCN/Voice of	7255af			
0900-1000 vl	Papua New Guinea, NBC	4890do	9675do		
0900-1000	Russia, Voice of	9835as	11800as	11900as	17590as
		17695as	17765as	17870as	
0900-1000	Slovakia, AWR	15620am			
0900-1000 vl	Solomon Islands, SIBC	5020do	9545do		
0900-0930	Switzerland, Swiss R Intl	9885au	13685au	17515au	
0900-1000	United Kingdom,BBC London	6190af	6195as	9740as	11750as
		11940af	12095va	15070va	15190sa
		15280va	15400va	15575me	17640va
		17705va	17830va	17885af	
0900-0915	United Kingdom,BBC London	9575as	11765as	11955as	15310as
		15360as			
0900-0930	United Kingdom,BBC London	9410me	11760me		
0900-1000	USA, KAIJ Dallas TX	5810am	9815am		
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, KWHR Naalehu HI	9930as			
0900-1000	USA, Monitor Radio Intl	7395sa	7535eu	9430as	13615pa
0900-1000	USA, WEWN Birmingham AL	7425na			
0900-1000	USA, WHRI Noblesville IN	5745am	9495am	9930am	
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 smtwhf	USA, WMLK Bethel PA	9465eu			
0900-1000 a	USA, WVHA Green Bush ME	9870af			
0900-1000	USA, WWCR Nashville TN	5065am	5935am	7435am	
0900-1000	Zimbabwe, ZBC/Radio 4	5975do	6045do	7285do	
0910-0940	Mongolia, R Ulan Bator	9960au	12000na		
0915-1000	Ghana, Ghana Broadc Corp	6130do	7295do		
0930-1000 mtwhfa	Austria, R Austria Intl	6155eu	13730pa	17870pa	
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Netherlands, Radio	7260pa	9720pa	9810pa	21505pa
0930-1000	Philippines, FEBC/R Intl	11690as			

1000 UTC

1000-1100	Australia, Radio	5995as	7240as	9580pa	9860pa
		13605as	15170as	21725as	
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	2325do			
1000-1100	Bahrain, Radio	6010do			
1000-1100	Canada, CFCX Montreal	6005do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	11755pa	15440pa		
1000-1100	Costa Rica, R Peace Intl	9400am			
1000-1100	Ecuador, HCJB Quito	6135as	15540am		
1000-1100 as	Eqt Guinea, R East Africa	9585af			
1000-1040	Ghana, Ghana Broadc Corp	6130do	7295do		
1000-1100	India, All India Radio	15050as	15180as	17387au	17895as
1000-1100	Iraq, Radio Iraq Intl	13680eu			
1000-1100 mtwh/vl	Italy, IRRS Milan	7125va			
1000-1100	Lebanon, Voice of Hope	6280me			
1000-1100	Lebanon, Wings of Hope	9960va			
1000-1100	Malaysia, Radio	7295do			
1000-1100	Malaysia, RTM/Kota Kinab	5980do			
1000-1030	Netherlands, Radio	7260pa	9720pa	9810pa	21505pa
1000-1100	New Zealand, R NZ Intl	6100pa			
1000-1100	Nigeria, FRCN/Radio	4990do	7285do		
1000-1100	Nigeria, FRCN/Voice of	7255af			
1000-1100 vl	Papua New Guinea, NBC	4890do	9675do		
1000-1100	Philippines, FEBC/R Intl	11690as			
1000-1100	Russia, Voice of	9835as	11800eu	11900as	13370as
		15110as	15405as	15510eu	17560as
		17590as	17765as	17870as	
1000-1100	Singapore, SBC Radio One	6155do			
1000-1030	Sweden, Radio	6160eu			
1000-1030	Switzerland, Swiss R Intl	6165eu	9535eu		
1000-1015	Uganda, Radio	4976do			
1000-1100	United Kingdom,BBC London	6190af	6195as	9410va	9740as
		11750as	11760me	11940af	12095va
		15070va	15190sa	15310as	15400eu
		15575me	17640va	17705va	17790as
		17885af			
1000-1030	United Kingdom,BBC London	15280as	17830as		
1000-1100	USA, KAIJ Dallas TX	9815am			
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, Monitor Radio Intl	6095ca	7395sa	9430as	13625as
1000-1100	USA, VOA Washington DC	5985pa	6165am	7405am	9590am
		11720pa	11915am	15120am	15425pa
1000-1100	USA, WHRI Noblesville IN	6040am	9495am	9930am	
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WWCR Nashville TN	5065am	5935am		
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1030	Vietnam, Voice of	7250na	9840as	12020as	15010as
1030-1100	Austria, R Austria Intl	17870pa			
1030-1100	Czech Rep, Radio Prague	7345eu	9505eu		
1030-1100	Malaysia, RTM/Kuching	7160do			
1030-1100	Netherlands, Radio	7260pa	9810pa		
1030-1100	South Korea, R Korea Intl	11715na			
1030-1100	Sri Lanka, SLBC Colombo	11835as	15120as	17850au	
1030-1100	UAE, Radio Dubai	13675eu	15320eu	15395eu	21605me

This QSL from Radio Cambodia was sent to MT by Craig Jordan, of Sacramento CA.

FREQUENCIES

1100-1200	Australia, Radio	5995as	7240as	9510pa	9580pa
		9710pa	9860pa	13605as	15170as
		15530as	15565as		
1100-1200 vl	Australia, VL8A Alice Spg	2310do			
1100-1200 vl	Australia, VL8K Katherine	2485do			
1100-1200 vl	Australia, VL8T Tent Crk	2325do			
1100-1200	Bahrain, Radio	6010do			
1100-1200	Canada, CFCX Montreal	6005do			
1100-1200	Canada, CFRX Toronto	6070do			
1100-1200	Canada, CFVP Calgary	6030do			
1100-1200	Canada, CHNX Halifax	6130do			
1100-1200	Canada, CKZN St John's	6160do			
1100-1200	Canada, CKZU Vancouver	6160do			
1100-1200	Costa Rica, AWR Alajuela	5030am	7375am	9725am	13750am
1100-1200	Costa Rica, R Peace Intl	9400am			
1100-1130	Ecuador, HCJB Quito	6135pa			
1100-1200	Ecuador, HCJB Quito	12005am	15115am	15540am	21455am
1100-1200 as	Eqt Guinea, R East Africa	9585af			
1100-1150	Germany, Deutsche Welle	15370af	15410af	17715af	17765af
		17800af	17860af		
1100-1110 as	Ghana, Ghana Broadc Corp	3366do	4915do		
1100-1200	Iraq, Radio Iraq Intl	13680eu			
1100-1200 mtwh/vl	Italy, IRRS Milan	7125va			
1100-1200	Japan, NHK/Radio	6120na	9610as	15350as	
1100-1200	Jordan, Radio	15170va			
1100-1200	Malaysia, Radio	7295do			
1100-1200	Malaysia, RTM/Kota Kinab	5980do			
1100-1200	Malaysia, RTM/Kuching	7160do			
1100-1200	New Zealand, R NZ Intl	6100pa			
1100-1105	Nigeria, FRCN/Radio	4990do	7285do		
1100-1150	North Korea, R Pyongyang	6576na	9977na	11335na	
1100-1120	Pakistan, Radio	15625as	17900as		
1100-1200 vl	Papua New Guinea, NBC	4890do	9675do		
1100-1200	Russia, Voice of	4740as	9835as	11900as	11940as
	13370as 15110as	15405as	15510eu	17560as	17590as
	17675as 17685as	17755as	17765as	17775as	17795as
	17835as 17870as				
1100-1115	Rwanda, Radio	6055do			

1100-1200	Singapore, SBC Radio One	6155do			
1100-1200	Singapore,R Singapore Int	9530as			
1100-1130	Sri Lanka, SLBC Colombo	11835as	15120as	17850au	
1100-1130	Switzerland, Swiss R Intl	6165eu	9535eu	13635as	15545as
		17515as			
1100-1200	Taiwan, Voice of Asia	7445as			
1100-1102	Uganda, Radio	7110do	7195do		
1100-1200	United Kingdom,BBC London	5965na	6190af	6195va	9410va
	9515na 9575as	9740va	11750as	11760me	11765as
	11940af 11955as	12095va	15070va	15310as	15360as
	15575me 17640va	17705af	17830af		
1100-1130	United Kingdom,BBC London	6100au	15190sa	15400eu	17790va
1100-1200	USA, KAIJ Dallas TX	5810am	9815am		
1100-1200	USA, KTBN Salt Lk City UT	7510am			
1100-1200	USA, KWHR Naalehu HI	9930as			
1100-1200	USA, Monitor Radio Intl	6095na	7395ca	9355eu	9425au
1100-1200	USA, VOA Washington DC	5985as	6110as	6165am	7405am
		9590am	9615as	9645as	9760as
		11720as	11915am	15160as	15425as
1100-1200	USA, WEWN Birmingham AL	7425na			
1100-1200	USA, WHRI Noblesville IN	6040am	9495am		
1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200 s/vl	USA, WVHA Green Bush ME	13770af			
1100-1200	USA, WWCR Nashville TN	5065am	13845am	15685am	
1100-1200	USA, WYFR Okeechobee FL	5950na	11830na		
1100-1130	Vietnam, Voice of	7250as	9840as	15010as	
1130-1200	Austria, R Austria Intl	13730na			
1130-1200	Bulgaria, Radio	15635as	17625as		
1130-1200 vl	China, China Radio Intl	6995as	11445as	15135as	
1130-1200	Finland, YLE/Radio	11900na	15400na		
1130-1200	Iran, VOIRI Tehran	11745as	11790as	11875me	11930me
		15260af	17750me		
1130-1155 s	Monaco, Trans World Radio	7115eu			
1130-1200	Netherlands, Radio	6045eu	7130eu	7160eu	
1130-1200	Sweden, Radio	13740au	15120as	15240as	
1130-1200	USA, WRMI/R Miami Intl	9955am			
1145-1200	Rwanda, Radio	6055do			
1155-1200 a	Monaco, Trans World Radio	7115eu			

SELECTED PROGRAMS

Sundays

1100 Costa Rica (AWR): Wavescan. Adventist World Radio's DX/Media program.
1100 Radio New Zealand Int I: Newsdesk. Rebroadcast of the BBC World Service's quality news program.
1100 WYFR: A Treasury of Favorite Hymns. Recordings of religious music from Bob Jones University.
1108 WYFR: The Open Forum. See S 0605.
1115 Costa Rica (AWR): The Gospel. A reading from scripture.
1130 Radio New Zealand Int I: Good Night from Wellington. National Radio.
1134 WYFR: Music. Recordings of music with a religious flavor.
1148 WYFR: Leading Little Ones to God. A christian teaching program for children.

Mondays

1100 Costa Rica (AWR): Your Radio Doctor. See M 0000.
1100 Radio New Zealand Int I: Newsdesk. See S 1100.
1105 WYFR (Satellite Net): Walk with the King. Advice for everyday Christian living.
1120 Costa Rica (AWR): Family Forum. A program of advice for youth on everyday living.
1130 BBC (am/as pac): Light Entertainment. Just a Minute (4th,11th,18th). See S 1530.
1130 Radio New Zealand Int I: Good Night from Wellington. See S 1130.
1135 Costa Rica (AWR): The Christian Working Woman. Mary Welchel provides advice for Christian women.
1143 Costa Rica (AWR): The Amazing Facts Broadcast. Joe Crews with unusual happenings which support Christian philosophy.

Tuesdays

1100 Costa Rica (AWR): Your Radio Doctor. See M 0000.
1100 Radio New Zealand Int I: Newsdesk. See S 1100.
1105 WYFR (Satellite Net): Walk with the King. See M 1105.
1120 Costa Rica (AWR): Family Forum. See M 1120.
1130 Radio New Zealand Int I: Good Night from Wellington. See S 1130.
1135 Costa Rica (AWR): The Christian Working Woman. See M 1135.
1143 Costa Rica (AWR): The Amazing Facts Broadcast. See M 1143.

Wednesdays

1100 Costa Rica (AWR): Your Radio Doctor. See M 0000.
1100 Radio New Zealand Int I: Newsdesk. See S 1100.
1105 WYFR (Satellite Net): Walk with the King. See M 1105.
1120 Costa Rica (AWR): Family Forum. See M 1120.
1130 Radio New Zealand Int I: Orient Express. Live music request program for Chinese listeners. Recommended.
1135 Costa Rica (AWR): The Christian Working Woman. See M 1135.
1143 Costa Rica (AWR): The Amazing Facts Broadcast. See M 1143.

Thursdays

1100 Radio New Zealand Int I: Newsdesk. See S 1100.
1105 WYFR (Satellite Net): Walk with the King. See M 1105.
1130 BBC (am): Popular Music. What is Jazz? (7th,14th). See T 0615.
1130 BBC (as pac) General Feature. Pick of the World. See M 0630.
1130 Radio New Zealand Int I: Good Night from Wellington. See S 1130.
1154 WYFR (Satellite Net): Insight. A few minutes of discernment from Joel Niederhood.

Fridays

1100 Radio New Zealand Int I: Newsdesk. See S 1100.
1105 WYFR (Satellite Net): Walk with the King. See M 1105.
1122 WYFR (Satellite Net): The Bible Quiz. See S 0549.
1130 Radio New Zealand Int I: Good Night from Wellington. See S 1130.

Saturdays

1100 Costa Rica (AWR): Your Radio Doctor. See M 0000.
1100 Radio New Zealand Int I: Newsdesk. See S 1100.
1120 Costa Rica (AWR): Family Forum. See M 1120.
1130 Radio New Zealand Int I: Good Night from Wellington. See S 1130.
1135 Costa Rica (AWR): The Christian Working Woman. See M 1135.
1143 Costa Rica (AWR): The Amazing Facts Broadcast. See M 1143.
1150 WYFR (Satellite Net): For the Record. Community action news as reported by local AM station affiliates of Family Radio.

KOREA SOUTH: R. KOREA

Half-hour broadcasts, including via Canada
1030-1100 on 11715:
Daily News, almost 10 minutes Mon-Fri
News Commentary, 5 minutes
last 15 minutes:

Mon	*Seoul Calling*
Tue	*Korean Cultural Trails*
Wed	*Pulse of Korea*
Thu	*Let's Learn Korean*
Fri	*Globalizing Korea*

last 20 minutes:

Sat	*From Us to You*
Sun	*Shortwave Feedback*

Let's Sing Together occupies the middle third of the hour-long broadcasts on Fridays. Musical score of the song of the month are automatically sent with QSL cards. (via Gigi Lytle, TX)

1200 UTC SHORTWAVE GUIDE 8:00 AM EDT 5:00 AM PDT

FREQUENCIES

1200-1300	Australia, Radio	5995pa	6060pa	6080pa	7260as
		9610as	11800pa	15565as	
1200-1300 vl	Australia, VL8A Alice Spg	2310do			
1200-1300 vl	Australia, VL8K Katherine	2485do			
1200-1300 vl	Australia, VL8T Tent Crk	2325do			
1200-1300	Bahrain, Radio	6010do			
1200-1300	Brazil, Radiobras	15445na			
1200-1230	Bulgaria, Radio	15635as	17625as		
1200-1215	Cambodia, Natl Voice of	11940as			
1200-1300 vl	Canada, CBC N Quebec Svc	9625do			
1200-1300	Canada, CFCX Montreal	6005do			
1200-1300	Canada, CFRX Toronto	6070do			
1200-1300	Canada, CFVP Calgary	6030do			
1200-1300	Canada, CHNX Halifax	6130do			
1200-1300	Canada, CKZN St John's	6160do			
1200-1300	Canada, CKZU Vancouver	6160do			
1200-1300 mtwhf	Canada, RCI Montreal	9635am	11855am	13650am	
1200-1300	China, China Radio Intl	8425na	9655as	9715as	11660as
		11795pa	15440pa		
1200-1230 vl	China, China Radio Intl	8660as	11445as	12110as	15135as
1200-1300	Costa Rica, AWR Alajuela	5030am	7375am	9725am	13750am
1200-1300	Costa Rica, R Peace Intl	6200am	9400am	15050am	
1200-1300	Ecuador, HCJB Quito	12005am	15115am	15540am	21455am
1200-1300 as	Eqt Guinea, R East Africa	9585af			
1200-1300	France, Radio France Intl	9805eu	11615au	13625na	15155eu
		15195eu	15325af	15530na	
1200-1230	Iran, VOIRI Tehran	11745as	11790as	11875me	11930me
		15260af	17750me		
1200-1300	Iraq, Radio Iraq Intl	13680eu			
1200-1300 mtwh/vl	Italy, IRRS Milan	7125va			
1200-1300 vl	Liberia, Radio ELBC	7275do			
1200-1300	Malaysia, Radio	7295do			
1200-1300	Malaysia, RTM/Kota Kinab	5980do			
1200-1300	Netherlands, Radio	6045eu	7130eu	7160eu	
1200-1206	New Zealand, R NZ Intl	6100pa			
1200-1230	Nigeria, FRCN/Radio	4990do	7285do		
1200-1230 s	Norway, Radio Norway Intl	13800as	15170as		
1200-1300 vl	Palau, KHBN/Voice of Hope	9965as			
1200-1300 vl	Papua New Guinea, NBC	4890do	9675do		
1200-1300	Poland, Polish R Warsaw	6135eu	7145eu	7270eu	9525eu
		11815eu			
1200-1300	Russia, Voice of	4740as	4975as	5960as	7150as
		9540na	9800pa	9895as	11820as
		11880as	13370as	15105as	15110as
		15405as	15435as	15510eu	15560as
		15570as	17590as	17600as	17645as
		17755as	17765as	17775as	17780as
		17795as	17835as	17870as	
1200-1300	Singapore, SBC Radio One	6155do			
1200-1300	Singapore,R Singapore Int	9530as			
1200-1300	South Korea, R Korea Intl	7285as			
1200-1300	Taiwan, VO Free China	7130au	9610as		
1200-1300	United Kingdom,BBC London	6190af	6195va	9410va	9515na
		9575as	9740va	11365am	11750as
		11760me	11765as	11865va	11940af
		11955as	12095va	15070va	15310as
		15360as	15575me	17640va	17705va
		17830af	17885af	21660af	
1200-1300	USA, KAIJ Dallas TX	5810am	9815am		
1200-1300	USA, KTBN Salt Lk City UT	7510am			
1200-1300	USA, KWHR Naalehu HI	9930as			
1200-1300	USA, Monitor Radio Intl	6095na	9355as	9425au	9455na
1200-1300	USA, VOA Washington DC	6110as	9645as	9760as	11715as
		15160as	15425as		
1200-1300	USA, WEWN Birmingham AL	7425na	9540sa		
1200-1300	USA, WHRI Noblesville IN	6040am	9495am		
1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300 s	USA, WRMI/R Miami Intl	9955am			
1200-1300 a	USA, WVHA Green Bush ME	11695af			
1200-1300	USA, WWCR Nashville TN	5065am	13845am	15685am	
1200-1300	USA, WYFR Okeechobee FL	5950na	6015na	11830na	17750na
1200-1230	Uzbekistan, R Tashkent	7285eu	9715eu	15295eu	17815eu
1206-1300 occsnal	New Zealand, R NZ Intl	6100pa			
1215-1300	Egypt, Radio Cairo	17595as			
1220-1229 vl	Ghana, Ghana Broadc Corp	4915do			
1230-1300	Austria, R Austria Intl	15450as			
1230-1300	Bangladesh, Radio	7105as	7185as	9650as	
1230-1255 s	Belgium, R Vlaanderen Int	13670na			
1230-1300	Canada, RCI Montreal	9660as	11855na	15195as	
1230-1300	Finland, YLE/Radio	11900na	15400na		
1230-1300	Ghana, Ghana Broadc Corp	6130do	7295do		
1230-1300	Indonesia, RRI Sorong	4875do			
1230-1255	Moldova, R Moldova Intl	15315na			
1230-1300	South Korea, R Korea Intl	9570as	9640as	13670eu	
1230-1300	Sweden, Radio	11650na	15240na		
1230-1300	Switzerland, Swiss R Intl	6165eu	9535eu		
1230-1300	Turkey, Voice of	9675as			
1230-1300	Vietnam, Voice of	7250as	9840as	15010as	
1240-1250	Greece, Voice of	15650af			

SELECTED PROGRAMS

Sundays

1200 Costa Rica (AWR): Your Story Hour. Dramatized children's stories.
1200 Radiobras: Sunday Special. Focus on a specialized topic mixed with Brazilian music.
1200 WYFR: Family Bible Reading Fellowship. See S 0500.
1213 China Radio Int'l: Press Clippings. Review of the Chinese press.
1220 China Radio Int'l: China Scrapbook. Snippets of facts about China's past and present.
1225 China Radio Int'l: Music Album. A combination of traditional and Western musical selections.
1230 BBC (eu): Popular Music. The Ed Stewart Show. See A 2330.
1230 Costa Rica (AWR): Voice of Prophecy. Write for an adult bible study program.
1230 WYFR: Music. See S 1134.
1239 WYFR: Daily Grace. A word found in scripture and its meaning.
1240 China Radio Int'l: Listeners' Letterbox. Listener letters and information about China.
1249 WYFR: Family Radio Worldwide. Behind the scenes at Family Radio.

Mondays

1200 Costa Rica (AWR): It is Written. George Vandeman examines Scripture.
1200 Radiobras: Brazilian Panorama. A magazine program of Brazilian music and features.
1200 WYFR: Family Bible Reading Fellowship. See S 0500.
1215 WYFR: The Family Bible Study. See M 0520.
1219 China Radio Int'l: China's Open Windows (biweekly). China's progress in world trade and news items about commerce.
1219 China Radio Int'l: The Business Show (biweekly). News on Chinese industry or trade.
1230 BBC (eu): Classical Music. Masterclass. Piano pieces used by music examiners and talk about them.
1230 Costa Rica (AWR): Your Story Hour. See S 1200.
1240 China Radio Int'l: Learn to Speak Chinese. Chinese language lessons for English speakers.
1246 WYFR: The Radio Reading Circle. Readings from the classics of American literature.

Tuesdays

1200 Costa Rica (AWR): It is Written. See M 1200.
1200 Radiobras: Brazilian Panorama. See M 1200.
1200 WYFR: Family Bible Reading Fellowship. See S 0500.
1212 China Radio Int'l: News Analysis. Background on current news events.
1215 WYFR: The Family Bible Study. See M 0520.
1219 China Radio Int'l: Current Affairs. An in-depth look at events and happenings in China.
1230 BBC (af): Background Current Affairs Feature. History Today. See T 0530.
1230 BBC (eu) General Feature. Pick of the World. See M 0630.
1230 Costa Rica (AWR): Your Story Hour. See S 1200.
1235 China Radio Int'l: Orient Arena. Focus on sporting events and Chinese sports personalities.
1240 China Radio Int'l: Listeners' Letterbox. See S 1240.
1246 WYFR: The Radio Reading Circle. See M 1246.

Wednesdays

1200 Costa Rica (AWR): It is Written. See M 1200.
1200 Radiobras: Brazilian Panorama. See M 1200.
1200 WYFR: Family Bible Reading Fellowship. See S 0500.
1215 WYFR: The Family Bible Study. See M 0520.
1218 China Radio Int'l: Current Affairs. See T 1219.
1230 Costa Rica (AWR): Your Story Hour. See S 1200.
1233 China Radio Int'l: Profile. The activities of an interesting individual are examined.
1240 China Radio Int'l: Learn to Speak Chinese. See M 1240.
1246 WYFR: The Radio Reading Circle. See M 1246.

Thursdays

1200 Costa Rica (AWR): It is Written. See M 1200.
1200 Radiobras: Brazilian Panorama. See M 1200.
1200 WYFR: Family Bible Reading Fellowship. See S 0500.
1215 BBC (am): Classical Music. Masterclass. See M 1230.
1215 WYFR: The Family Bible Study. See M 0520.
1219 China Radio Int'l: Current Affairs. See T 1219.
1230 Costa Rica (AWR): Folk Tracks. See M 2330.
1232 China Radio Int'l: Focus. Looking at an issue of significance to China's development.
1241 China Radio Int'l: Culture in China. The rich cultural heritage of China as manifested in literature and art.
1246 WYFR: The Radio Reading Circle. See M 1246.

Fridays

1200 Costa Rica (AWR): It is Written. See M 1200.
1200 Radiobras: Brazilian Panorama. See M 1200.
1200 WYFR: Family Bible Reading Fellowship. See S 0500.
1215 WYFR: The Family Bible Study. See M 0520.
1220 China Radio Int'l: Current Affairs. See T 1219.
1230 Costa Rica (AWR): Your Story Hour. See S 1200.
1235 China Radio Int'l: Life in China. Focus on an aspect of everyday living.
1241 China Radio Int'l: China in Action (biweekly). Review of events in China during the past two weeks.
1241 China Radio Int'l: World in Action (biweekly). Review of events in China and worldwide.
1246 WYFR: The Radio Reading Circle. See M 1246.
1247 China Radio Int'l: In the Third World. News about developing nations.

Saturdays

1200 Costa Rica (AWR): It is Written. See M 1200.
1200 Radiobras: The Best of Brazilian Popular Music. Eighty minutes of great music.
1200 WYFR: Family Bible Reading Fellowship. See S 0500.
1205 WYFR (Satellite Net): Story Time. Saturday morning stories for children.
1215 WYFR: The Mailbag. See S 0517.
1220 China Radio Int'l: Travel Talk. See S 0020.
1229 China Radio Int'l: The Cooking Show. See S 0029.
1230 BBC (eu): Quiz. Brain of Britain. Robert Robinson has some more questions with which to tease the would-be Brains of Britain.
1230 Costa Rica (AWR): Your Story Hour. See S 1200.
1230 WYFR (Satellite Net): Danger is the Password. Entertainment for children.
1235 China Radio Int'l: Music from China. See S 0035.

FREQUENCIES

1300-1400	Australia, Radio	5995pa 11800pa	7240as	9560pa	9610as
1300-1330	Australia, Radio	6060pa	6080as	9510pa	
1300-1400 vl	Australia, VL8A Alice Spg	2310do			
1300-1400 vl	Australia, VL8K Katherine	2485do			
1300-1400 vl	Australia, VL8T Tent Crk	2325do			
1300-1400	Bahrain, Radio	6010do			
1300-1335 mtwhfa	Belgium, R Vlaanderen Int	13670na			
1300-1320	Brazil, Radiobras	15445na			
1300-1400 vl	Canada, CBC N Quebec Svc	9625do			
1300-1400	Canada, CFCX Montreal	6005do			
1300-1400	Canada, CFRX Toronto	6070do			
1300-1400	Canada, CFVP Calgary	6030do			
1300-1400	Canada, CHNX Halifax	6130do			
1300-1400	Canada, CKZN St John's	6160do			
1300-1400	Canada, CKZU Vancouver	6160do			
1300-1400 s	Canada, RCI Montreal	11955na	17820na		
1300-1400	China, China Radio Intl	7405na	9715as	11660pa	15440pa
1300-1400	Costa Rica, R Peace Intl	6200am	9400am	15050am	
1300-1400	Ecuador, HCJB Quito	12005am	15115am	15540am	21455eu
1300-1330	Egypt, Radio Cairo	17595as			
1300-1400 as	Eqt Guinea, R East Africa	9585af			
1300-1330	Ghana, Ghana Broadc Corp	3366do	4915do		
1300-1400 mtwh/vl	Italy, IRRS Milan	7125va			
1300-1400	Lebanon, Wings of Hope	9960va			
1300-1400 vl	Liberia, Radio ELBC	7275do			
1300-1400	Malaysia, Radio	7295do			
1300-1400	Malaysia, RTM/Kota Kinab	5980do			
1300-1400	Malaysia, RTM/Kuching	7160do			
1300-1325	Netherlands, Radio	6045eu	7130eu	7160eu	
1300-1400 occsnal	New Zealand, R NZ Intl	6100pa			
1300-1350	North Korea, R Pyongyang	9345as 15430as	9640eu	11740as	15230as
1300-1330 s	Norway, Radio Norway Intl	9590eu	11850na		
1300-1400 vl	Palau, KHBN/Voice of Hope	9965as			
1300-1400 vl	Papua New Guinea, NBC	4890do	9675do		
1300-1400	Philippines, FEBC/R Intl	11995as			
1300-1400	Romania, R Romania Intl	11940eu	15365eu	17720eu	
1300-1400	Russia, Voice of	9540na 13370as	9800pa 17675as	9895as 17685as	11940as 17725as
1300-1400	Singapore, SBC Radio One	17755as 6155do	17780as	17795as	17835as
1300-1400	Singapore,R Singapore Int	9530as			
1300-1330	Switzerland, Swiss R Intl	7230as	7480as	13635as	15545as
1300-1400	United Kingdom,BBC London	6190af 9515na 11760me 12095va 17640va 21470af	6195va 9740va 11860af 15070va 17705va 21660af	7180as 11365am 11865va 15310as 17830af	9410va 11750as 11940af 15575me 17885af
1300-1400	USA, KAIJ Dallas TX	5810am	9815am		
1300-1400	USA, KJES Mesquite NM	11715na			
1300-1400	USA, KNLS Anchor Point AK	7365as			
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	USA, Monitor Radio Intl	6095na	9355as	9455na	13625as
1300-1400	USA, VOA Washington DC	6110as 15160as	9645as 15425as	9760as	11715as
1300-1400	USA, WEWN Birmingham AL	7425na	11875na		
1300-1400	USA, WHRI Noblesville IN	6040am	15105am		
1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1400 s	USA, WRMI/R Miami Intl	9955am			
1300-1400 a	USA, WVHA Green Bush ME	11695af			
1300-1400	USA, WWCR Nashville TN	7435am	13845am	15685am	
1300-1400	USA, WYFR Okeechobee FL	5950na 17750na	6015na	11830na	13695na
1300-1400	Zambia, Christian Voice	6065af			
1330-1400	Austria, R Austria Intl	6155eu	13730eu	15450as	
1330-1357	Canada, RCI Montreal	9535as	11795as		
1330-1400	Canada, RCI Montreal	15315eu 21455eu	15325eu	17820eu	17895eu
1330-1400	Finland, YLE/Radio	11900na	15400na		
1330-1400 tw	Ghana, Ghana Broadc Corp	4915do			
1330-1400	India, All India Radio	13732as	15120as		
1330-1400	Netherlands, Radio	9890as	13700as	15150as	
1330-1400	Sweden, Radio	11650na	15240na		
1330-1400	UAE, Radio Dubai	13675eu	15320eu	15395eu	21605me
1330-1400	Uzbekistan, R Tashkent	7285eu	9715eu	15295eu	17815eu
1330-1400	Vietnam, Voice of	7250as	9840as	15010as	
1335-1345	Greece, Voice of	15630na	17525na		
1345-1400	Vatican State, Vatican R	11625as	13765as	15585as	

SELECTED PROGRAMS

Sundays
1308 WYFR: The Open Forum. See S 0605.
1313 China Radio Int'l: Press Clippings. See S 1213.
1320 China Radio Int'l: China Scrapbook. See S 1220.
1325 China Radio Int'l: Music Album. See S 1225.
1334 WYFR: Music. See S 1134.
1339 WYFR: Daily Grace. See S 1239.
1340 China Radio Int'l: Listeners' Letterbox. See S 1240.

Mondays
1300 WYFR: Music. See S 1134.
1305 WYFR: The Open Forum. See S 0605.
1310 Radiobras: Brazilian Reporter. Focus on life in Brazil.
1319 China Radio Int'l: China's Open Windows (biweekly). See M 1219.
1319 China Radio Int'l: The Business Show (biweekly). See M 1219.
1330 WYFR (Satellite Net): The Family Bible Study. See M 0520.
1335 WYFR: Creation Moments. See M 0638.
1340 China Radio Int'l: Learn to Speak Chinese. See M 1240.
1347 WYFR: Family Bible Counseling. Advice for parents about family living.

Tuesdays
1300 WYFR: Music. See S 1134.
1305 WYFR: The Open Forum. See S 0605.
1310 Radiobras: Brazilian Reporter. See M 1310.
1312 China Radio Int'l: News Analysis. See T 1212.
1319 China Radio Int'l: Current Affairs. See T 1219.
1330 WYFR (Satellite Net): The Family Bible Study. See M 0520.
1335 China Radio Int'l: Orient Arena. See T 1235.
1335 WYFR: Creation Moments. See M 0638.
1340 China Radio Int'l: Listeners' Letterbox. See S 1240.
1350 WYFR: The Basic Bible Study. See T 0650.

Wednesdays
1300 WYFR: Music. See S 1134.
1305 WYFR: The Open Forum. See S 0605.
1310 Radiobras: Brazilian Reporter. See M 1310.
1318 China Radio Int'l: Current Affairs. See T 1219.
1330 WYFR (Satellite Net): The Family Bible Study. See M 0520.
1333 China Radio Int'l: Profile. See W 1233.
1335 WYFR: Creation Moments. See M 0638.
1340 China Radio Int'l: Learn to Speak Chinese. See M 1240.
1349 WYFR: Family Bible Counseling. See M 1347.

Thursdays
1300 WYFR: Music. See S 1134.
1305 WYFR: The Open Forum. See S 0605.
1310 Radiobras: Brazilian Reporter. See M 1310.
1319 China Radio Int'l: Current Affairs. See T 1219.
1330 WYFR (Satellite Net): The Family Bible Study. See M 0520.
1332 China Radio Int'l: Focus. See H 1232.
1335 WYFR: Creation Moments. See M 0638.
1341 China Radio Int'l: Culture in China. See H 1241.
1350 WYFR: The Basic Bible Study. See T 0650.

Fridays
1300 WYFR: Music. See S 1134.
1305 WYFR: The Open Forum. See S 0605.
1310 Radiobras: Brazilian Reporter. See M 1310.
1320 China Radio Int'l: Current Affairs. See T 1219.
1330 WYFR (Satellite Net): The Family Bible Study. See M 0520.
1335 China Radio Int'l: Life in China. See F 1235.
1335 WYFR: Creation Moments. See M 0638.
1341 China Radio Int'l: China in Action (biweekly). See F 1241.
1341 China Radio Int'l: World in Action (biweekly). See F 1241.
1347 China Radio Int'l: In the Third World. See F 1247.
1349 WYFR: Family Bible Counseling. See M 1347.

Saturdays
1300 WYFR (Satellite Net): Children's Bible Hour. Songs and stories for children.
1300 WYFR: The Open Forum. See S 0605.
1320 China Radio Int'l: Travel Talk. See S 0020.
1329 China Radio Int'l: The Cooking Show. See S 0029.
1330 WYFR (Satellite Net): The Adventures of Captain Patch. Patch the Pirate takes the kids for a ride.
1335 China Radio Int'l: Music from China. See S 0035.
1345 WYFR (Satellite Net): Allegra. See W 1545.
1350 WYFR: Farm Radio. See A 0648.

Program Tip

Radio for Peace International celebrates its 8th anniversary with four hours of live, toll-free calls. The Fiesta will begin at 6 pm (Sep 16) local time in Costa Rica (Central Standard Time) or 0000 (Sep 17) UTC. Listeners in the US and Canada may call at 1-800-404-7374. Listeners outside the US and Canada may call collect at 506-249-1095 between 0000 to 0400 UTC.

1400 UTC SHORTWAVE GUIDE 10:00 AM EDT 7:00 AM PDT

FREQUENCIES

1400-1500	Australia, AF Radio	8743af	10621af		
1400-1430	Australia, Radio	5995pa	7240pa	9560as	9610pa
		11695pa	11800pa		
1400-1500 vl	Australia, VL8A Alice Spg	2310do			
1400-1500 vl	Australia, VL8K Katherine	2485do			
1400-1500 vl	Australia, VL8T Tent Crk	2325do			
1400-1500	Bahrain, Radio	6010do			
1400-1500 vl	Canada, CBC N Quebec Svc	9625do			
1400-1500	Canada, CFCX Montreal	6005do			
1400-1500	Canada, CFRX Toronto	6070do			
1400-1500	Canada, CFVP Calgary	6030do			
1400-1500	Canada, CHNX Halifax	6130do			
1400-1500	Canada, CKZN St John's	6160do			
1400-1500	Canada, CKZU Vancouver	6160do			
1400-1500 s	Canada, RCI Montreal	11955na	17820na		
1400-1500	China, China Radio Intl	7405na	11815as		
1400-1500	Costa Rica, R Peace Intl	6200am	9400am	15050am	
1400-1500 as	Eqt Guinea, R East Africa	9585af			
1400-1500	France, Radio France Intl	7110as	15405as	17560as	17695as
1400-1420	Ghana, Ghana Broadc Corp	3366do	4915do		
1400-1500	India, All India Radio	13732as	15120as		
1400-1500 mtwh/vl	Italy, IRRS Milan	7125va			
1400-1500	Japan, NHK/Radio	9535na	9610as	11705na	11895as
		11915as			
1400-1500	Jordan, Radio	15270na			
1400-1500	Lebanon, Wings of Hope	9960va			
1400-1500 vl	Liberia, Radio ELBC	7275do			
1400-1500	Malaysia, Radio	7295do			
1400-1500	Malaysia, RTM/Kota Kinab	5980do			
1400-1500	Malaysia, RTM/Kuching	7160do			
1400-1500 mtwhfa	Malta, V of Mediterranean	11925me			
1400-1435 s	Malta, V of Mediterranean	11925me			
1400-1425 mtwhfa	Moldova, R Moldova Intl	11580eu			
1400-1500 s	Morocco, RTV Marocaine	17575af			
1400-1500	Netherlands, Radio	9890as	13700as	15150as	
1400-1500 occsnal	New Zealand, R NZ Intl	6100pa			
1400-1405	Nigeria, FRCN/Radio	4990do	7285do		
1400-1500 vl	Palau, KHBN/Voice of Hope	9965as			
1400-1500	Philippines, FEBC/R Intl	11995as			
1400-1500	Russia, Voice of	9595as	11835as	11910as	11935as
		11945sa	11985me	12025as	13770as
		15320me	15425me	15540me	17570af
		17710me	17780as		
1400-1500	Singapore, SBC Radio One	6155do			
1400-1500	Slovakia, AWR	13595am			
1400-1500	United Kingdom,BBC London	6190af	6195as	7180as	9410va
		9515na	9740va	11365am	11750as
		11865va	11940af	12095va	15070va
		15310as	15575me	17640va	17705va
		17830af	21470af	21660af	
1400-1500	USA, KAIJ Dallas TX	5810am	9815am		
1400-1500	USA, KJES Mesquite NM	11715na			
1400-1500	USA, KTBN Salt Lk City UT	7510am			
1400-1500	USA, Monitor Radio Intl	9355as			
1400-1500	USA, VOA Washington DC	6110as	7215as	9645as	9760as
		15160as	15255as	15395as	15425as
1400-1500	USA, WEWN Birmingham AL	7425na	11875na		
1400-1500	USA, WHRI Noblesville IN	6040am	15105am		
1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500	USA, WRNO New Orleans LA	15420am			
1400-1500 a	USA, WVHA Green Bush ME	11695af			
1400-1500	USA, WWCR Nashville TN	12160am	13845am	15685am	
1400-1500	USA, WYFR Okeechobee FL	6015na	11550as	11830na	17750na
1400-1415	Vatican State, Vatican R	11625as	13765as	15585au	
1415-1500 mtwtfa	Bhutan, Bhutan BC Service	5025do			
1430-1500	Australia, Radio	6060pa	6080pa	7260as	9710pa
		11660as	11695pa		
1430-1500 vl	China, China Radio Intl	8660as	11445as	15135as	
1430-1500	Ecuador, HCJB Quito	6080am	12005am	15115am	15540am
		21455eu			
1430-1500 s	Ghana, Ghana Broadc Corp	3366do			
1430-1500	Myanmar, Radio	5990do	7185do		
1430-1500 mtwhf	Portugal, Radio	21515me			
1430-1500	Romania, R Romania Intl	11775as	15335as	17720as	
1445-1500	Mongolia, R Ulan Bator	7293as	9950as		

SELECTED PROGRAMS

Sundays

1400 Radio Jordan: Program Announcements. The program line-up for today is outlined, but in Jordan time.
1400 WYFR: Family Bible Reading Fellowship. See S 0500.
1401 BBC (south as) General Feature. Pick of the World. See M 0630.
1402 Radio Jordan: Music. A half-hour of popular music.
1405 BBC (am): Science and Technology. The Laws of Nature. See S 0350.
1413 China Radio Int'l: Press Clippings. See S 1213.
1420 China Radio Int'l: China Scrapbook. See S 1220.
1425 China Radio Int'l: Music Album. See S 1225.
1434 WYFR: Daily Grace. See S 1239.
1440 China Radio Int'l: Listeners' Letterbox. See S 1240.

Mondays

1400 Radio Jordan: On-the-Air if You Dare. A live, two-hour quiz program during which listeners call in and win prizes.
1400 WYFR (Satellite Net): Back to the Bible. A mix of music and daily Bible study
1400 WYFR: Family Bible Reading Fellowship. See S 0500.
1416 WYFR: The Family Bible Study. See M 0520.
1419 China Radio Int'l: China's Open Windows (biweekly). See M 1219.
1419 China Radio Int'l: The Business Show (biweekly). See M 1219.
1440 China Radio Int'l: Learn to Speak Chinese. See M 1240.
1440 WYFR (Satellite Net): Helps for the Family. Advice and guidance for family living.
1445 BBC (as pac): Popular Music. Live from the Archive. See S 0445.

Tuesdays

1400 Radio Jordan: Program Announcements. See S 1400.
1400 WYFR (Satellite Net): Back to the Bible. See M 1400.
1400 WYFR: Family Bible Reading Fellowship. See S 0500.
1412 China Radio Int'l: News Analysis. See T 1212.
1416 WYFR: The Family Bible Study. See M 0520.
1419 China Radio Int'l: Current Affairs. See T 1219.
1430 Radio Jordan: Pop Session. Nonstop pop music.
1435 China Radio Int'l: Orient Arena. See T 1235.
1440 China Radio Int'l: Listeners' Letterbox. See S 1240.
1440 WYFR (Satellite Net): Helps for the Family. See M 1440.
1445 BBC (am): Popular Music. Live from the Archive. See S 0445.
1445 WYFR (Satellite Net): Psychology for Living. Christian advice on issues of today.

Wednesdays

1400 Radio Jordan: Program Announcements. See S 1400.
1400 WYFR (Satellite Net): Back to the Bible. See M 1400.
1400 WYFR: Family Bible Reading Fellowship. See S 0500.
1402 Radio Jordan: Jordan Weekly. Discussions about current activities in Jordan.
1416 WYFR: The Family Bible Study. See M 0520.
1418 China Radio Int'l: Current Affairs. See T 1219.
1430 BBC (south as): Background Current Affairs Feature. History Today. See T 0530.
1431 Radio Jordan: Feature Series. A series of quarter-hour programs dealing with a variety of subjects ("Plants" featured in Jun 95).
1433 China Radio Int'l: Profile. See W 1233.
1440 China Radio Int'l: Learn to Speak Chinese. See M 1240.
1440 WYFR (Satellite Net): Helps for the Family. See M 1440.
1445 Radio Jordan: Pop Session. See T 1430.

Thursdays

1400 Radio Jordan: Program Announcements. See S 1400.
1400 WYFR (Satellite Net): Back to the Bible. See M 1400.
1400 WYFR: Family Bible Reading Fellowship. See S 0500.
1416 WYFR: The Family Bible Study. See M 0520.
1419 China Radio Int'l: Current Affairs. See T 1219.
1431 Radio Jordan: Pop Session. See T 1430.
1432 China Radio Int'l: Focus. See H 1232.
1440 WYFR (Satellite Net): Helps for the Family. See M 1440.
1441 China Radio Int'l: Culture in China. See H 1241.
1445 WYFR (Satellite Net): Psychology for Living. See T 1445.

Fridays

1400 Radio Jordan: Program Announcements. See S 1400.
1400 WYFR (Satellite Net): Back to the Bible. See M 1400.
1400 WYFR: Family Bible Reading Fellowship. See S 0500.
1402 Radio Jordan: The Story of Pop. The BBC's series of programs on the history of popular music.
1416 WYFR: The Family Bible Study. See M 0520.
1420 China Radio Int'l: Current Affairs. See T 1219.
1430 BBC (as pac): Background Current Affairs Feature. Islam: Faith and Power. See H 1615.
1430 BBC (south as): Popular Music. What is Jazz? (8th,15th). See T 0615.
1430 Radio Jordan: Pop Session. See T 1430.
1435 China Radio Int'l: Life in China. See F 1235.
1440 WYFR (Satellite Net): Helps for the Family. See M 1440.
1441 China Radio Int'l: China in Action (biweekly). See F 1241.
1441 China Radio Int'l: World in Action (biweekly). See F 1241.
1447 China Radio Int'l: In the Third World. See F 1247.

Saturdays

1400 Radio Jordan: Program Announcements. See S 1400.
1400 WYFR (Satellite Net): Family Radio Weekend. Easy listening Christ-centered music.
1400 WYFR: Family Bible Reading Fellowship. See S 0500.
1402 Radio Jordan: Jordan Weekly. See W 1402.
1417 WYFR: The Mailbag. See S 0517.
1420 China Radio Int'l: Travel Talk. See S 0020.
1429 China Radio Int'l: The Cooking Show. See S 0029.
1430 Radio Jordan: Music. See S 1402.
1435 China Radio Int'l: Music from China. See S 0035.

HAUSER'S HIGHLIGHTS
JORDAN: RADIO JORDAN

Domestic service in Arabic on shortwave (external service given last month p.43):

0000-0159	11935, 11805, 7180
0259-0459	9630
0259-0714	11810
0305-0714	15290
0959-1159	15355
0959-1459	15215
1159-1459	17800, 11705
1529-1659	12000, 11945
1529-1959	9610
1659-1959	9830
1759-2059	11740
1959-2400+	7180

(BBC Monitoring)

1500 UTC SHORTWAVE GUIDE

11:00 AM EDT
8:00 AM PDT

FREQUENCIES

1500-1600	Australia, Radio	5995pa	6060pa	6080pa	7260as
		9615as	9710pa	11660as	11695pa
		11800pa			
1500-1600 vl	Australia, VL8A Alice Spg	2310do			
1500-1600 vl	Australia, VL8K Katherine	2485do			
1500-1600 vl	Australia, VL8T Tent Crk	2325do			
1500-1600	Bahrain, Radio	6010do			
1500-1600 vl	Canada, CBC N Quebec Svc	9625do			
1500-1600	Canada, CFCX Montreal	6005do			
1500-1600	Canada, CFRX Toronto	6070do			
1500-1600	Canada, CFVP Calgary	6030do			
1500-1600	Canada, CHNX Halifax	6130do			
1500-1600	Canada, CKZN St John's	6160do			
1500-1600	Canada, CKZU Vancouver	6160do			
1500-1600 s	Canada, RCI Montreal	11955na	17820na		
1500-1600	China, China Radio Intl	11815as	15165as		
1500-1600	Costa Rica, R Peace Intl	6200am	9400am	15050am	
1500-1600	Ecuador, HCJB Quito	6080am	12005am	15115am	15540am
		21455eu			
1500-1600 as	Eqt Guinea, R East Africa	9585af			
1500-1600	Guam, TWR/KTWR	11580as			
1500-1600	Italy, AWR Europe	7230eu			
1500-1600 mtwh/vl	Italy, IRRS Milan	7125va			
1500-1600	Japan, NHK/Radio	9535na	11915as	11955as	15355af
1500-1600	Jordan, Radio	15270na			
1500-1600 vl	Liberia, Radio ELBC	7275do			
1500-1600	Malaysia, Radio	7295do			
1500-1600	Malaysia, RTM/Kota Kinab	5980do			
1500-1600	Malaysia, RTM/Kuching	7160do			
1500-1515	Mongolia, R Ulan Bator	7293as	9950as		
1500-1525	Netherlands, Radio	9890as	13700as	15150as	
1500-1600 occsnal	New Zealand, R NZ Intl	6100pa			
1500-1530	Nigeria, FRCN/Radio	4990do	7285do		
1500-1600	Nigeria, FRCN/Voice of	7255af			
1500-1550	North Korea, R Pyongyang	9325eu	9640eu	9977na	13785me
1500-1600 vl	Palau, KHBN/Voice of Hope	9965as			
1500-1600	Philippines, FEBC/R Intl	11995as			
1500-1530	Romania, R Romania Intl	11775as	15335as	17720as	
1500-1600	Russia, Voice of	4940as	4975as	7305me	9595as
		11775as	11890as	11910as	11945sa
		12025as	12035me	15320me	15400af
		15480as	15540me	17570af	17750me
		21740af			
1500-1600	S Africa, Channel Africa	3220af	7240af		
1500-1600 twhf	Seychelles, FEBA Radio	9810as	12090as		
1500-1545 asm	Seychelles, FEBA Radio	12090as			
1500-1600	Singapore, SBC Radio One	6155do			
1500-1600	Sri Lanka, SLBC Colombo	9720as	15425as		
1500-1530	Switzerland, Swiss R Intl	12075as	13635as	15545as	
1500-1600	United Kingdom,BBC London	5965as	5975as	6190af	6195as
		7180as	9410va	9515na	9740va
		11365am	11750as	11775va	11865va
		11940af	12095va	15070va	17705va
		17830af	21470af	21660af	
1500-1530	United Kingdom,BBC London	11860af	15400eu	17880af	21490af
1500-1600	USA, KAIJ Dallas TX	13815am	15725am		
1500-1600	USA, KTBN Salt Lk City UT	15590am			
1500-1600	USA, KWHR Naalehu HI	9930as			
1500-1600	USA, Monitor Radio Intl	9355as			
1500-1600	USA, VOA Washington DC	6110as	7125as	7215as	9645as
		9700as	9760as	15205me	15395as
1500-1600	USA, WEWN Birmingham AL	7425na	11875na		
1500-1600	USA, WHRI Noblesville IN	13760am	15105am		
1500-1600	USA, WJCR Upton KY	7490na	13595na		
1500-1600	USA, WRNO New Orleans LA	15420am			
1500-1600 thas	USA, WVHA Green Bush ME	15665af			
1500-1600	USA, WWCR Nashville TN	12160am	13845am	15685am	
1500-1600	USA, WYFR Okeechobee FL	11705na	11830na	17750na	
1500-1600	Zambia, Christian Voice	4965af			
1520-1530 mtwtf	Estonia, Estonian Radio	5925eu			
1530-1600	Austria, R Austria Intl	11780as			
1530-1600	Finland, YLE/Radio	11900na	15400na		
1530-1545	India, All India Radio	7140as	7412as	9910as	11585me
		11670me			
1530-1600	Iran, VOIRI Tehran	11875as	15260as	17750as	
1530-1600	Lebanon, Wings of Hope	9960va			
1530-1600	Netherlands, Radio	9890as	15150as		
1530-1600	United Kingdom,BBC London	11765as			
1545-1600	Vatican State, Vatican R	11640as	15585as		

SELECTED PROGRAMS

Sundays

1500 WYFR: Family Bible Reading Fellowship. See S 0500.
1513 China Radio Int'l: Press Clippings. See S 1213.
1520 China Radio Int'l: China Scrapbook. See S 1220.
1525 China Radio Int'l: Music Album. See S 1225.
1530 BBC (af/am): Light Entertainment. Just a Minute (3rd,10th,17th). Nicholas Parsons returns with another series of the long-running panel-game.
1531 WYFR: Music. See S 1134.
1540 China Radio Int'l: Listeners' Letterbox. See S 1240.
1550 WYFR: Guidelines. A five-minute commentary on living from Harold Sala.
1500 WYFR (Satellite Net): The Christian Home. Two and a half hours of guidance on living and family, plus music and news.

Mondays

1500 WYFR: Music. See S 1134.
1504 Radio Jordan: On-the-Air if You Dare. See M 1400.
1505 WYFR: The Open Forum. See S 0605.
1519 China Radio Int'l: China's Open Windows (biweekly). See M 1219.
1519 China Radio Int'l: The Business Show (biweekly). See M 1219.
1530 WYFR (Satellite Net): Family Forum. A program of advice for youth on everyday living.
1535 WYFR: Creation Moments. See M 0638.
1540 China Radio Int'l: Learn to Speak Chinese. See M 1240.
1545 BBC (eu): Popular Music. Live from the Archive. See S 0445.
1550 WYFR: Family Bible Counseling. See M 1347.

Tuesdays

1500 WYFR (Satellite Net): The Christian Home. See M 1500.
1500 WYFR: Music. See S 1134.
1505 BBC (am): General Feature. A Small Matter of Taste. Shirley Mann samples some traditional English delicacies and visits the placeds that brought them to our attention.
1505 WYFR: The Open Forum. See S 0605.
1512 China Radio Int'l: News Analysis. See T 1212.
1519 China Radio Int'l: Current Affairs. See T 1219.
1530 BBC (af) General Feature. Pick of the World. See M 0630.
1535 China Radio Int'l: Orient Arena. See T 1235.
1535 WYFR: Creation Moments. See M 0638.
1540 China Radio Int'l: Listeners' Letterbox. See S 1240.
1540 WYFR (Satellite Net): Ask R.C.. Answers to questions about scripture and christianity.
1550 WYFR: The Basic Bible Study. See T 0650.

Wednesdays

1500 WYFR (Satellite Net): The Christian Home. See M 1500.
1500 WYFR: Music. See S 1134.
1504 Radio Jordan: The Mix. The latest pop music news and releases.
1505 WYFR: The Open Forum. See S 0605.
1518 China Radio Int'l: Current Affairs. See T 1219.
1530 BBC (am): Popular Music. The Ed Stewart Show. See A 2330.
1530 WYFR (Satellite Net): Ask R.C.. See T 1540.
1533 China Radio Int'l: Profile. See W 1233.
1535 WYFR: Creation Moments. See M 0638.
1540 China Radio Int'l: Learn to Speak Chinese. See M 1240.
1545 WYFR (Satellite Net): Allegra. Story-telling for children.
1548 WYFR: Family Bible Counseling. See M 1347.

Thursdays

1500 WYFR (Satellite Net): The Christian Home. See M 1500.
1500 WYFR: Music. See S 1134.
1505 Radio Jordan: Radio Jordan's Top 20. A hit parade of western pop music releases in Jordan.
1505 WYFR: The Open Forum. See S 0605.
1519 China Radio Int'l: Current Affairs. See T 1219.
1530 BBC (af): Background Current Affairs Feature. Islam: Faith and Power. See H 1615.
1530 WYFR (Satellite Net): Ask R.C.. See T 1540.
1532 China Radio Int'l: Focus. See H 1232.
1535 WYFR: Creation Moments. See M 0638.
1541 China Radio Int'l: Culture in China. See H 1241.
1550 WYFR: The Basic Bible Study. See T 0650.
1555 WYFR (Satellite Net): A Visit with the Family. Family Radio interviews a listener.

Fridays

1500 WYFR (Satellite Net): The Christian Home. See M 1500.
1500 WYFR: Music. See S 1134.
1504 Radio Jordan: Country Music. The best of country & western music.
1505 BBC (am): Science and Technology (1st,8th). A World of Its Own. Tracey Logan peers into the secret worlds of chemical elements with the help of chemist and science writer John Emsley.
1505 WYFR: The Open Forum. See S 0605.
1515 BBC (south as): Background Current Affairs Feature. Islam: Faith and Power. See H 1615.
1520 China Radio Int'l: Current Affairs. See T 1219.
1530 WYFR (Satellite Net): Ask R.C.. See T 1540.
1535 China Radio Int'l: Life in China. See F 1235.
1535 WYFR: Creation Moments. See M 0638.
1541 China Radio Int'l: China in Action (biweekly). See F 1241.
1541 China Radio Int'l: World in Action (biweekly). See F 1241.
1547 China Radio Int'l: In the Third World. See F 1247.
1550 WYFR: Family Bible Counseling. See M 1347.

Saturdays

1500 WYFR: The Open Forum. See S 0605.
1503 Radio Jordan: Music. See S 1402.
1504 WYFR (Satellite Net): Family Radio Weekend. See A 1400.
1520 China Radio Int'l: Travel Talk. See S 0020.
1529 China Radio Int'l: The Cooking Show. See S 0029.
1535 China Radio Int'l: Music from China. See S 0035.
1550 WYFR: Farm Radio. See A 0648.

FREQUENCIES

1600-1615	Albania, R Tirana Intl	7155eu	9760eu		
1600-1700	Australia, Radio	5995pa	6060pa	6080pa	7260as
		9710pa	9770as	9860pa	11660pa
		11695pa	11800pa		
1600-1700 vl	Australia, VL8A Alice Spg	2310do			
1600-1700 vl	Australia, VL8K Katherine	2485do			
1600-1700 vl	Australia, VL8T Tent Crk	2325do			
1600-1700	Bahrain, Radio	6010do			
1600-1700 vl	Canada, CBC N Quebec Svc	9625do			
1600-1700	Canada, CFCX Montreal	6005do			
1600-1700	Canada, CFRX Toronto	6070do			
1600-1700	Canada, CFVP Calgary	6030do			
1600-1700	Canada, CHNX Halifax	6130do			
1600-1700	Canada, CKZN St John's	6160do			
1600-1700	Canada, CKZU Vancouver	6160do			
1600-1700	China, China Radio Intl	4130af	11575as	15110af	
1600-1700	Costa Rica, R Peace Intl	6200am	9400am	15050am	
1600-1627	Czech Rep, Radio Prague	5930eu	17485af		
1600-1700	Ecuador, HCJB Quito	6080am	12005am	15115am	15540am
		21455eu			
1600-1700	Ethiopia, Radio	7165af	9560af		
1600-1700	France, Radio France Intl	6175eu	11615af	11700af	12015af
		15210af	15460af	15530af	
1600-1630	Georgia, Georgian Radio	11910eu			
1600-1700	Germany, Deutsche Welle	9735af	11965af	17800af	
1600-1650	Germany, Deutsche Welle	6170as	7225as	9875as	13690as
		15595as	17810as		
1600-1700	Guam, AWR/KSDA	9370as			
1600-1615 mt	Guam, TWR/KTWR	11580as			
1600-1630 whfas	Guam, TWR/KTWR	11580as			
1600-1630	Iran, VOIRI Tehran	11875as	15260as	17750as	
1600-1700 mtwh/vl	Italy, IRRS Milan	7125va			
1600-1630	Jordan, Radio	15270na			
1600-1700	Lebanon, Voice of Hope	6280me			
1600-1630	Lebanon, Wings of Hope	9960va			
1600-1700 vl	Liberia, Radio ELBC	7275do			
1600-1700	Malaysia, Radio	7295do			
1600-1625	Netherlands, Radio	9895as	15150as		
1600-1649 occsnal	New Zealand, R NZ Intl	6100pa			
1600-1700	Nigeria, FRCN/Radio	4990do	7285do		
1600-1700	Nigeria, FRCN/Voice of	7255af			
1600-1630 s	Norway, Radio Norway Intl	11850na			
1600-1630	Pakistan, Radio	7425af	9485af	11570af	11710af
		13590af	15555af		
1600-1700 vl	Palau, KHBN/Voice of Hope	9965as			
1600-1700	Russia, Voice of	7350eu	9480eu	9820af	9880af
		11630eu	11675eu	11775as	11860af
		11890as	11910as	11945sa	11990af
		12025as	15385as	15400af	15480as
		15540me	17570af	17875af	21740af
1600-1700	S Africa, Channel Africa	3220af	7240af		
1600-1700	S Africa, Trans World R	9500af			
1600-1700	Singapore, SBC Radio One	6155do			
1600-1700	South Korea, R Korea Intl	5975as	6480eu	9515af	9870af
1600-1630	Sri Lanka, SLBC Colombo	9720as	15425as		
1600-1700	Swaziland, Trans World R	9500af			
1600-1640	UAE, Radio Dubai	13675eu	15320eu	15395me	15435me
1600-1700	United Kingdom,BBC London	3915as	5975as	6190af	6195va
		7180as	9410va	9510as	9515na
		9740va	11750as	11775va	12095va
		15070va	15400eu	17830va	21660af
1600-1615	United Kingdom,BBC London	5965as	6195as	11365am	11865va
		17705va	21470af		
1600-1630	United Kingdom,BBC London	11860af	11940af		
1600-1700	USA, KAIJ Dallas TX	13815am	15725am		
1600-1700	USA, KTBN Salt Lk City UT	15590am			
1600-1700	USA, KWHR Naalehu HI	6120as			
1600-1700	USA, Monitor Radio Intl	9355af	21640af		
1600-1700	USA, VOA Washington DC	3970af	6110as	7125as	7215as
		9645as	9700as	9760as	12040af
		13710af	15225af	15395as	15410af
		17785af			
1600-1700	USA, WEWN Birmingham AL	7425na	13615na		
1600-1700	USA, WHRI Noblesville IN	13760am	15105am		
1600-1700	USA, WJCR Upton KY	7490na	13595na		
1600-1700	USA, WRNO New Orleans LA	15420am			
1600-1700	USA, WVHA Green Bush ME	15665eu			
1600-1700	USA, WWCR Nashville TN	12160am	13845am	15685am	
1600-1700	USA, WYFR Okeechobee FL	11705na	11830na	17750na	21500eu
		21525af	21745eu		
1600-1630	Vietnam, Voice of	7250eu	9840eu	15010eu	
1600-1700	Zambia, Christian Voice	4965af			
1615-1700	United Kingdom,BBC London	3255af	9630af		
1615-1630	Vatican State, Vatican R	6245eu	7250eu	9645eu	11810eu
1630-1657	Canada, RCI Montreal	7150as	9550as		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700 mtwhfa	Liberia, Radio ELWA	4760do			
1630-1645	Sweden, Radio	6065eu			
1630-1700	USA, VOA Washington DC	6040eu	15245me	15445af	17735af
		17895af	19379me		
1630-1700	Zimbabwe, ZBC/Radio 4	3306do	3396do	4828do	
1640-1650 s	Rwanda, Radio	6055do			
1645-1700 mtwhf	Canada, RCI Montreal	9555eu	11935eu	15325eu	17820eu
1645-1700	Tajikistan, Radio	7245as			
1650-1700 mtwhf	New Zealand, R NZ Intl	6145pa			

SELECTED PROGRAMS

Sundays

1600 WYFR: Family Bible Reading Fellowship. See S 0500.
1610 Radio Jordan: Instrumental Music. Music for easy listening.
1613 China Radio Int'l: Press Clippings. See S 1213.
1615 BBC (af): Classical Music. Masterclass. See M 1230.
1615 BBC (as pac): Popular Music. The Ed Stewart Show. See A 2330.
1620 China Radio Int'l: China Scrapbook. See S 1220.
1625 China Radio Int'l: Music Album. See S 1225.
1634 WYFR: Daily Grace. See S 1239.
1640 China Radio Int'l: Listeners' Letterbox. See S 1240.
1650 WYFR: Guidelines. See S 1550.

Mondays

1600 WYFR: Family Bible Reading Fellowship. See S 0500.
1606 WYFR (Satellite Net): Freedom Under Fire. Attorney and author John Whitehead defends life, liberty, and family freedom.
1610 Radio Jordan: Instrumental Music. See S 1610.
1615 BBC (am) General Feature. Pick of the World. See M 0530.
1615 WYFR: The Family Bible Study. See M 0520.
1619 China Radio Int'l: China's Open Windows (biweekly). See M 1219.
1619 China Radio Int'l: The Business Show (biweekly). See M 1219.
1640 China Radio Int'l: Learn to Speak Chinese. See M 1240.
1646 WYFR: The Radio Reading Circle. See M 1246.
1650 Radio New Zealand Int l: Bellbird. RNZI's famous interval signal.
1655 Radio New Zealand Int l: Karanga/Reading/Hymn. Vespers at the beginning of transmission.

Tuesdays

1600 WYFR: Family Bible Reading Fellowship. See S 0500.
1606 WYFR (Satellite Net): Freedom Under Fire. See M 1606.
1610 Radio Jordan: Instrumental Music. See S 1610.
1612 China Radio Int'l: News Analysis. See T 1212.
1615 WYFR: The Family Bible Study. See M 0520.
1619 China Radio Int'l: Current Affairs. See T 1219
1630 BBC (am): Background Current Affairs Feature. History Today. See T 0530.
1635 China Radio Int'l: Orient Arena. See T 1235.
1640 China Radio Int'l: Listeners' Letterbox. See S 1240.
1646 WYFR: The Radio Reading Circle. See M 1246.
1650 Radio New Zealand Int l: Bellbird. See M 1650.
1655 Radio New Zealand Int l: Karanga/Reading/Hymn. See M 1655.

Wednesdays

1600 WYFR: Family Bible Reading Fellowship. See S 0500.
1606 WYFR (Satellite Net): Freedom Under Fire. See M 1606.
1610 Radio Jordan: Instrumental Music. See S 1610.
1615 BBC (eu) General Feature. Pick of the World. See M 0630.
1615 WYFR: The Family Bible Study. See M 0520.
1618 China Radio Int'l: Current Affairs. See T 1219.
1633 China Radio Int'l: Profile. See W 1233.
1640 China Radio Int'l: Learn to Speak Chinese. See M 1240.
1646 WYFR: The Radio Reading Circle. See M 1246.
1650 Radio New Zealand Int l: Bellbird. See M 1650.
1655 Radio New Zealand Int l: Karanga/Reading/Hymn. See M 1655.

Thursdays

1600 WYFR: Family Bible Reading Fellowship. See S 0500.
1606 WYFR (Satellite Net): Freedom Under Fire. See M 1606.
1610 Radio Jordan: Instrumental Music. See S 1610.
1615 BBC (eu): Background Current Affairs Feature. Islam: Faith and Power. BBC's Middle East analyst searches for the answers to questions about the destiny of Islam.
1615 WYFR: The Family Bible Study. See M 0520.
1619 China Radio Int'l: Current Affairs. See T 1219.
1632 China Radio Int'l: Focus. See H 1232.
1641 China Radio Int'l: Culture in China. See H 1241.
1646 WYFR: The Radio Reading Circle. See M 1246.
1650 Radio New Zealand Int l: Bellbird. See M 1650.
1655 Radio New Zealand Int l: Karanga/Reading/Hymn. See M 1655.

Fridays

1600 WYFR: Family Bible Reading Fellowship. See S 0500.
1606 WYFR (Satellite Net): Freedom Under Fire. See M 1606.
1610 Radio Jordan: Instrumental Music. See S 1610.
1615 WYFR: The Family Bible Study. See M 0520.
1620 China Radio Int'l: Current Affairs. See T 1219.
1635 China Radio Int'l: Life in China. See F 1235.
1641 China Radio Int'l: China in Action (biweekly). See F 1241.
1641 China Radio Int'l: World in Action (biweekly). See F 1241.
1646 WYFR: The Radio Reading Circle. See M 1246.
1647 China Radio Int'l: In the Third World. See F 1247.
1650 Radio New Zealand Int l: Bellbird. See M 1650.
1655 Radio New Zealand Int l: Karanga/Reading/Hymn. See M 1655.

Saturdays

1600 WYFR: Family Bible Reading Fellowship. See S 0500.
1610 Radio Jordan: Instrumental Music. See S 1610.
1617 WYFR: The Mailbag. See S 0517.
1620 China Radio Int'l: Travel Talk. See S 0020.
1629 China Radio Int'l: The Cooking Show. See S 0029.
1635 China Radio Int'l: Music from China. See S 0035.
1649 WYFR: The Bible Quiz. See S 0549.

FREQUENCIES

1700-1800	Australia, Radio	6060pa	6080pa	6090pa	7260as
		9580pa	9710pa	9860pa	11660pa
		11695pa	11880pa		
1700-1800 vl	Australia, VL8A Alice Spg	2310do			
1700-1800 vl	Australia, VL8K Katherine	2485do			
1700-1800 vl	Australia, VL8T Tent Crk	2325do			
1700-1800	Azerbaijan, Voice of	7160eu			
1700-1800	Bahrain, Radio	6010do			
1700-1800	Canada, CFCX Montreal	6005do			
1700-1800	Canada, CFRX Toronto	6070do			
1700-1800	Canada, CFVP Calgary	6030do			
1700-1800	Canada, CHNX Halifax	6130do			
1700-1800	Canada, CKZN St John's	6160do			
1700-1800	Canada, CKZU Vancouver	6160do			
1700-1800	China, China Radio Intl	7405af	9535as	11575af	
1700-1800 as	Costa Rica, AWR Alajuela	13750am			
1700-1800	Costa Rica, R Peace Intl	6200am	9400am	15050am	
1700-1727	Czech Rep, Radio Prague	5930as	15640af		
1700-1800	Ecuador, HCJB Quito	6080am	12005am	15115am	15540am
		21455eu			
1700-1800	Egypt, Radio Cairo	15255af			
1700-1730	France, Radio France Intl	15210af	15460af		
1700-1800 mtwh/vl	Italy, IRRS Milan	7125va			
1700-1800	Japan, NHK/Radio	6150na	9535na	9580as	11840as
		11930as			
1700-1800	Lebanon, Voice of Hope	6280me			
1700-1800 vl	Liberia, Radio ELBC	7275do			
1700-1800	New Zealand, R NZ Intl	6100pa			
1700-1800	Nigeria, FRCN/Radio	3326do	4990do		
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9977af	13785me
1700-1800	Pakistan, Radio	7485eu	11570eu		
1700-1800 vl	Palau, KHBN/Voice of Hope	9965as			
1700-1800	Poland, Polish R Warsaw	6095eu	7270eu	7285eu	
1700-1800	Russia, Voice of	9480eu	9880af	11630eu	11715me
		11890as	11960af	11990eu	12065me
		15400af	15480as	17570af	17875af
		21740af			
1700-1800	S Africa, Channel Africa	3220af	7240af		
1700-1800	S Africa, Trans World R	9500af			
1700-1800	Slovakia, AWR	13595am	15620am		
1700-1730	Switzerland, Swiss R Intl	9885af	9905eu	12075me	13635me
1700-1720	Uganda, Radio	4976do			
1700-1800	United Kingdom,BBC London	3255af	5965as	6180eu	6190af
		6195eu	7180as	9410va	9510as
		9740as	11750as	11860af	12095va
		15070va	15400va	17830af	
1700-1715	United Kingdom,BBC London	9515na	17775va		
1700-1745	United Kingdom,BBC London	3915as	9630af		
1700-1730	United Kingdom,BBC London	6005af			
1700-1800	USA, KAIJ Dallas TX	13815am	15725am		
1700-1800	USA, KTBN Salt Lk City UT	15590am			
1700-1800	USA, KWHR Naalehu HI	6120as			
1700-1800	USA, Monitor Radio Intl	9355af	21640af		
1700-1800	USA, VOA Washington DC	3980eu	5900as	5990eu	6045as
		6110as	7150as	7170as	7215as
		9525as	9645as	9690af	9700eu
		9760af	9770af	11870as	11895af
		11920af	11945af	12040af	13710af
		15205as	15410af	15445af	17895af
		19379me			
1700-1800	USA, WEWN Birmingham AL	7425na	13615na		
1700-1800	USA, WHRI Noblesville IN	13760am	15105am		
1700-1800	USA, WJCR Upton KY	7490na	13595na		
1700-1800 smtwhf	USA, WMLK Bethel PA	9465eu			
1700-1800 as/vl	USA, WRMI/R Miami Intl	9955am			
1700-1800	USA, WRNO New Orleans LA	15420am			
1700-1800 mwf	USA, WVHA Green Bush ME	17612af			
1700-1800	USA, WWCR Nashville TN	12160am	13845am	15685am	
1700-1800	USA, WYFR Okeechobee FL	21500eu	21745eu		
1700-1800	Zambia, Christian Voice	4965af			
1700-1800	Zimbabwe, ZBC/Radio 4	3306do	3396do	4828do	
1705-1800	Ghana, Ghana Broadc Corp	3366do			
1715-1800	United Kingdom,BBC London	7160me			
1730-1800	Austria, R Austria Intl	9665me	11780as		
1730-1800	Netherlands, Radio	6020af	9605af	11655af	
1730-1800	Romania, R Romania Intl	11830af	15340af	15365af	17805af
1730-1800	Sweden, Radio	6065eu	13605me	15600af	
1730-1800	Vatican State, Vatican R	11625af	13765af	15570af	
1745-1800 mtwhf	Armenia, Voice of	4810eu	7480eu	9675eu	11960me
1745-1800	Bangladesh, Radio	7190eu	9560as	15520as	
1745-1800	India, All India Radio	7412eu	9650me	9950me	11620eu
		11935af	13750as	15075me	
1745-1800 mtwhf	Swaziland, Trans World R	3200af			
1800-1900	Australia, Radio	6060pa	6080pa	6090pa	9580pa
		9860pa	11660as	11695pa	11880pa
1800-1900 vl	Australia, VL8A Alice Spg	2310do			
1800-1900 vl	Australia, VL8T Tent Crk	2325do			
1800-1900	Bahrain, Radio	6010do			
1800-1825	Belgium, R Vlaanderen Int	5910eu			
1800-1900	Canada, CFCX Montreal	6005do			
1800-1900	Canada, CFRX Toronto	6070do			
1800-1900	Canada, CFVP Calgary	6030do			
1800-1900	Canada, CHNX Halifax	6130do			
1800-1900	Canada, CKZN St John's	6160do			
1800-1900	Canada, CKZU Vancouver	6160do			
1800-1900	Costa Rica, R Peace Intl	6200am	9400am	15050am	
1800-1900	Ecuador, HCJB Quito	6080am	12005am	15115am	15540am
		21455eu			
1800-1830	Egypt, Radio Cairo	15255af			
1800-1830	Ghana, Ghana Broadc Corp	3366do	4915do		
1800-1845	India, All India Radio	7412eu	9650me	9950me	11620eu
		11935af	13750as	15075me	
1800-1900 mtwh/vl	Italy, IRRS Milan	7125va			
1800-1900	Kenya, Kenya Broadc Corp	4885do	4935do		
1800-1900	Kuwait, Radio	11990na			
1800-1900	Lebanon, Voice of Hope	6280me			
1800-1900	Liberia, Radio ELBC	7275do			
1800-1900	Liberia, Radio ELWA	4760do			
1800-1830	Netherlands, Radio	6020af	9605af	11655af	
1800-1849 mtwhf	New Zealand, R NZ Intl	6100pa			
1800-1830	Nigeria, FRCN/Radio	3326do	4990do		
1800-1830 s	Norway, Radio Norway Intl	5960eu	13805af	15220af	
1800-1900 vl	Palau, KHBN/Voice of Hope	9965as			
1800-1900	Russia, Voice of	7350eu	9480eu	9755as	9880eu
		11675eu	11715me	11775as	11890as
		11910as	11945sa	11960af	15400af
		15480as			
1800-1830	S Africa, Trans World R	9500af			
1800-1900 irreg	Sudan, Sudan Natl BC	9200af			
1800-1900	Swaziland, Trans World R	3200af			
1800-1900	United Kingdom,BBC London	3255af	6180eu	6190af	6195eu
		9410va	9740as	11860af	11955au
		12095va	15070va	15400va	17830af
1800-1830	United Kingdom,BBC London	5965as	7160me	9410as	9510as
1800-1815	United Kingdom,BBC London	7180as			
1800-1900	USA, KJES Mesquite NM	15385na			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, KWHR Naalehu HI	13625au			
1800-1900	USA, Monitor Radio Intl	9355me	13770me	15665eu	17510af
1800-1900	USA, VOA Washington DC	3980eu	4875af	6040eu	9760eu
		9770af	11920af	12040af	13680af
		13710af	15205af	15410af	15580af
		17895af	19379me		
1800-1900	USA, WEWN Birmingham AL	7425eu	13615na		
1800-1900	USA, WHRI Noblesville IN	9495am	13760eu		
1800-1900	USA, WJCR Upton KY	7490na	13595na		
1800-1900	USA, WMLK Bethel PA	9465eu			
1800-1900 as/vl	USA, WRMI/R Miami Intl	9955am			
1800-1900	USA, WRNO New Orleans LA	15420am			
1800-1900 mwf	Usa, WVHA Green Bush ME	15745af			
1800-1900 sth	USA, WVHA Green Bush ME	13720eu			
1800-1900	USA, WWCR Nashville TN	12160am	13845am	15685am	
1800-1900	USA, WYFR Okeechobee FL	21500eu	21745eu		
1800-1830	Vietnam, Voice of	7250eu	9840eu	15010eu	
1800-1900	Yemen, Yemeni Rep Radio	9780as			
1800-1900	Zambia, Christian Voice	4965af			
1800-1900	Zimbabwe, ZBC/Radio 4	3306do	3396do	4828do	
1815-1900	Bangladesh, Radio	7190eu	9560as	15520as	
1830-1900	Albania, R Tirana Intl	7260eu	9730eu		
1830-1900 t	Belarus, Radio Minsk	5905eu	7210eu	11840eu	11960eu
1830-1900	Kazakhstan, Radio Almaty	5035eu	5260eu	5940eu	5960eu
		5970eu	9505eu		
1830-1900	Netherlands, Radio	6015af	6020af	9605af	9860af
		9895af	15315af	17605af	
1830-1845	Rwanda, Radio	6055do			
1830-1857	S Africa, Trans World R	9525af			
1830-1900	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1830-1900	United Kingdom,BBC London	6005af	9630af		
1830-1900	Yugoslavia, Radio	6100eu	9720af		
1833-1900	Cote D' Ivoire, RDTV	11920do			
1840-1850	Greece, Voice of	11645af	15650af		
1845-1900 irreg s	Mali, RDTV Malienne	4783do	4835do	5995do	
1850-1900	New Zealand, R NZ Intl	11910pa			

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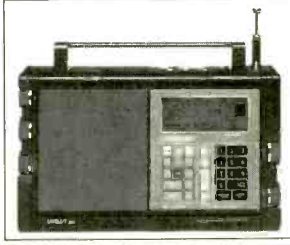

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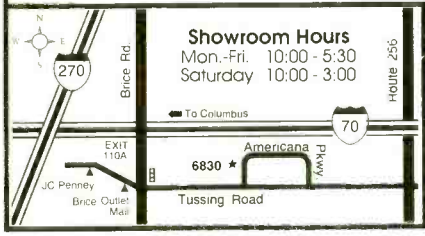

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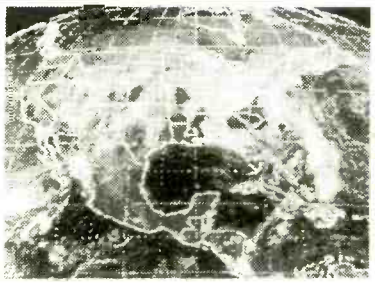

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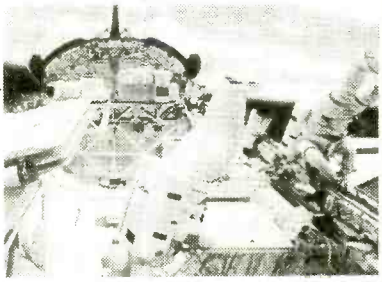

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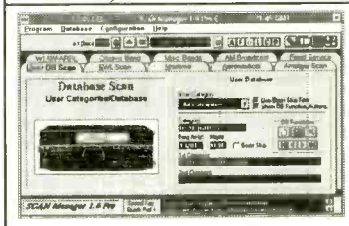
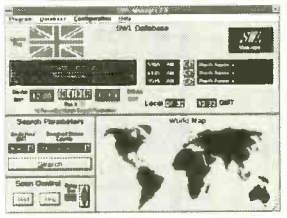


Scan Manager 1.0 Pro



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FREQUENCIES

1900-2000 mtwhf	Argentina, RAE	15345eu			
1900-2000	Australia, Radio	6060pa	6080pa	6150as	7240pa
		7260as	9560as	9580pa	9860pa
		11660pa	11695pa	11880pa	
1900-2000 vl	Australia, VL8A Alice Spg	2310do			
1900-2000 vl	Australia, VL8K Katherine	2485do			
1900-2000 vl	Australia, VL8T Tent Crk	2325do			
1900-2000	Bahrain, Radio	6010do			
1900-2000	Brazil, Radiobras	15268eu			
1900-2000	Bulgaria, Radio	9700eu	11720eu		
1900-2000	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-2000 vl	China, China Radio Intl	9440af	11515me		
1900-2000	Costa Rica, AWR Alajuela	13750am	15460am		
1900-2000	Costa Rica, R Peace Intl	6200am	9400am	15050am	
1900-1930	Cote D' Ivoire, RDTV	11920do			
1900-2000	Ecuador, HCJB Quito	6080am	12005am	15115am	15490eu
		15540am	21455eu		
1900-1930	Finland, YLE/Radio	9730eu	15440af		
1900-1950	Germany, Deutsche Welle	7170af	9670af	9735af	11740af
		11785af	13690af	13790af	
1900-2000	Guatemala, AWR	5980am			
1900-1930	Hungary, Radio Budapest	3955eu	6140eu	7130eu	9835eu
1900-1945	India, All India Radio	7412eu	9650me	9950me	11620eu
		11935af	13750as	15075me	
1900-1930	Israel, Kol Israel	7465na	9435eu	11603na	11685na
		15640af			
1900-2000 mtwh/vl	Italy, IRRS Milan	7125va			
1900-2000	Japan, NHK/Radio	6150as	7140au	9535na	9580au
		11850au			
1900-2000	Kenya, Kenya Broadc Corp	4885do	4935do		
1900-2000	Kuwait, Radio	11990eu			
1900-2000	Lebanon, Wings of Hope	9960va			
1900-2000	Liberia, Radio ELBC	7275do			
1900-2000	Liberia, Radio ELWA	4760do			
1900-1925	Netherlands, Radio	6015af	6020af	9605af	9860af
		9895af	15315af	17605af	
1900-2000	New Zealand, R NZ Intl	11910pa			
1900-2000	Nigeria, FRCN/Voice of	7255af			
1900-2000 vl	Papua New Guinea, NBC	4890do	9675do		
1900-2000	Romania, R Romania Intl	9690eu	9750eu	11810eu	11940eu
1900-2000	Russia, Voice of	7230eu	7350eu	9480eu	9755as
	9865af 9880eu	11675eu	11775as	11890as	11910as
	11945sa 11990af	15400af	15480as	17570af	17875af
1900-1915	Rwanda, Radio	6055af			
1900-2000	Slovakia, AWR	15620am			
1900-2000	South Korea, R Korea Intl	5975eu	6480eu	7275as	
1900-2000	Swaziland, Trans World R	3200af			
1900-1930	Switzerland, Swiss R Intl	6165eu			
1900-2000	Thailand, Radio	7200eu	9655eu	11905eu	
1900-1915	Uganda, Radio	4976do	5026do		
1900-2000	United Kingdom,BBC London	3255af	6005af	6190af	6195eu
		7160va	9410va	9630af	9740au
		11955au	12095va	15070va	17830af
1900-2000	USA, KAIJ Dallas TX	13815am			
1900-2000	USA, KTBN Salt Lk City UT	15590am			
1900-2000 as	USA, KVOH Los Angeles CA	17775am			
1900-2000	USA, KWHR Naalehu HI	13625au			
1900-2000	USA, Monitor Radio Intl	9355me	13770me		
1900-2000	USA, VOA Washington DC	3980eu	6040eu	7375af	7415af
	9525pa 9760af	9770af	11870as	11920af	12040af
	15180as 15205af	15410af	15445af	15580af	19379me
1900-2000	USA, WEWN Birmingham AL	7425eu	13615na	15375eu	
1900-2000	USA, WHRI Noblesville IN	9495am	13760eu		
1900-2000	USA, WJCR Upton KY	7490na	13595na		
1900-2000	USA, WMLK Bethel PA	9465eu			
1900-2000 as/vl	USA, WRMI/R Miami Intl	9955am			
1900-2000	USA, WRNO New Orleans LA	15420am			
1900-2000 ths	USA, WVHA Green Bush ME	15745af			
1900-2000 a	USA, WVHA Green Bush ME	13720eu			
1900-2000	USA, WWCR Nashville TN	12160am	13845am	15685am	
1900-2000	USA, WYFR Okeechobee FL	21745eu			
1900-1930	Vietnam, Voice of	7250eu	9840eu	15010eu	
1900-2000	Zambia, Christian Voice	4965af			
1900-2000	Zimbabwe, ZBC/Radio 4	3306do	3396do	4828do	
1930-2000	Austria, R Austria Intl	5945eu	6155eu		
1930-2000 mtwhfa	Austria, R Austria Intl	9665me	13730af		
1930-2000	Iran, VOIRI Tehran	7260af	9022eu		
1930-1955	Moldova, R Moldova Intl	11580eu			
1930-2000	Netherlands, Radio	6020af	9605af	9860af	9895af
		11655af	15315af	17605af	
1930-2000	Poland, Polish R Warsaw	6095eu	6135eu	7285eu	
1930-2000 a	Uganda, Radio	4976do	5026do		
1930-2000	United Kingdom,BBC London	11835af			
1935-1955	Italy, RAI Rome	7275eu	9575eu	11905eu	
1940-2000	Mongolia, R Ulan Bator	7530as	11790as	12015as	
1950-2000	Vatican State, Vatican R	4055eu	5885eu	7250eu	

2000-2100	Algeria, R Algiers Intl	15160eu			
2000-2100	Australia, Radio	6060pa	6080pa	6150pa	7260as
	9580pa 9860pa	11660pa	11695pa	11855as	11880pa
2000-2100 vl	Australia, VL8A Alice Spg	2310do			
2000-2100 vl	Australia, VL8K Katherine	2485do			
2000-2100 vl	Australia, VL8T Tent Crk	2325do			
2000-2100	Bahrain, Radio	6010do			
2000-2020	Brazil, Radiobras	15268eu			
2000-2100 vl	Canada, CBC N Quebec Svc	9625do			
2000-2100	Canada, CFCX Montreal	6005do			
2000-2100	Canada, CFRX Toronto	6070do			
2000-2100	Canada, CFVP Calgary	6030do			
2000-2100	Canada, CHNX Halifax	6130do			
2000-2100	Canada, CKZN St John's	6160do			
2000-2100	Canada, CKZU Vancouver	6160do			
2000-2100	Canada, RCI Montreal	5995eu	7235eu	11985eu	13650eu
	13670eu 15150eu	15325eu	17820eu	17870eu	
2000-2100	China, China Radio Intl	6950eu	9440af	9920eu	15110af
2000-2100	Costa Rica, R Peace Intl	6200am	9400am	15050am	
2000-2027	Czech Rep, Radio Prague	5930eu	11640pa		
2000-2100	Ecuador, HCJB Quito	6080am	12005am	15540am	
2000-2100	Eqt Guinea, Radio Africa	15186af			
2000-2050	Germany, Deutsche Welle	7170eu	9615eu		
2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do		
2000-2010	Greece, Voice of	9375eu			
2000-2100	Guatemala, AWR	5980am			
2000-2100	Indonesia, Voice of	9675as			
2000-2030	Iran, VOIRI Tehran	7260af	9022eu		
2000-2015 mtwh/vl	Italy, IRRS Milan	7125va			
2000-2100	Kenya, Kenya Broadc Corp	4885do	4935do		
2000-2100	Kuwait, Radio	11990eu			
2000-2100	Lebanon, Wings of Hope	9960va			
2000-2100	Liberia, Radio ELBC	7275do			
2000-2100	Liberia, Radio ELWA	4760do			
2000-2010	Mongolia, R Ulan Bator	7530as	11790as	12015as	
2000-2025	Netherlands, Radio	6020af	9605af	9860af	9895af
		11655af	15315af	17605af	
2000-2050	New Zealand, R NZ Intl	11910pa			
2000-2005	Nigeria, FRCN/Radio	3326do	4990do		
2000-2100	Nigeria, FRCN/Voice of	7255af			
2000-2050	North Korea, R Pyongyang	6576eu	9345as	9640af	9977as
2000-2100 vl	Papua New Guinea, NBC	4890do	9675do		
2000-2030	Poland, Polish R Warsaw	6095eu	6135eu	7285eu	
2000-2030 mtwhf	Portugal, Radio	6130af	9780eu	9815eu	15515af
2000-2100	Russia, Voice of	7230eu	9480eu	9755as	9880eu
		11675eu	11730na	11890as	12070eu
2000-2100 vl	Solomon Islands, SIBC	5020do	9545do		
2000-2015	Swaziland, Trans World R	3200af			
2000-2100	Sweden, Radio	6065eu	9655af		
2000-2030	Switzerland, Swiss R Intl	9770af	9885af	11640af	13635af
2000-2100	Turkey, Voice of	9445eu			
2000-2015	Uganda, Radio	4976do	5026do		
2000-2030	United Kingdom,BBC London	9410va	15070va		
2000-2100	United Kingdom,BBC London	3255af	6005af	6180eu	6190af
	6195eu 7160af	7325va	9410va	9630af	9740au
	11750sa 11835va	11955au	12095va	15070af	17830af
2000-2100	USA, KAIJ Dallas TX	13815am			
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2100 as	USA, KVOH Los Angeles CA	17775am			
2000-2100	USA, KWHR Naalehu HI	15405as			
2000-2100	USA, Monitor Radio Intl	9355eu	13770eu		
2000-2100	USA, VOA Washington DC	6040eu	7375af	7415af	9760af
	9770af 11855af	13710af	15205me	15410af	15445af
	15580af 17725af	17755af	19379me		
2000-2100	USA, WEWN Birmingham AL	7425na	13615na	15375au	
2000-2100	USA, WHRI Noblesville IN	9495am	13760eu		
2000-2100	USA, WJCR Upton KY	7490na	13595na		
2000-2100	USA, WMLK Bethel PA	9465eu			
2000-2100 as/vl	USA, WRMI/R Miami Intl	9955am			
2000-2100	USA, WRNO New Orleans LA	15420am			
2000-2100 as	USA, WVHA Green Bush ME	13720eu			
2000-2100	USA, WWCR Nashville TN	12160am	13845am	15685am	
2000-2100	USA, WYFR Okeechobee FL	17845af	21525af	21745eu	
2000-2030	Vatican State, Vatican R	9645af	11625af	13765af	
2000-2010	Vatican State, Vatican R	4055eu	5885eu	7250eu	
2000-2030	Zambia, Christian Voice	4965af			
2000-2100	Zimbabwe, ZBC/Radio 3	3306do	3396do	4828do	
2005-2100	Syria, Radio Damascus	12085eu	15095na		
2015-2100 f/vl	Italy, IRRS Milan	7125va			
2015-2045 s	Swaziland, Trans World R	3200af			
2025-2045	Italy, RAI Rome	7235me	9710me	11800me	
2030-2100	Armenia, Voice of	11920na			
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100 mt	Estonia, Estonian Radio	5925eu			
2030-2100 as	Latvia, Radio	5935eu			
2030-2100 asmtwh	Moldova, R Dniester Intl	11270na	15290na		
2030-2100	Netherlands, Radio	9860af	9895af		
2030-2045	Thailand, Radio	9555eu	9655eu	11905eu	
2030-2100	United Kingdom,BBC London	15400eu			
2030-2100 mtwhf	USA, WRMI/R Miami Intl	9955am			
2030-2100	Vietnam, Voice of	7250as	9840eu	15010eu	
2045-2100	India, All India Radio	7412eu	9910au	9950eu	11620eu
		11715pa	15225pa		
2051-2100	New Zealand, R NZ Intl	15115pa			

FREQUENCIES

2100-2200	Australia, Radio	6060pa	6080pa	7240pa	7260as
		9580pa	9660pa	11660pa	11855as
		11880pa	11955pa		
2100-2130 vl	Australia, VL8A Alice Spg	2310do			
2100-2130 vl	Australia, VL8K Katherine	2485do			
2100-2130 vl	Australia, VL8T Tent Crk	2325do			
2100-2115	Bahrain, Radio	6010do			
2100-2125	Belgium, R Vlaanderen Int	5910eu			
2100-2200	Bulgaria, Radio	9700eu	11720eu		
2100-2200	Canada, CFCX Montreal	6005do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2130	Canada, RCI Montreal	5995eu	7235eu	11690eu	13650eu
		13670eu	15150eu	15325eu	17820eu
2100-2200	China, China Radio Intl	6950eu	9920eu		
2100-2130	China, China Radio Intl	3985eu	15110af		
2100-2200	Costa Rica, R Peace Intl	6200am	9400am	15050am	
2100-2200	Cuba, Radio Havana Cuba	11705eu			
2100-2200	Ecuador, HCJB Quito	15540am			
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2150	Germany, Deutsche Welle	7115as	9670as	9735af	9765as
		11765af	11785as	15135af	
2100-2200	Guatemala, AWR	5980am			
2100-2130	Hungary, Radio Budapest	3955eu	5935eu	7250eu	9835eu
2100-2200	India, All India Radio	7412eu	9910eu	9950eu	11620au
		11715au	15225au		
2100-2200 f/vl	Italy, IRRS Milan	7125va			
2100-2200	Japan, NHK/Radio	6035eu	7140eu	9580af	11850as
		11865as			
2100-2115	Japan, NHK/Radio	9660as	11915as		
2100-2200	Lebanon, Voice of Hope	6280me			
2100-2200 mtwhfa	Liberia, Radio ELWA	4760do			
2100-2125	Netherlands, Radio	9860af	9895af	11655af	
2100-2200	New Zealand, R NZ Intl	15115pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4990do		
2100-2200 vl	Papua New Guinea, NBC	4890do	9675do		
2100-2200	Romania, R Romania Intl	7195eu	9570eu	9690eu	11940eu
2100-2200	Russia, Voice of	7350eu	7360eu	9480eu	9530af
		9755as	9820eu	11680eu	11750as
		11980eu	12070na	13615as	
2100-2115	Sierra Leone, SLBS	3316do			
2100-2200	Slovakia, AWR	6055eu			
2100-2200 vl	Solomon Islands, SIBC	5020do	9545do		
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2200	Spain, R Exterior Espana	6125eu			
2100-2200	Syria, Radio Damascus	12085eu	15095na		
2100-2110	Uganda, Radio	4976do	5026do		
2100-2200	Ukraine, R Ukraine Intl	4825eu	5905eu	6010eu	6020eu
		6090eu	7240eu	7285eu	9560eu
		9750eu	11610eu	11780eu	11825eu
		11875eu	11950eu		
2100-2200	United Kingdom,BBC London	3255af	3915as	3915as	5975na
		6005af	6180eu	6190af	6195va
		7325va	9410va	9580as	9740va
		11750sa	11835va	11945as	11955va
		12095va			
2100-2130	United Kingdom,BBC London	9630af	15070af	15400eu	
2100-2200	USA, KAIJ Dallas TX	13815am			
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200 s	USA, KVOH Los Angeles CA	17775am			
2100-2200	USA, Monitor Radio Intl	9355pa	13770na	13840au	
2100-2200	USA, VOA Washington DC	6040eu	6160eu	7375af	7415af
		9535af	9760eu	11870pa	13710af
		15185pa	15205me	15410af	15445af
		15580af	17725af	17735pa	19379me
2100-2200	USA, WEWN Birmingham AL	7425na	13615na	15375am	
2100-2200	USA, WHRI Noblesville IN	9495am	13760am		
2100-2200	USA, WJCR Upton KY	7490na	13595na		
2100-2200	USA, WMLK Bethel PA	9465eu			
2100-2130 a	USA, WRMI/R Miami Intl	9955am			
2100-2200	USA, WRNO New Orleans LA	15420am			
2100-2200 a	USA, WVHA Green Bush ME	13740eu			
2100-2200	USA, WWCR Nashville TN	12160eu	13845am	15685am	
2100-2200	USA, WYFR Okeechobee FL	17845af	21515af		
2100-2145	USA, WYFR Okeechobee FL	21745eu			
2100-2130	Yugoslavia, Radio	6100eu	6185eu		
2100-2200	Zimbabwe, ZBC/Radio 3	3306do	3396do	4828do	
2115-2200	Egypt, Radio Cairo	9900eu			
2130-2200	Australia, Radio	9610as	9645as	15365pa	17860pa
2130-2200 vl	Australia, VL8A Alice Spg	4835do			
2130-2200 vl	Australia, VL8K Katherine	5025do			
2130-2200 vl	Australia, VL8T Tent Crk	4910do			
2130-2200	Finland, YLE/Radio	6120eu	9730eu	11755af	15400af
2130-2200	Iran, VOIRI Tehran	6175au			
2130-2200	Liberia, Radio ELWA	4760do			
2130-2200	Lithuania, Radio Vilnius	9710eu			
2130-2200	Sweden, Radio	6065eu			
2145-2200 a	Greece, Voice of	9375au			

2200 UTC

2200-2300	Australia, Radio	9580pa	9610as	9645as	9660pa
		11660pa	11695pa	11855as	11880pa
		11955pa	13755as	15365pa	17795pa
		17860pa			
2200-2300 vl	Australia, VL8A Alice Spg	4835do			
2200-2300 vl	Australia, VL8K Katherine	5025do			
2200-2300 vl	Australia, VL8T Tent Crk	4910do			
2200-2300 vl	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFCX Montreal	6005do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2230	Canada, RCI Montreal	5960am	9755am	11705as	11895am
		13670am	13740am	15305am	
2200-2300	China, China Radio Intl	9880eu			
2200-2300	Costa Rica, R Peace Intl	7385am	9400am	15050am	
2200-2210	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
2200-2300	Cuba, Radio Havana Cuba	6180na	11960na		
2200-2300	Ecuador, HCJB Quito	15540am			
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eqt Guinea, Radio Africa	15186af			
2200-2300	Guatemala, AWR	5980am			
2200-2230	India, All India Radio	7412eu	9910eu	9950eu	11620au
		11715au	15225au		
2200-2230	Iran, VOIRI Tehran	6175au			
2200-2300 f/vl	Italy, IRRS Milan	7125va			
2200-2215 as/vl	Italy, IRRS Milan	7125va			
2200-2225	Italy, RAI Rome	9710as	11800as	15330as	
2200-2300	Lebanon, Voice of Hope	6280me			
2200-2300	Lebanon, Wings of Hope	9960va			
2200-2300	Malaysia, Radio	7295do			
2200-2300	Malaysia, RTM/Kota Kinab	5980do			
2200-2300	New Zealand, R NZ Intl	15115pa			
2200-2205	Nigeria, FRCN/Radio	3326do	4990do		
2200-2300 vl	Papua New Guinea, NBC	4890do	9675do		
2200-2300	Russia, Voice of	9530af	9720af	11730na	11750as
2200-2215	Sierra Leone, SLBS	3316do			
2200-2300	Slovakia, AWR	11610am			
2200-2235 vl	Solomon Islands, SIBC	5020do	9545do		
2200-2230	South Korea, R Korea Intl	5965eu			
2200-2300	Spain, R Exterior Espana	9675af			
2200-2205	Syria, Radio Damascus	12085na	15095na		
2200-2300	Taiwan, VO Free China	17750eu	21750eu		
2200-2300	Turkey, Voice of	7185me	9445na	11710eu	
2200-2300	UAE, Radio Abu Dhabi	11885na	11970na	13605na	
2200-2300	United Kingdom,BBC London	6195eu	7110as	7325va	9590va
		9890as	11695au	11750sa	11835af
		11955va			
2200-2230	United Kingdom,BBC London	6180eu	9410va	12095eu	
2200-2300	USA, KAIJ Dallas TX	13815am			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, KWHR Naalehu HI	17510as			
2200-2300	USA, Monitor Radio Int	7510am	13625eu	13770am	15405as
		17555sa			
2200-2300	USA, VOA Washington DC	7215as	9705as	9770as	11760as
		12080af	13710af	15185au	15290as
		15305as	17735as	17820as	
2200-2230 mtwhf	USA, VOA Washington DC	7340af	7375af	7415af	
2200-2300	USA, WEWN Birmingham AL	7425na	11820eu	13615na	
2200-2300	USA, WHRI Noblesville IN	13760am			
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300 as	USA, WRMI/R Miami Intl	9955am			
2200-2300	USA, WRNO New Orleans LA	15420am			
2200-2300	USA, WVHA Green Bush ME	9852eu			
2200-2300	USA, WWCR Nashville TN	9475am	12160am	13845am	
2200-2245	USA, WYFR Okeechobee FL	17845af	21525af		
2230-2300	Finland, YLE/Radio	9650na	9665na	11845na	
2240-2250	Greece, Voice of	9375au	9425au		
2245-2300	Ghana, Ghana Broadc Corp	3366do	4915do		
2245-2300	India, All India Radio	9705as	9950as	11745as	13750as
		15145as			
2245-2300 mtwhf	USA, Voice of the OAS	9670na	11835na	15155na	
2245-2300	Vatican State, Vatican R	9600au	11830pa		

2300 UTC SHORTWAVE GUIDE 7:00 PM EDT 4:00 PM PDT

FREQUENCIES

2300-0000	Australia, Radio	9610as	9660pa	11645as	11660pa
		11695as	11855as	13755as	15365pa
		17795pa	17860pa		
2300-0000 vl	Australia, VL8A Alice Spg	4835do			
2300-0000 vl	Australia, VL8K Katherine	5025do			
2300-0000 vl	Australia, VL8T Tent Crk	4910do			
2300-0000	Bulgaria, Radio	9700na	11720na		
2300-0000 vl	Canada, CBC N Quebec Svc	9625do			
2300-0000	Canada, CFCX Montreal	6005do			
2300-0000	Canada, CFRX Toronto	6070do			
2300-0000	Canada, CFVP Calgary	6030do			
2300-0000	Canada, CHNX Halifax	6130do			
2300-0000	Canada, CKZN St John's	6160do			
2300-0000	Canada, CKZU Vancouver	6160do			
2300-0000	Canada, RCI Montreal	5960am	9755am	11940am	13670am
		15305am			
2300-0000	Costa Rica, AWR Alajuela	5030am	7375am	9725am	13750am
2300-0000	Costa Rica, R Peace Intl	7385am	9400am	15050am	
2300-2310	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
2300-0000	Egypt, Radio Cairo	9900na			
2300-0000	Germany, Deutsche Welle	7235as	9690as	11705as	
2300-0000	Guam, AWR/KSDA	11980as			
2300-0000	Guatemala, AWR	5980am			
2300-0000	India, All India Radio	9705as	9950as	11745as	13750as
		15145as			
2300-0000 f/vl	Italy, IRRS Milan	7125va			
2300-0000	Japan, NHK/Radio	5965eu	6155eu	7140eu	9580as
		11850as			
2300-0000	Lebanon, Voice of Hope	6280me			
2300-0000	Lebanon, Wings of Hope	9960va			
2300-2330 as	Lithuania, Radio Vilnius	9530na			
2300-0000	Malaysia, Radio	7295do			
2300-0000	Malaysia, RTM/Kota Kinab	5980do			
2300-0000	New Zealand, R NZ Intl	15115pa			
2300-2305	Nigeria, FRCN/Radio	3326do	4990do		
2300-2350	North Korea, R Pyongyang	11700na	13650na		
2300-0000 vl	Papua New Guinea, NBC	4890do	9675do		
2300-0000	Russia, Voice of	7300na	9530na	9620na	9720af
		11730na	11750as		
2300-2317	Sierra Leone, SLBS	3316do			
2300-0000	UAE, Radio Abu Dhabi	11885na	11970na	13605na	
2300-0000	United Kingdom,BBC London	5975na	6175na	6195va	7110as
		7250as	7325va	9580as	9590va
		11750sa	11945as	11955va	
2300-2330	United Kingdom,BBC London	3915as	11835eu		
2300-2330	USA, KAIJ Dallas TX	13815am			
2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	USA, KWHR Naalehu HI	17510as			
2300-0000	USA, Monitor Radio Intl	7510eu	13625as	13770eu	15405as
		17555sa			
2300-0000	USA, VOA Washington DC	7215as	9705as	9770as	9890as
		11760as	15185au	15290as	15305as
		17735as	17820as		
2300-0000	USA, WEWN Birmingham AL	7425na	13615na	15375am	
2300-0000	USA, WHRI Noblesville IN	5745am	17510am		
2300-0000	USA, WJCR Upton KY	7490na	13595na		
2300-0000 as	USA, WRMI/R Miami Intl	9955am			
2300-2330 mtwhf	USA, WRMI/R Miami Intl	9955am			
2300-0000	USA, WRNO New Orleans LA	7355am			
2300-0000	USA, WVHA Green Bush ME	9852eu			
2300-0000	USA, WWCR Nashville TN	9475am	12160am	13845am	
2330-0000	Australia, Radio	9645as	9850as	13605as	15240pa
2330-0000 irreg	Belarus, Radio Minsk	9530eu	15180eu	15425eu	
2330-2355	Belgium, R Vlaanderen Int	6030na	13800na		
2330-0000	Netherlands, Radio	6020na	6165na	9845na	
2330-0000	Palau, KHBN/Voice of Hope	15140as			
2330-0000	Vietnam, Voice of	7250eu	9840eu	15010eu	
2335-2345	Greece, Voice of	9935sa	11595sa	11645sa	

SELECTED PROGRAMS

Sundays

2310 BBC (am): East Asia Today. News, analysis, press reviews and reports from BBC correspondents.
2310 Radio Japan: Let's Learn Japanese. See S 0310.
2310 Voice of America (as): VOA Today. Up-to-the-minute news summaries, hourly business and sports updates, interviews on world news events, plus features on topics from movies to medicine.
2325 Radio Japan: Media Roundup. See S 0525.
2330 BBC (am): Short Story. See S 0430.
2330 BBC (as pac): Letter from America. See S 0030.
2345 BBC (am): Write On. See S 0145.
2350 Radio Japan: Viewpoint. See S 0550.
2355 Radio Japan: Tokyo Pop-In. See S 0155.

Mondays

2310 BBC (am): East Asia Today. See S 2310.
2310 BBC (eu): Take Five. See M 0410.
2310 Voice of America (as): VOA Today. See S 2310.
2315 Radio Japan: Today's Top News Asia. See M 1515.
2325 Radio Japan: Profile. See M 1525.
2330 BBC (am): Outlook. See M 1405.
2330 BBC (as pac): The World Today. See M 1645.
2355 Radio Japan: Tokyo Pop-In. See S 0155.

Tuesdays

2310 BBC (am): East Asia Today. See S 2310.
2310 BBC (eu): An A-Z of Composers. Life-stories of some of the lesser known composers.
2310 Voice of America (as): VOA Today. See S 2310.
2315 Radio Japan: Today's Top News Asia. See M 1515.
2325 Radio Japan: Enjoy Japanese. See T 1525.
2330 BBC (am): Outlook. See M 1405.
2330 BBC (as pac): The World Today. See M 1645.
2355 Radio Japan: Tokyo Pop-In. See S 0155.

Wednesdays

2310 BBC (af): Topical Reports. A five-minute current affairs program.
2310 BBC (am): East Asia Today. See S 2310.
2310 Voice of America (as): VOA Today. See S 2310.
2315 Radio Japan: Today's Top News Asia. See M 1515.
2325 Radio Japan: History and Classics. See W 1525.
2330 BBC (am): Outlook. See M 1405.
2330 BBC (as pac): The World Today. See M 1645.
2355 Radio Japan: Tokyo Pop-In. See S 0155.

Thursdays

2310 BBC (am): East Asia Today. See S 2310.
2310 BBC (eu): Take Five. See M 0410.
2310 Voice of America (as): VOA Today. See S 2310.
2315 Radio Japan: Today's Top News Asia. See M 1515.
2325 Radio Japan: Enjoy Japanese. See T 1525.
2330 BBC (am): Outlook. See M 1405.
2330 BBC (as pac): The World Today. See M 1645.
2355 Radio Japan: Tokyo Pop-In. See S 0155.

Fridays

2310 BBC (af): Science Five. See W 0410.
2310 BBC (am): East Asia Today. See S 2310.
2310 BBC (eu): Science Five. See W 0410.
2310 Voice of America (as): VOA Saturday. See S 0010.
2315 Radio Japan: Today's Top News Asia. See M 1515.
2325 Radio Japan: Music and Book Beat. See F 1525.
2330 BBC (am): Outlook. See M 1405.
2330 BBC (as pac): The World Today. See M 1645.
2355 Radio Japan: Tokyo Pop-In. See S 0155.

Saturdays

2310 BBC (af): Spotlight. See S 0410.
2310 BBC (eu): Spotlight. See S 0410.
2310 Radio Japan: Asia Weekly. See S 0110.
2310 Voice of America (as): VOA Sunday. See S 0010.
2311 Radio Japan: Asian News Summary. See S 0111.
2321 Radio Japan: Business Report. See S 0121.
2325 Radio Japan: Entertaining in Asia. See S 0125.
2330 BBC (am): The John Dunn Show. See S 0330.
2340 BBC (as pac): Book Choice. See S 1525.
2346 Radio Japan: Asia Kaleidoscope. See S 0146.
2355 Radio Japan: Tokyo Pop-In. See S 0155.

HAUSER'S HIGHLIGHTS
SPAIN: RADIO EXTERIOR DE ESPANA

Announces the week's program schedule between the 0000 and 0100 broadcasts on 9540; repeated at 0500 UT, but local days here Mon-Fri News is first; Spanish lesson is last; in between: *Panorama* with Spanish music, commentary or report, press review, weather, and:

Mon *Sports Spotlight, Cultural Encounters*—between Spain and N. America
Tue *Economic Report, World of Entertainment in Spain*
Wed *As Others See Us*—foreign press and alternating: *Natural World* or *Science Desk*
Thu *People of Today*—famous Spaniards, *Cultural Clippings*
Fri *Window on Spain, Look at the Arts*
Sat News, *Hall of Fame, Distance Unknown, Gallery of Spanish Voices*
Sun News, *Visitors' Book, Great Figures in Flamenco, Radio Club*—mailbag and music.

(Diane Mauer, WI)

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Optional AC adapter: $10.95

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Grundig's flagship SW receiver, with advanced microprocessor functions, synchronous AM detection, USB/LSB, alphanumeric memory channels, 512 presets (expandable to 2048!), AC power supply. *List $699.95*
Gilfer Price: $ CALL!

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E-Mail: GilferSW@aol.com • WWW Home Page: http://www.pics.com/gilfer

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Computer Aided Scanning

a new dimension in communications from Datametrics

Now Radio Shack PRO 2006 owners for the first time have access to the exciting world of Computer Aided Scanning with the highly acclaimed Datametrics Communications Manager system. Computer Aided Scanning is as significant as the digital scanner was five years ago and is changing the way people think about radio communications.

- The Datametrics Communications Manager provides computer control over the Radio Shack PRO2006 receiver.
- Powerful menu driven software includes full monitoring display, digital spectrum analyzer and system editor.
- Uses innovative Machine State Virtualizer technology (patent pending) hardware interface by Datametrics.
- Comprehensive manual includes step by step instructions, screen displays, and reference information.
- Extends receiver capabilities including autolog recording facilities, 1000 channel capacity per file, and much more.
- Simple 4 step installation - no soldering or modification to normal receiver operations.

Datametrics, Inc

- Computer Aided Scanning system $ 349
- PRO2006 receiver w/interface installed and CAS system $ 749
- Manual and demo disk $15

Requires Radio Shack PRO 2006 receiver and IBM PC with 360K memory (640K for full channel capacity) and parallel (printer) port.

Send check or money order to Datametrics, Inc., 2575 South Bayshore Dr. Suite 8A, Coconut Grove, FL 33133. 30 day return privileges apply.

DELTACOMM™ DSS

Digital Signal Strength Option For Your ICOM™ R7000

DELTACOMM™ I-7000 and your MS-DOS computer integrated with the Delta Research custom CI-V interface and optimized software will not just control but will maximize the potential of your ICOM™ IC-R7000's monitoring capability.

- CYBERSCAN function allows scan file tracking control of systems employing frequency hopping techniques.
- Spectrum log at speeds in excess of 1300 channels a minute, generate a real time histogram of activity and create scan database file automatically.
- Birdie log during frequency search automatically characterizes your R7000, then locks out those frequencies.
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Optional DELTACOMM™ DSS (Digital Signal Strength) upgrade for your DELTACOMM™ I-7000 communication manager.

- Innovative interface design allows digitizing and storing the R7000 signal level information with 8-bit accuracy via your computer's game/joy stick port.
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- Log signal strength information to printer or delimited log file while DELTACOMM™ I-7000 is scanning or activity logging the selected database file.

DELTACOMM™ I-7000 communication manager program includes all cabling, manual, UL listed power supply and Delta Research custom CI-V interface for $299.00 + $8.00 (U.S.) or $25.00 (foreign) S&H. The DELTACOMM™ DSS interface upgrade comes complete with easy to follow NO SOLDER installation instructions, all cabling and 8-bit DSS A/D converter module (game port required) for $99.00 + $8.00 (U.S.) or $25.00 (foreign) S&H and is available as an upgrade option to registered I-7000 users. Contact us for additional information on DELTACOMM™ communication managers for ICOM™ R7100, R71A, R72 and IC735.

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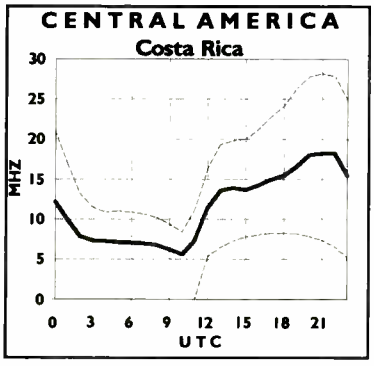
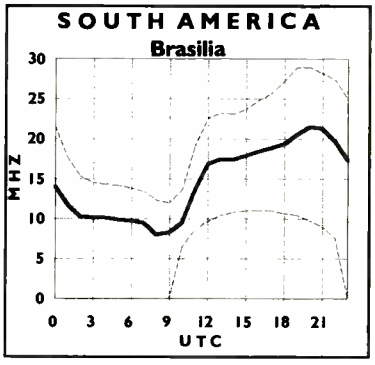
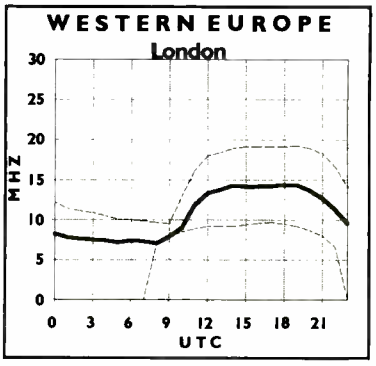
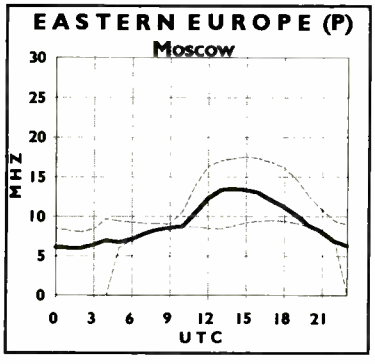
Propagation conditions: Eastern United States

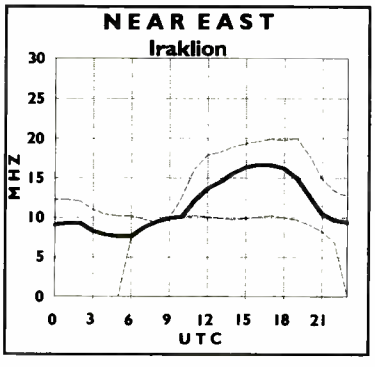
How to use the propagation charts: Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the station you want to hear. The Sun Spot Number used this month for forcasting purposes is 8.

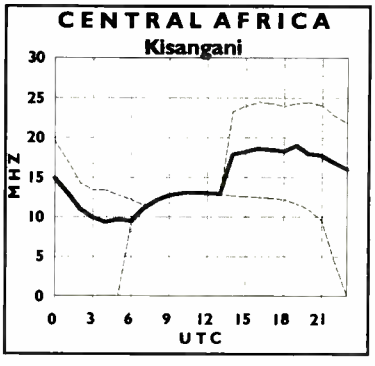


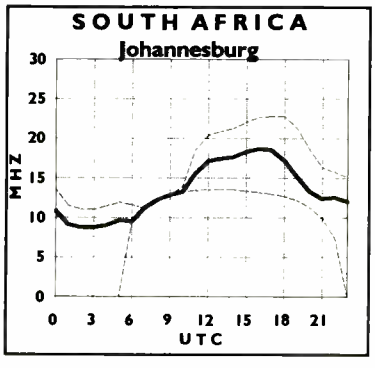


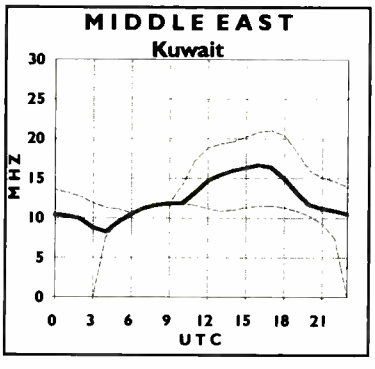


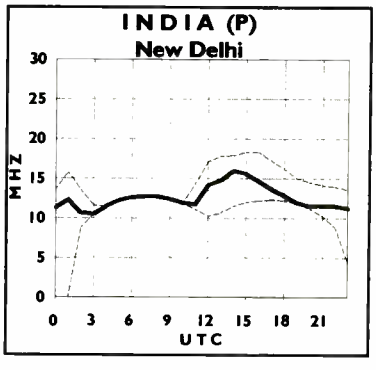


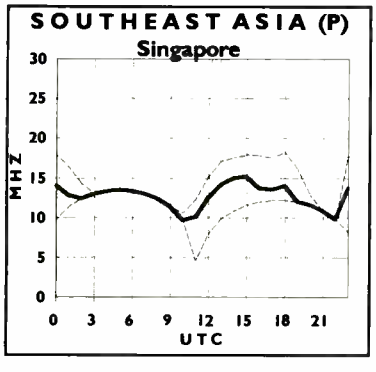


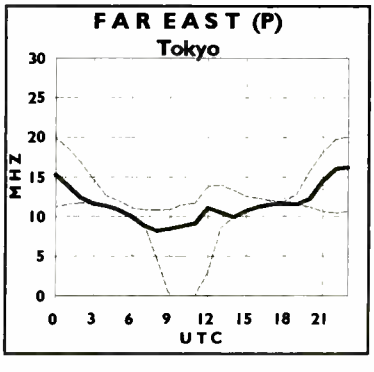


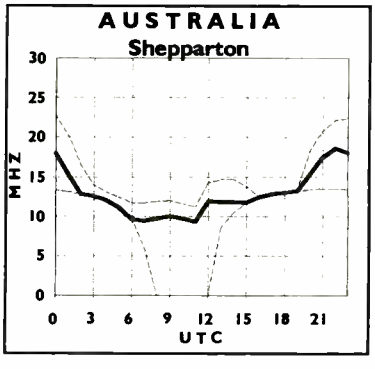






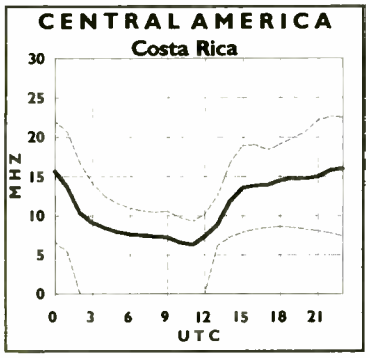


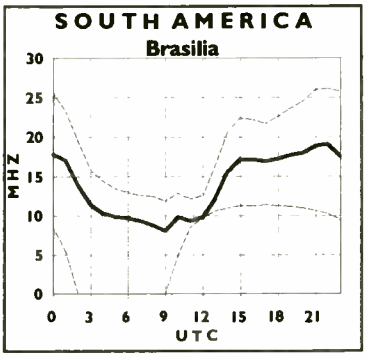


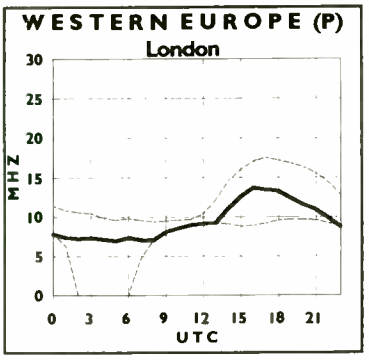


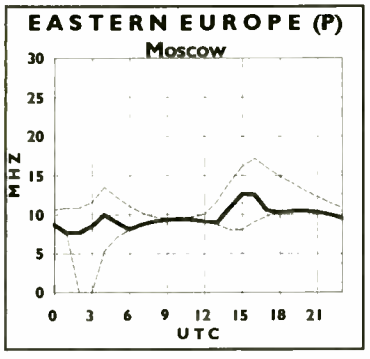
Propagation Conditions: Western United States

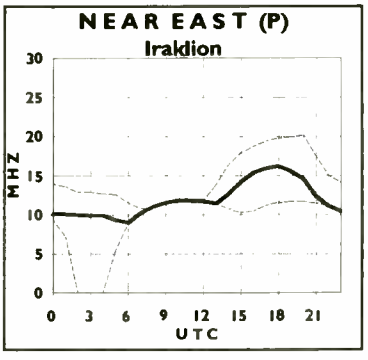
Once you've located the correct charts, look along the horizontal axis of the graph for the time you are listening. The top line of the graph shows the maximum usable frequency (MUF), the heavy middle line is the frequency for best reception, or optimum working frequency (OWF), and finally, the bottom line is the lowest usable frequency (LUF). You will find the best reception along the heavy middle line. Circuits labeled (P) cross the polar auroral zone. Expect poor reception on these circuits during ionospheric disturbances.

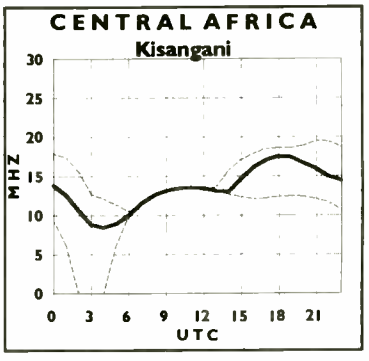


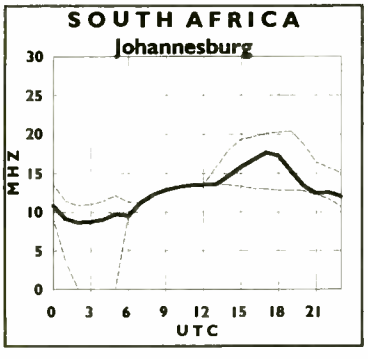


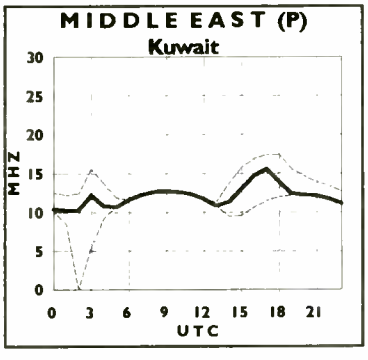


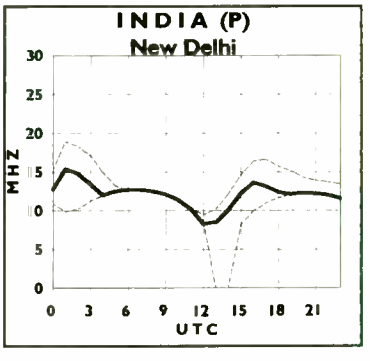


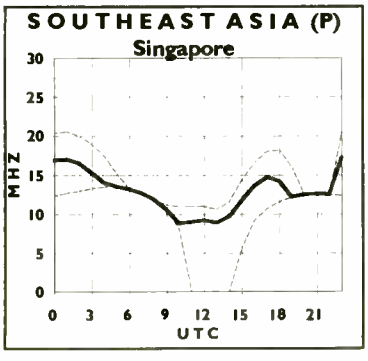


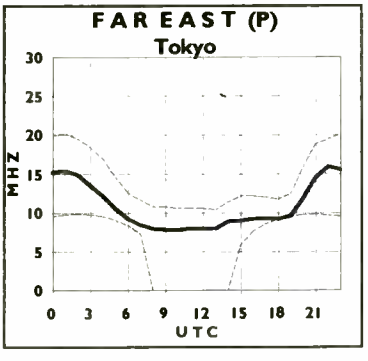


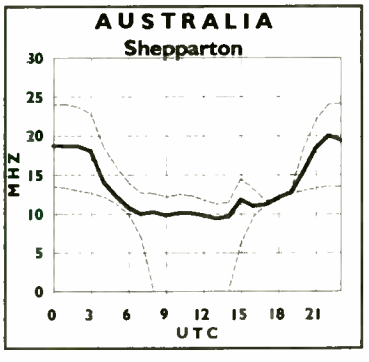












Radio on the Internet

By Jim Frimmel

Internet is a marvelous tool for anyone thirsty for information. However, it can be disastrous to the budget if you don't have an outlet within reach of a local phone call. That's why Grove Enterprises has established itself as a service provider for the Western North Carolina Clay and Cherokee counties. Look for Grove, Monitoring Times, and Satellite Times home pages now appearing at www.grove.net!

I've been reading the shortwave listener's newsgroup on the Internet for quite some time, via America Online (AOL). The newsgroup, which is commonly known as "rec.radio.shortwave," contains global E-mail messages concerning all aspects of shortwave radio. Although I occasionally reply to someone who has posted something of interest to me, I mostly just download the 50 or so messages per day for later reading off-line.

This practice shortens the time I spend on line and also keeps the subscription costs down. It also puts me in the category of user known as a "lurker," that is, someone who "lurks" in the background without actively participating in the back and forth commentary. I recommend lurking to beginners as the best way to find out what's going on and the rules of the game. It's far easier to observe the criticisms of others on how to be "politically correct" in using this forum, and safer to your ego, too.

This forum enables me to keep current on the latest shortwave news and to pick up listening tips and schedule information. Meanwhile, however, I impatiently awaited the next giant step forward—access to the World Wide Web (WWW). Finally, in mid-June 1995, AOL released the first (interim) version of its web browser software, and I began a fascinating adventure down the information superhighway.

The AOL Web Browser

I had read about the beauty of the full color graphics, the sounds which could be played in real time, and the "HyperText" links which could whisk you from one web site to another, regardless of its physical location around the world. I was soon to discover that the claims were true and the experience is exhilarating.

The new web browser was not difficult to learn. According to standard practice, web information is presented in logical sequences and in color. Underlined words or phrases represent HyperText links to other pages of information or to other web sites. Clicking on one of these underlined HyperText links brings up either a new screen of relative information or transports you to a different web site.

The AOL software colors these hyperlinks blue until you click on one. Upon return to the same page, the underlined HyperText turns to red to signify that the link had already been made. This color change can be very helpful in preventing unwanted returns to previously visited links and permits the user to jump around a page randomly.

The color preferences, as well as other screen settings, can be set by the user. One setting I found to be especially useful was to set a function of the web browser to display the address of any hyperlink. Then, as the mouse moves the cursor over any HyperText, the address is displayed on screen and can be noted without actually visiting the linked address.

Getting Started on the Web

After first browsing through some of the web pages recommended by AOL to gain a little practice and familiarity with the new software, I decided to venture out on my own. I entered http://www.rnw.nl/rnw in the address box provided on the screen, and, in a matter of seconds, my computer monitor displayed the opening page for Radio Netherlands. No question about it—I was really there!

The colorful Radio Netherlands globe logo appeared at the top of the screen with welcoming words in four languages and options to select either Dutch, English, Spanish, or Indonesian versions. I clicked on the word "English" and a new page appeared with links to:

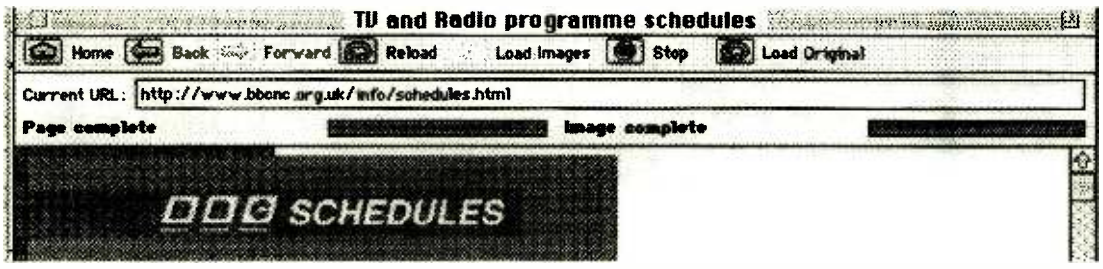
- This is Radio Netherlands
- Why are we here?
- Radio Netherlands Training Centre
- Television Catalogue for Broadcasters
- Programme information
- Media Network Preview
- English Transmission Schedules
- English Service on Astra 1C
- Publications
- Other language
- Link to other services

I selected the last item to see what other international broadcasters were linked to the Radio Netherlands web site and found these to be listed:

- The BBC Networking Club, London
- Deutsche Welle
- Radio Japan
- Radio Canada International
- Radio Vlaanderen Internationaal
- Radio France Internationale
- Radio Sweden
- Radio Austria
- Voice Of America

Wow! This was getting better and better. I selected Deutsche Welle and felt that I had been miraculously beamed to Germany. Full color flags of other countries offered more hyperlinks. I immediately saw the potential for travel but opted to return to The Netherlands.

I clicked on "Media Network Preview" and read interesting biographies of Diana



Janssen and Jonathan Marks. The "Preview" page gave a synopsis of topics to be covered in the weeks ahead. Even though I seldom miss a Media Network program, I copied this for future reference.

My next venture was "Publications." This selection presented the "Listener Service Catalog" containing descriptions of all the wonderful, free publications available from Radio Netherlands. I knew that Tom Sundstrom had just completed version 5.0 of the "Infodutch" publication, and there it was. To save on-line time costs I swept through the entire document consisting of eight separate categories and innumerable sub-topics, saving each as a text file as I jumped from page to page.

I'll leave the rest of these explorations for your own discovery. When you get on the World Wide Web you definitely want to visit Radio Netherlands.

Indexes and Links

Internet addresses are not easily remembered. For this reason and for ease of access, most web software provides "Hot Lists" for you to record your favorite WWW addresses. I used this feature to remember the addresses I might want to return to.

A good way to start browsing the web is to begin with some of the radio catalog pages that provide a multitude of information about the radio hobby as well as links to other web sites. Things change rapidly on the Internet and this is a good way to learn about new web sites.

The Shortwave/Radio Catalog at http://itre.ncsu.edu/radio/ is an excellent place to start browsing, whether you are a newbie or an experienced web surfer. Besides indexing most of the current radio information to be found on the Internet, site manager Pete Costello offers many links to other web sites. Visiting here is a must.

TRS Consultants web page at http://www.pics.com/trs is another address you may want to keep in your address list. Tom Sundstrom offers news items, a web directory, software for radio enthusiasts, web advertising services, and links to other important web sites.

Shortwave Radio Schedule Guide at http://aloha.nmsu.edu/w5gb/swl/swl.html is an attempt by Byron Hicks at putting together an on-line guide of frequency and schedule data of international broadcasters. When visited in early July, it contained 57 separate schedule listings.

The inset to the right provides a handy summary of radio-related internet sites and is provided with permission of Brett Miller (brett_miller@ccm.ut.intel.com).

TABLE 1: WORLD WIDE WEB RADIO SITES

http://dice.dac.neu.edu/Homepages/paul/al.html - FAQs, Freqs, Mods
http://hypatia.gsfc.nasa.gov/sarex_mainpage.html - Sarex Info
http://www.cs.nmsu.edu/~thharrel/ - Scanner stuff
http://itre.ncsu.edu/radio/ - Shortwave/Radio Catalog (lots of links)
http://www.law.indiana.edu/fclj/fclj.html - Federal Communications Law Journal
http://bjr.acf.nyu.edu/railinfo/scanning/scanning.html - Railroad Scanning
http://ux1.cso.uiuc.edu/~roma/rr-freqs.html - Railroad Freqs
http://www.mcc.ac.uk/John/SatTrack.html - Satellite Tracking
http://www.cc.columbia.edu/~fuat/cuarc/www-sites.html - Lot of Links to ARC pages
http://kzsu.stanford.edu/other-radio.html - Links to non-commercial broadcasters
http://www.mit.edu:8001/activities/wmbr/otherstations.html - Radio stns on Internet
http://www.fcc.gov - FCC Web Server
http://www.rpi.edu/dept/union/w2sz/www
http://www.access.digex.net/~cps/numbers.html - HF numbers station loggings
http://www.demon.co.uk/javiation
http://usis.com/~odium/- scanner, hacking, etc.
http://www.analysys.co.uk/commslib.html - many links to comms & telecomms sites
http://www4.ncsu.edu/unity/users/jwprice/index.htm
http://p300.cpl.uiuc.edu/~tpeckish/ar8000.html
http://www.okc.com/freq-out - frequency database
http://www.demon.co.uk/lowe/index.html - Lowe Electronics Home Page
http://home.eznet.net/~dstark/index.html - David Stark's home page (scanner stuff)
http://www.pics.com/trs - TRS Consultants Shortwave Software
http://hamster.business.uwo.ca/~amsoft - AmSoft web site
http://nether.net/~mikel/radio.html - Radio/TV Dial pages
http://metro.turnpike.net/~termcon/radio.html - HTML version of this list
http://www.primenet.com/~keithr/mesafreq.html - Arizona public service freqs
http://www.ultranet.com/~bellvill/radio.html
http://www.msen.com/~lwp/radio.html - HTML version of this list
http://www.best.com/~sdunham/homepage.html - Sam Dunham's SCAN*STAR Homepage
http://www.raddev.com/biz/raddev/ - Radio Devices homepage
http://www.cts.com/browse/rcsi - ScannerWear Homepage (scanner control software)
http://www.wolfe.net/~kiwa - Kiwa Electronics Homepage
http://comp.uark.edu/~plaws/scan/ - Peter Laws scanning page
http://www.panix.com/clay/scanning/
http://www.ci.la.ca.us/department/LAFD/index.html - Los Angeles Fire Dept. (w/Freqs)
http://www.webcom.com/~sjl/HamNet_Companion/ - Scanning, Ham, & CompuServe information
http://www.li.net/~j4dice/scanli.html - Long Island area Scanning + links, FAQs etc.

FTP (URLS)

ftp://bubba.business.uwo.ca/mods
ftp://ftp.sunet.se/pub/radio
ftp://mgate.arrl.org ARRL FTP site
ftp://unbc.edu/ampr
ftp://nic.funet.fi/pub/ham and /pub/dx
ftp://ftp.demon.co.uk/pub/ham/mac - MAC stuff
ftp://rtfm.mit.edu/pub/usenet/news.answers/ham-radio - Radio FAQs
ftp://ftp.qrz.com/qrz - QRZ CD-ROM files
ftp://archive.afit.af.mil/pub/space/amateur.tle - Keplerian Elements
ftp://ftp.crl.com/users/ro/vhealey/www (use WWW viewer for HTML docs)
ftp://scitsc..wlv.ac.uk/pub/hamradio - UK ham radio stuff, buffalo mirror
ftp://ftp.iea.com/pub/borg/hdn - Ham Distribution Network site

E-MAIL SERVERS (URLS)

mailto:ftpmail@exchange.tlh.fl.us - get INDEX.TXT
mailto:qsl-info@aug3.augsburg.edu - Callsign server - no subject, callsign in body
mailto:wl-scan-cj@society.com - Frequency lists - put INDEX as subject
mailto:mail-server@rtfm.mit.edu - put help in the message body
mailto:davem0911@aol.com - All Ohio scanner club.type: GET AOSC INFO

GOPHER (URLS)

gopher://gopher.switch.ch /11/misc/faq/faq-dir FAQs
gopher://hamster.business.uwo.ca (129.100.89.100)
gopher://gopher.cic.net:2000/11/e-serials/archive/general/radio
gopher://gopher.fcc.gov

USENET (URLS)

news:alt.radio.scanner - Above 30 MHz
news:alt.radio.scanner.uk - scanning discussions for the United Kingdom
news:alt.radio.pirate - Pirate radio station topics
news:rec.antiques.radio+phono - Antique radio & phono topics
news:rec.radio.amateur.antenna - Antenna related topics
news:rec.radio.amateur.misc - Main newsgroup for Ham radio topics
news:rec.radio.amateur.digital.misc - Digital communications (including Packet)
news:rec.radio.amateur.homebrew - Make your own radio equipment
news:rec.radio.amateur.policy - Ham radio rules, regulations, policy changes
news:rec.radio.amateur.space - Ham radio & space communications
news:rec.radio.broadcasting - AM & FM broadcasting
news:rec.radio.scanner - Monitor. abv. 30 MHz
news:rec.radio.shortwave - Monitor. bel. 30 MHz
news:rec.radio.swap - radio sales & swap topics
news:rec.radio.cb - Citizens Band topics
news:rec.radio.info - Radio related newsgoup FAQs, reference info, (no discussions)
news:phl.scanner - Scanner top. in Phil., PA area.

MAILING LISTS

rccons!rec@telerama.lm.com -Western Pennsylvania scanner mailing list
kyscan@ukcc.uky.edu -Kentucky area scanning
LISTSERVE@UAFSYSB.UARK.EDU - SCAN-L mailing list send: 'subscribe SCAN-L your_name'

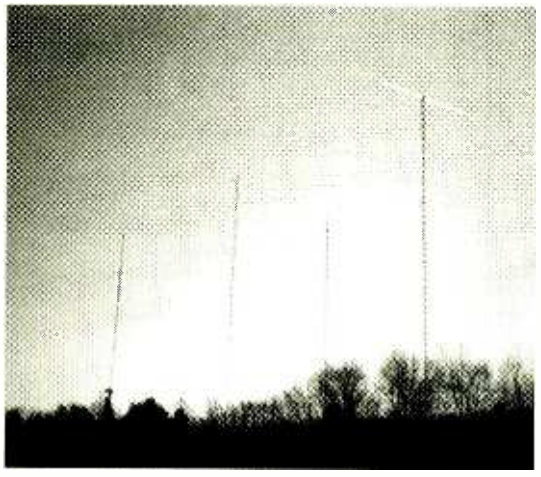
DOUG SMITH, W9WI

Tower-Hunting Tips

Have you ever seen a radio tower and thought, "I wonder which station that is"? I'm sure most DXers have. Curiosity about towers is natural among radio enthusiasts of all kinds. Of course, there's also a practical reason for knowing where your local towers are. If you have the opportunity to choose your DXing site, (either by moving to a new house/apartment, or by DXing from your car) you certainly want to be as far as possible from strong local signals.

Many small-town stations have their studios and business offices at the same place as the transmitting tower. Business offices are usually well-marked with the station's call letters. These towers aren't hard to identify. Be careful. Often, a station will have a short (20-50') tower at the studio with a small dish antenna; this antenna feeds the *real* transmitter a few miles away. Also, it's common for a station's AM towers to be at the studio, but the FM antenna to be on another tower some distance away.

But what if you find a tower out in the middle of nowhere, without any offices or signs? Now, a little detective work is necessary. A short safety note is in order here. Stations are supposed to fence in all hazardous high-voltage areas, but sometimes the fences aren't well maintained. The voltage at the base of an AM tower may be as high as 1000 volts or more. Of course, it's always dangerous to be near a radio tower during a thunderstorm. Do your detective work from the road or other nearby public property.



This collection of towers (crossed by a jet trail) was used by WWGM-1560kHz, Nashville. (WWGM is now WMRO, Gallatin, Tennessee, and no longer uses these towers) The multiple towers indicate a directional antenna. WWGM beamed its power away from 1560kHz station WPAD Paducah, Kentucky.

The bare facts

Most radio towers are strictly supporting structures. The tower itself serves no electrical purpose; it exists simply to hold the real antennas off the ground. AM broadcast towers are different: on AM, the tower *is* the antenna. This fact results in physical characteristics that make it easy to identify AM broadcast towers.

First, the AM tower is almost always electrically insulated from ground. Look at the bottom of the tower. Is there a large ceramic or glass insulator there? Or is the tower fastened directly to the concrete base? If the base is insulated, it's an AM tower.

Take note of the guy wires supporting the tower. Guy wires on AM towers usually contain an insulator every dozen feet or so. These are used to prevent the wire from becoming part of the antenna—they could cause the antenna's resonance to change (making the transmitter unhappy) or change the pattern of a directional antenna. If the guy wires aren't insulated, it almost certainly isn't an AM tower.

Are there any other antennas on the tower? Obviously, few people would erect a radio tower and then not use it. If there are no antennas fastened to the tower, it's probably AM. If the tower does support some other antennas, that doesn't necessarily mean it isn't an AM tower, however. If the AM station also owns an FM or low-power TV station, it'll often put those transmitting antennas on the AM tower. Also, many AM towers support studio-transmitter link antennas (more on these later).

Is there more than one identical tower? While it's not unusual for more than one company or government agency to build a tower on the same land, such towers are usually obviously different. If there are two or more identical towers on the same site, it's an AM site. Multiple towers are used to create a directional antenna—one which radiates more in some directions than others. When multiple towers are used, there are often identical small shacks at the base of each tower. These shacks house electronic tuning networks.

What kind of land are the towers on? A general rule for VHF and UHF radio is that the antenna should be as high in the air as possible. Thus, you'd expect to find these towers (including those for FM and TV broadcast stations) on high ground.

The "as high as possible" rule does not, however, apply to AM stations. At AM sites, it's more important to have a good ground. Some types of ground are easier to connect to than others. Swampy land is the best, and if there are any swamps in your area, you'll probably find AM towers nearby. Land near rivers or lakes is usually also good for AM. Hilltops are usually especially *bad* for AM; you won't find many AM stations on high land.

FM and TV towers

FM and TV transmitting towers are some-

WLW-700kHz, Cincinnati, uses this impressive single tower near Mason, Ohio. Again, this single-tower system indicates that WLW is a non-directional station.

SKIPPING IN

This month, we have some FM/TV skip reported by John Brugliera in Vermont:

92.5MHz	WPAP, Panama City
93.3MHz	WVFJ, Manchester, Georgia
93.7MHz	WRJM, Geneva, Alabama
95.5MHz	WTVY, Dothan, Alabama
96.1MHz	WHBX, Tallahassee
96.3MHz	WRXR, Aiken, S. Carolina; WJIZ Albany, Georgia
TV-4	WTVY-TV, Dothan, Alabama
TV-5	WKRG-TV, Mobile

By the time you read this, the traditional skip season will be over. But off-season skip can happen at any time, and September is the beginning of the tropo season in the northern states. Send your FM/TV catches (and AM too!) to me at Box 98.

what more difficult to identify. They're usually considerably taller than AM towers, ranging from roughly 300' to as high as 2000'. And the actual transmitting antennas are on top, making them much harder to see! Binoculars are handy for examining these towers.

Since the actual transmitting antennas are usually some distance from the guy wires, the wires aren't usually insulated. Nor is the bottom of the tower insulated from ground. Many (most?) FM/TV tower owners also lease space to two-way radio companies, police and fire departments, or paging companies, so there may be a half-dozen or more antennas on the tower. It's also not unusual for more than one FM/TV station to share the same tower.

But which station?

I know what your next question is going to be. OK, now I know it's an AM tower, but there are five AM stations in my town—which one is it? This part is somewhat more difficult to answer. A technical reference such as the NRC *AM Radio Log* or the *Broadcasting and Cable Yearbook* will be invaluable here. Use the reference to determine which of your city's AM stations use directional antennas. If the site has only one tower, it can't be directional, so you can rule out several stations that way.

The height of an AM tower is inversely proportional to the station's dial position. In other words, a station operating on 1490kHz will have a much shorter tower than one operating at 620. By comparing the heights of the towers, and knowing the dial positions of your local stations, you can make some educated guesses as to which tower goes with which station.

Finally, check the orientation of the studio-transmitter link (STL) antennas. These antennas are used to carry the station's programming from the studio to the tower; so, the antenna at the studio will be pointing towards the transmitter, and the antenna at the transmitter will be pointing at the studio. STL antennas are usually small microwave dishes, though some stations use Yagi antennas (the latter look like very small TV antennas).

If you don't already know where a station's studio is, you can usually look it up in the Yellow Pages. By determining which direction these link antennas are pointed, you can often determine which studio goes with which tower.

Good luck! Tower hunting can be productive and fun. If nothing else, it gets you out of the DX shack and into the great outdoors!

Bits and Pieces

• The U.S.'s first radio station owned by a retirement community has gone on the air. Dave Alpert in New York City forwarded a UPI item on WMKV, 89.3FM in Cincinnati. The call letters stand for "Maple Knoll Village." WMKV-FM plans to operate 24 hours a day, airing health information, news of interest to seniors, and music from 1915 to 1955.

• Just when we thought it might be over... More TV stations are changing networks. WLOV, channel 27 in Tupelo, Mississippi, and WSJV, channel 28 in South Bend, Indiana, are both dumping ABC and switching to Fox. The moves leave both cities without ABC stations. WTVW, channel 7 in Evansville, Indiana, is also switching from ABC to Fox; WEHT, channel 25 will switch from CBS to ABC. While no deal has yet been signed, WEVV, channel 44, will probably switch from Fox to CBS.

John Fulford, WA4VPY

Visiting the Big Apple

A loyal reader, who wishes to remain anonymous, spent a bit of time in New York City this past summer. When he was not visiting the famous—and infamous—tourist sites, he spent a bit of time monitoring the airwaves from his high-rise hotel room overlooking Manhattan. Table 1 is a compilation of the main frequencies in use in New York City and the surrounding areas.

It's a substantial report, even leaving a lot of it out. The DEA frequencies are the same as reported in the last couple of issues. DEA uses the same frequencies almost everywhere, whether it be Miami, New York, or Bogota, Colombia.

That's right; I saw a documentary on DEA operations in South America, showing the radios they used. They looked identical to the type they use up here, right down to the UHF antennas. I'm willing to bet the 418 MHz channels used in Miami are also used down in South America.

The FBI is a different story. The Department of Justice is still rearranging their frequency scheme. You New York monitors will have to do a little researching to find what they are using. One of the main FBI frequencies in New York is 170.6250 MHz. Also check out 168.8250, 171.5500, 170.5500, 170.8250, 170.9000, and the frequency range between 150 and 151 MHz. The FBI has been showing up in these ranges.

Scanning Around

• I just found a couple of new frequencies for the **Federal Emergency Management** Agency (FEMA). They are 164.8625 and 165.6625. These frequencies were in use recently at a hazardous material spill in Knoxville, Tennessee.

• We normally don't get reports from Idaho, but this month I received two submissions. The first report was for the **Boise Idaho River Festival.** Held in June, it is four days of water-related activities for the entire family. Frequencies in use were:

170.4250	Security and Parade floats
170.4500	Security
170.9750	Administration.

Where's the fed connection? These frequencies are allocated to the Forest Service and Department of the Interior.

The second report was on the **Bureau of Land Management**. These frequencies become active during fire season. The following frequencies are reported:

163.9375	Boise Direct Operations
417.2250	Boise Direct Link
167.9500	Air Guard net
163.1750	Tac 2
417.9250	Tac 2 Link
417.3500	Forestry Tanker Airplanes
410.2000	Link to Boise Direct
417.8250	Tac 1
122.9250	Forestry Tanker Airplanes
122.9000	Forestry Tanker Airplanes
169.1750	Unknown BLM
414.6500	Unknown BLM
163.8375	Unknown BLM
173.8625	Unknown BLM
417.9750	Unknown BLM

The **United States Forestry Service** uses the following frequencies in the Boise National Forest.

165.4125	Dispatch
172.2000	Channel 3

The following frequencies are in use but no use was specified for any of them:
171.4500 164.6000 170.6000 170.4750
175.5500 172.2500 168.6250
Forest-related activity has also been found on 410.2000.

• Pueblo, Colorado, is home to the national test facility for the **Association of American Railroads.** This was formerly a U.S. Government operation, but was turned over to private sector. They still use federal government frequencies, however. They are:

Chan	Freq	Use
CH1	172.7000	ROAD, DISPATCH, & SECURITY
CH2	173.1500	ALTERNATE FOR CH1
CH3	173.0500	AUDIO & TELEMETRY
CH4	172.8250	TESTING
CH5	171.6500	TESTING
CH6	172.3000	HAZARDOUS MATERIAL HANDLING
CH7	171.2375	SPECIAL PROJECTS
CH8	173.9125	SPECIAL PROJECTS

More Hidden Freqs

In closing for this month, let's look at ideas for new surveillance frequencies. FCC rules allow media providers, such as television networks, to use UHF frequencies on a non-interference basis. I have found networks using frequencies in the 500/600 MHz range for on-site communications, such as at political conventions.

For those of you who live in a big city and possess spectrum analysis equip-

ment, you might want to keep a close eye on the 500-800 MHz range. You might find it interesting to see who shows up there. One of our famous three-letter agencies has been running non-domestic operations in the 600-800 MHz band for years.

I have also heard mention of federal agencies using the input frequencies of cellular sites on a simplex basis for communications. This is done with the phone in the test mode. One federal agency found out that you can take three cellular phones and make a real neat on-site repeater with a little reengineering of the phones in the test mode. Keep a check of the input ranges of the cellular range for "interesting conversations." Oops, sorry. That's illegal under the ECPA. Well, back to work. See you at the Grove Expo in October!

TABLE 1: NEW YORK CITY MAIN FREQUENCIES

Castle Clinton National Monument

166.875	PARK RANGERS	KFB746

National Park Service, Gateway Nat'lRecreationArea, Brooklyn

166.3250	NPS POLICE	RPTR OUT
166.9250	NPS POLICE	RPTR INPUT TO 166.325
166.7500	PARK RANG.	(IDENTIFY AS 570 BASE)
167.0750	NPS POLICE	CH-2 KFB728
417.2500	NPS POLICE	GATEWAY RELAY
417.8250	NPS POLICE	UHF LINK TO 166.3250 KFB723 GATEWAY RELAY

Fire Island National Seashore

166.9000	NPS POLICE	RPTR OUT
169.2250	NPS POLICE	RPTR INPUT TO 166.9000
166.3000	SECONDARY INPUT TO 166.900	

Federal Hall National Monument

166.8750	PARK RANGERS	KFB746

General Grant National Monument

166.8750	PARK RANGERS	KFB746

Hamilton George National Monument

166.8750	PARK RANGERS	KFB746

Statue of Liberty National Monument

34.790	PARK RANGERS	KID703
414.8250	PHONE TO SANDY HOOK, N.J.	
417.7500	PHONE FROM SANDY HOOK, N.J.	
414.9250	LINK TO SANDY HOOK, N.J.	
417.9500	LINK FROM SANDY HOOK, N.J.	

Theodore Roosevelt Birthplace National Historic Site

166.8750	PARK RANGER	KFB746

Ellis Island National Monument

166.3250	NPS POLICE	RPTR OUT
166.9250	NPS POLICE	RPTR INPUT TO 166.3250

Federal Aviation Administration

172.8250	F7	RPTR OUT
166.9250	F7	RPTR IN
162.3500	JFK Airport	LOW LEVEL WIND SHEAR TELEMETRY
165.7125	JFK	FAA OPERATIONS
165.7625	JFK	AIRPORT TELEMETRY
166.1750	JFK	FAA PHONE PATCH--UNK INPUT
162.3000	LaGuardia	LOW LEVEL WIND SHEAR TELEMETRY
165.6625	LaGuardia	AIRPORT TELEMETRY
169.2500	LaGuardia	FAA TELEMETRY
166.1750	Mac-Islip	FAA PHONE PATCH
165.5000	FAA TELEM.	UNKNOWN LOCATION

U.S. Customs

165.2375	CH1	RPTR OUT--INPUT 166.4375
166.4625	CH.3	NATIONWIDE TREASURY COMMON
166.5875	CH.4	SPECIAL OPERATIONS

U.S. Coast Guard

164.3000	BROOKLYN AIR SEARCH AND RESCUE
165.2625	GROUP NEW YORK MAINTENANCE AND SECURITY

Federal Communications Commission

167.0500	MAIN REPEATER OUTPUT

General Services Administration

413.8750	MANHATTAN	PAGING -- 26 Federal Plaza
417.2000	MANHATTAN	RPTR OUT--INPUT 415.3000

Health and Human Services

171.2375	FLUSHING HOSP.	PAGING

Internal Revenue Service

165.9500	WHITE PLAINS	
414.7000	BRONX BASE	RPTR INPUT
418.2250	MAIN UHF RPTR OUT AND SIMPLEX--INPUT 414.7000	
418.7250	WHT. PLNS. CH F6	RPTR

Marshall's Service

163.2000	MAIN RPTR	OUTPUT--INPUT 163.8125
162.7125	CH.F5	INPUT 170.8000
162.7875	E CONTROL AND E WARRANT BASES	SIMPLEX

Immigration Service

162.8500	BRKLYN. F1/F3	KAD600
163.6250	BRKLYN. F2/F4/F5	RPTR--INPUT 165.8250
163.7500	NEW YORK CITY	
165.8750	NEW YORK CITY	
167.3000	NEW YORK CITY	

Alcohol, Tobacco, and Firearms

165.2875	RPTR OUT	INPUT 166.5375
166.4625	TREAS.COM.	SIMPLEX
165.9125	CH.4	SIMPLEX
168.0000	CH.5	SIMPLEX
165.5375	CH.6	SIMPLEX

Army Corps of Engineers

163.0000	BRKLYN CH.F4	
163.0250	STMFRD, CT.	HURRICANE BAR.
163.4125	BROOKLYN BASE	

Department of Agriculture

170.4750	NY OPERATIONS	SIMPLEX
171.5750	BROOKLYN	RPTR OUTPUT

Bureau of Prisons

170.8750	MANHATTAN OPERATIONS--F1
170.9250	MANHATTAN OPERATIONS--F2

Secret Service

162.6875	YANKEE SECURE TELEPHONE SYSTEM TO LIMOS
171.2875	ZULU SECURE TELEPHONE SYSTEM FROM LIMOS
164.4000	PAPA CHANNEL--NEW YORK BASE RPTR OUT (INPUT 164.375)
164.6500	TANGO--F4
164.8875	OSCAR--F5
165.2125	MIKE--F3
165.3750	CHARLIE--MAIN CHANNEL
165.5125	NEWARK RPTR--F5 INPUT 166.7500
165.7875	BAKER CHANNEL--F2

State Department

165.6125	UNITED NATIONS OPERATIONS
165.7125	UNITED NATIONS OPERATIONS
166.1000	UNITED NATIONS SECURITY
408.1000	MANHATTAN COMMAND CENTER RPTR INPUT 409.700; ID "FLAGSHIP"
409.0250	QUEENS TRANSPORTATION RPTR INPUT 407.6500; ID "FLUSHING CONTROL"
409.6250	MANHATTAN SECURITY AND COMMAND POST
408.6000	MANHATTAN SIMPLEX
409.6000	MANHATTAN SIMPLEX

Treasury Department

169.8500	UNKNOWN USER ID "BACKSTOP" & "HOMEPLATE"

Veterans Affairs Department

164.1750	NORTHPORT MEDICAL CENTER PAGING KEE736
164.7000	BROOKLYN MEDICAL CENTER PAGING KJN940
164.9375	BROOKLYN MEDICAL CENTER SECURITY KJN946
165.5625	BRONX MEDICAL CENTER KLM539
166.6750	BRONX MEDICAL CENTER SECURITY KLM539
168.0000	BROOKLYN MEDICAL CENTER F4 MAINTENANCE KFB732
170.3500	BRONX MEDICAL CENTER PAGING KLM539

West Point (U.S. Military Academy)

165.0625	SIGNAL BASE

The Navy's New Boat

Guest Columnist, John T. Ward

The U.S. Navy showed off its newest warship to reporters in Tampa, Florida, in December. The Mark V Special Operations Craft is the first of 20 planned.

On board the 82-footer the ride was smooth and stable as we rocketed across Hillsborough Bay at more than 60 miles per hour. Only the rumble of the twin diesel engines, producing more than 4,500 horsepower, gave any indication of the power and the speed of which the 57-ton boat is capable.

The Mark V is designed to deliver 16 Navy commandos to a combat zone at high speed, then get them out quickly once their mission is complete, said Navy Capt. Jon Wright, a former SEAL commander and the officer in charge of the Mark V development program. Navy commandos are called SEALs because of their ability to operate on the SEa, in the Air and on the Land. SEALS, like the Army's Green Berets and special operations units from the other services, are part of the U.S. Special Operations Command headquartered at MacDill Air Force Base in Tampa. The Mark V procurement program has been run from the base and testing of the prototypes was done in Tampa Bay and along the Florida gulf coast.

The Mark V's first public appearance came just two weeks after the U.S. Special Operations Command, also known as SOCOM, awarded an $11 million contract to Halter Marine Inc. of Gulfport, Miss., for two of the $3.7 million boats, plus support equipment. The boats will be built at the Equitable Shipyards in New Orleans, where many World War II PT-class boats were built.

"SOCOM has said they want 20 of the boats, and there's an option for 20 more," said Peter Lenes, program manager for Trinity Marine Group. Both Halter Marine and Equitable Shipyards are subsidiaries of Trinity Marine Group.

Problems delivering SEAL teams into Iraqi-held Kuwait during Desert Shield and Desert Storm pointed out the need for a new boat, Wright said. SEALs were repeatedly sent into Kuwait on reconnaissance missions, traveling more than 200 miles at night in small rubber boats.

A SEAL platoon is 16 men, and since each rubber boat held only four to six men, at least four boats had to be sent on each mission, Wright said. Because of the severe conditions—not the least of which were the millions of gallons of crude oil Iraqi troops had dumped into the Persian Gulf—two extra boats were sent along on each mission just to make sure that four made the trip successfully.

The new Mark V boat can deliver a full SEAL platoon along with their equipment at twice the speed and with far better reliability, he said.

U.S. Special Operations Command

The Halter Mark V Special Operations Craft prototype - callsign "Hotel Bravo" - is shown here with the city of Tampa skyline in the background. The Mark V is designed to deliver a 16-man Navy SEAL team into a combat area quickly and quietly.

Full Range of Communications

Communications equipment aboard the new boat includes VHF-BTB, VHF/UHF AM and FM, LOS/SATCOM, HF, UHF Motorola Radius P100 handhelds, and IFF (Identification Friend or Foe) equipment. It's also equipped with a Sinrad radar, a Motorola MX100 Global Positioning System slaved to a ChartNav LaserPlot computer mapping system, a David Clark intercom, and an ICOM M125 VHF Marine transceiver.

RTTY and encryption equipment will be added later.

According to sources, the boat crew is using 3.249 MHz HF to communicate with the project office when out of UHF range. A vertical HF antenna with an auto tuner is erected just outside the mobile home that serves as project headquarters. The callsign for the Mark V prototype is Hotel Bravo.

The Mark V carries a crew of five, and can be armed with a variety of light machine guns and other weapons for self-defense.

U.S. Special Operations Command

Since the Mark V uses water jets for propulsion and there are no propellers to foul the boat can operate in just over four feet of water, allowing SEAL team members to board directly from the beach.

Best of Three

The Mark V program began in 1992 when SOCOM invited boat builders to submit designs. Testing of the resulting three prototypes began in earnest in February 1994 and continued through May, said SOCOM spokesman George Grimes.

"They were tested in Tampa Bay, and along the gulf north to Apalachicola, and down to the Dry Tortugas," Grimes said. Testing included making

U.S. Special Operations Command

Inflatable boats can be driven right up the rear ramp of the Mark V while the larger boat is still underway. Up to four rubber boats can be stored aboard.

sure the boat's performance was as specified, including its speed, payload capacity and fuel consumption, he said.

The aluminum V-hull built by Halter Marine was judged to be the best, Wright said.

The government spent $23 million on the procurement of the three prototypes and the testing program, Grimes said. The two prototypes not selected for production will be stored at MacDill until they are either transferred to the fleet, or another use is found.

A fact sheet supplied by SOCOM shows the Mark V has a top speed of 50-plus knots per hour at full gross weight, a range of more than 500 miles and fuel capacity of 2,600 gallons. The boat is 82 feet long, has a beam of 17.5 feet and can operate in water just over four feet deep.

Power comes from two 2,285-horsepower diesel engines, and propulsion from two waterjet nozzles in the stern. Maneuvering jets on each side give the Mark V an extremely tight turn radius.

The Mark V is capable of delivering its SEAL team directly onto the beach, or in four inflatable boats carried onboard. The inflatables can be recovered while the Mark V is underway, thanks to a retractable rear ramp that lets the inflatable crew drive their boat right up onto the deck of the Mark V.

The most unique feature of the boat, however, is its ability to be transported in an Air Force C-5 "Galaxy" cargo aircraft, Wright said. The Mark V can be loaded aboard a giant boat trailer—pulled by a semi-truck—and the entire rig loaded aboard the aircraft.

"We can have two of these boats deployed anywhere in the world in 16 hours," he said.

"Compared to what the SEALs are used to—yes, it is a dream machine," Wright said.

The first two operational Mark Vs are expected to be delivered to the Navy in December 1995.

Ken Reitz, KS4ZR

Satellite Audio Throughout Your House

One of the great things about having a satellite TV system—whether it's a C-band full-view system or one of the more limited, small dish DBS systems—is listening to the various audio programming sources available.

It's not long after installing your system that you start wanting to listen to the programming in other parts of the house. And at first it seems simple enough: get a couple hundred feet of speaker cable, a half dozen speakers, a distribution amplifier, speaker switching set up and . . . wait a minute, there has to be an easier way!

Low Power FM Broadcasting

What would really make it simple is to transmit the programming on a small, low-power FM stereo transmitter and pick up the signals on any FM radio within range.

Luckily there are a number of products on the market which make such an arrangement not only cheap but very easy. For the last four months I've been using such an arrangement which has turned out to be very satisfactory.

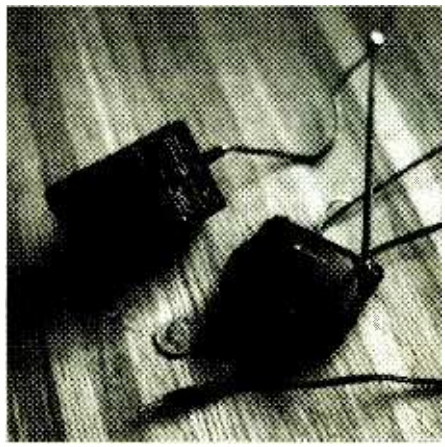
By coincidence, two short articles on this subject appeared in the June issue of *MT*, and I urge you to read them if you're the experimenting type who would like to build your own FM transmitter. The less adventurous may want to try the method I used.

Riding the FX Wave

I found a neat little ready-made stereo FM transmitter called the FX Wave, sold through a mail-order catalog company called Heartland America. The unit sells for $29.95 plus $4.95 shipping and handling.

The FX Wave is set at the factory to transmit on 100.5 MHz FM. The audio quality was very good and the signal was easily received by a portable radio from any room in the house. The only thing that was wrong was that it was powered by two AA batteries (as usual, not included). The problem here was that the batteries wore down quickly, and as they lost power it caused the frequency to shift on the transmitter's output.

The solution to this problem proved equally easy and cheap. The FX Wave requires 3 volts DC; it just so happens that Radio Shack makes a dandy little 1.5 or 3 VDC switchable output adapter which is filtered to reduce hum in the audio. The adapter is catalog number 273-1654 and sells for $13.99. Using a pair of insulated alligator clips soldered to the adapter wires and installing them in the battery compartment finishes the modification. My unit has run in this fashion for months without any noticeable problem.



The FX Wave comes complete with case, antenna, and stereo source plug. The Radio Shack 3-volt adapter is to the left. The quarter coin next to both shows relative size.

End Results

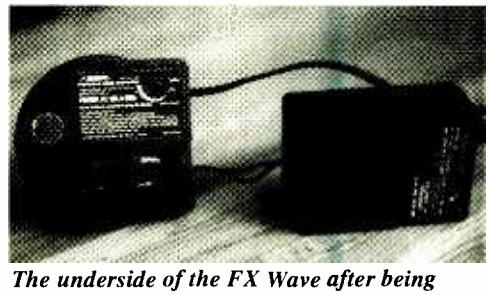
The FX Wave is pre-wired with a 1/8th inch stereo plug which may be plugged into any music source. I use an adapter and plug it into the headphone jack on the front of my main stereo receiver/amp. This means that anything coming through the amp is transmitted as long as the plug is in the headphone jack. This is where the audio from the satellite TV, cassette deck, audio subcarrier, SCPC radio, or any other audio source can be patched in. I can even connect this to my music-on-hold source, so that when folks have to be put on hold they can be listening to the BBC World Service, NASA Select, KLON-FM or whatever else is coming through. I can even listen to the local 2 meter repeater or the Old Buzzard's 75 meter phone net on any radio in the house with this method.

The cost of the FX Wave with Radio Shack power adapter is $48.88 inclusive, while the cost for the Ramsey FM-10A (as reviewed in June *MT*) with case, antenna set, 110 VAC adapter and shipping and handling is $64.80. With the Ramsey unit there's the assembly factor to consider which will either be seen as an lark by some or a horror story by others.

The two photos show relative size of the unit and the power adapter modification. To order the FX Wave, call Heartland at 1-800-229-2901 and ask for item # H4-2016.

Satellite News Worth Noting

- Several months ago (Dec '94) I did a piece on Digital Music Express (DMX). At the time of the column the company was making the service available to only cable customers or businesses via satellite TVRO systems. Now they are to make the service available to the home dish market via their Ku band transponder on Telstar 401. Using a special digital audio receiver the unit is equipped to receive the 70 audio channels currently sent and will receive the 120 channels the service is expected to expand to later this year. You may want to start saving right away for this unit as the digital audio receiver will cost about $500 and the monthly programming will cost an additional $20 per month for subscriptions.
- Long time TVRO experimenter and *MT* reader Joe Bernard N5EB notes that there is a company in California which sells New Old Stock (NOS) TVRO gear. Notable are LNAs, downconverters, 70 MHz receivers, polariser motors, and more. The name of the company is Altronics and their phone number is 408-943-9773.
- There are reports that TVRO and Amateur radio talk shows are to be found on the 5.8



The underside of the FX Wave after being modified to use the Radio Shack power adapter. The insulated alligator clips fit neatly into the battery compartment. If you use yours as I do (24 hours/day) you'll easily save the cost of the batteries in the first two months. The FX Wave has a little red LED to indicate when the power is on.

The BBC Breakfast News as seen in glorious NTSC color as retransmitted live at 3:00 am ET via Anik E1 channel 13

MHz subcarrier of Telstar 302 channel 21. The TVRO mail order company Skyvision has the video and main audio channel. Among the line-up of interesting shows are: Tuesday from 11-12 pm Houston Area Amsat Net; Wednesday from 9-12 pm TVRO news and listener call-in; Thursday 9-12 pm more TVRO news and talk; Friday 8-12 pm "Friday Night Live" hosted by Gary Bourgois; Saturday 7:30-9 Ppm "This Week in Amateur Radio"; Sunday 9-11 pm The Satellite Dealer Association's "Pro Show."

- By the time you read this, Court TV will no longer be available via analog C band. Reports are that they will be available on DirecTV.
- Longtime hams, SWLers and TVRO experimenters have long been aware that the Dayton Ham Vention is a great place to scrounge old TVRO gear. The July issue of *Satellite Retailer* had a feature article on the venerable old fest noting that "...nearly everything needed to bring some older systems up to par can be had at the fest for bargain prices." Those of you who may be looking for stand-alone dish drives, stereo processors, descramblers, or bits and pieces of things to put together a nice used and very cheap system may want to mark your calendar for next year for the weekend of May 17, 18, and 19.
- In the "Chasing Auntie Beeb" Dept.: The Galaxy 4 channel 9 feed of the "BBC Breakfast News" at 3:00 am has been dropped. But the feed is still available on Anik E1 channel 13 at the same time. Set your VCR for 2:50 am because there is usually ten minutes of local English programming before the News. Here, you'll get a chance to scope out the London traffic snarls.

My favorite part of the show is the presenting of the headlines of the major dailies. But, watch out, this show is addictive. You'll find you can't go to bed at night until you've programmed your VCR. For greater authenticity rerun the show at eight am and the clock on the screen during the show will be telling the correct time!

Quick, Hand Me That Crystal Ball!

Recent items in satellite industry trade journals allow us to have a glimpse into the future of satellite broadcasting. The current transponder crunch could be alleviated in the near future if the plans of satellite manufacturers and luck of satellite launchers holds. As of now, an alarming number of broadcast satellites are wobbling around in inclined orbit in a desperate attempt to extend the lives of birds which should have been retired this year or last.

Many of the proposed satellites are the pipe dreams of entrepreneurs delirious at the success of the DSS services and eager to get their feet, toes, or even just a toenail in the door. A total of 16 satellites are proposed to be manufactured and launched in the next few years. They include the usual GE, Telstar. and Galaxy configurations, and ask for orbital slots from as far as 135 degrees West (EchoStar 2) to 58 Degrees West GE 7.

The earliest launch would be Galaxy 3R which might even be in orbit by the time you read this. Galaxy 9 would be launched one year from now in mid-1996 and Galaxy 10 in '98 or '99. Telstar 402R, the sister of currently orbiting Telstar 401, should also be launched this year. It will be followed by Telstar 5 in July, 1997.

Look for GE Americom to launch its next series of satellites beginning with GE 1 in early 1996. They will follow in later years with GE 2 and GE 3. The Galaxy birds will be 24 C band transponder configurations while the Telstar birds will be C and Ku with up to 28 Ku band transponders. The GE satellites are said to have C and Ku band capabilities with 24 C band at 20 watts and 24 Ku band. This would be a significant increase in C band power.

Veterans of the TVRO industry will remember when 4.5 watts was considered healthy output for C band satellites. The high power of the Ku birds in the range of 100 watts and up means that smaller and smaller antennas for various types of broadcasting applications will be possible.

And Finally,

An item in the BBC Monitoring *Summary of World Broadcasts* caught my eye. It's about the Finnish Broadcasting Company and its proposed satellite television service designed for the benefit of Finns abroad. As it was stated: "...The bulk of programming is in the official domestic languages Finnish and Swedish, but also includes transmissions in English, German, French, Russian, and a weekly news review in classic Latin." Cogito ergo sum, cogito!

Kevin Carey, WB2QMY

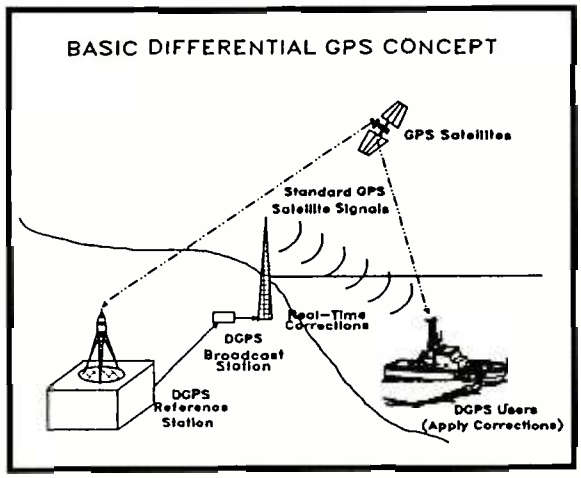
GPS Meets Longwave

What could a system operating at 1,500 MHz possibly have to do with the longwaves? It may surprise you that there is a strong (and growing) link between the two—in the form of *DGPS*, an enhanced version of the satellite-based GPS navigation system. This month, let's take a look at the longwave/GPS connection and see how it is affecting beacon activity on the band.

Aside from the Internet, one of the hottest terms in technology circles today is the *Global Positioning System* (GPS). It's being used for precise military and civilian navigation, electronic map displays in cars, automated survey work, and instrument landing systems in aircraft. A small hand-held GPS receiver can now be purchased for under $600.00, even from *MT* advertisers, and the price will probably go lower as the GPS user base increases.

The longwave side of the GPS story began a couple of years ago. Many listeners started reporting a distinct "warbling" note on the Morse ID of some 285-325 kHz marine beacons. Details were soon released by the Coast Guard that some of its beacons were being retrofitted for a new service called *Differential* GPS (DGPS). The purpose was to further improve the local accuracy of GPS service via correction signals transmitted by beacons.

Before DGPS, civilian users of GPS could expect an accuracy of 100 meters (about 330 feet), which is not bad. But with DGPS signals applied, an accuracy of less than 10 meters (about 30 feet) can be realized. Such accuracy is important to shipping interests operating in harbors or other congested areas.



■ DGPS—How it Works

Because the precise latitude and longitude coordinates of radiobeacons are known, the amount of error in the received GPS signal can be analyzed at the site and the appropriate correction signals can be generated. These corrections are then transmitted to other users within the vicinity of the beacon. (See Figure 1.) The mainly ground wave coverage of radiobeacons makes them well suited for this task.

You'll know a DGPS beacon when you hear one. They send an Audio Frequency Shift (AFSK) data stream which sounds something like narrow-shift RTTY. Until recently, most DGPS signals were sent "piggyback" on the regular Morse ID of selected beacons, the only effect being the warbling keyed tone.

Now, however, the Coast Guard is announcing plans to abolish the Morse ID from many of its beacons, and replace it with a continuous DGPS data stream. According to the Coast Guard, surveys are showing that few people are using the beacons for direction finding, so the station identifier is no longer necessary.

All of this is happening at a time when the Coast Guard is decomissioning the majority of its coastal beacons. The ones being retained for DGPS service tend to be the higher powered sites that are in strategic locations providing maximum coverage. The refurbishment for DGPS service also includes new high efficiency antennas at many sites, so watch for some louder signals to show up soon.

By the way, with the overall reduction in marine beacons, it will surely reduce the amount of congestion on the band and open some new DXing opportunities for more distant beacons. Be sure to keep an ear to the band as the weather turns cooler.

You can get more information on GPS/DGPS by calling the U.S. Coast Guard's GPS Information Center at (703) 313-5900 24 hours daily, or the GPS computer bulletin board service at (703) 313-5910.

■ Mailbag & Loggings

First-time contributor David Murphy (MA) wrote in with a fine list of loggings for *Below 500 kHz* (see Table 1). David is using an old Collins 51S1 receiver and an end-fed 300 foot long antenna. As I looked over his loggings, one particular entry stood out—"OW" (397 kHz) in Norwood, MA. Some have called this the "Brinks Beacon," and for a good reason.

Back in 1950, one of history's largest armored car heists took place in Boston, Massachusetts. Some time later, investigators discovered the remains of the getaway truck in a landfill near the city. After several years the landfill was covered over and shut down. Today, beacon "OW" sits almost directly over the area where the truck parts were found. Could the improved ground conductivity around "OW" be helping to propagate its signal a little farther?

Come to think of it, there are a lot of beacons in interesting and peculiar settings. I'm reminded of one in Western NY that sits behind a Civil War cemetery. And how about the one near Chicago that's right next to a Taco Bell restaurant? Perhaps you know of some beacons near you with an interesting story to tell. Why not drop a line and a photo of your favorite beacon to me c/o *MT*, P.O. Box 98, Brasstown, NC 28902?

Lyle Ahrens (OR) sent me an interesting piece about an old 6-tube intercom system he picked up recently that operates on 175 kHz. The unit carries the name Vocatron, and was built by the Vocaline company of Connecticut sometime in the late 50's or early 60's. Lyle wonders if anyone else is familiar with this unit.

My very first lowfer beacon "KC" (185 kHz) consisted of just such a unit, except that mine was made by the Lafayette Corporation. These things worked by coupling their low frequency RF into the AC line, allowing fairly reliable room-to-room communication. It was an easy task to modify my set to send the RF right into the antenna instead of the AC line. As simple as it was, the old thing generated enough power to light a flashlight bulb to medium intensity.

I never achieved any great DX with my

19-Feb-92 00:57:55 ZCZC QA79
CCGD11 BNM 0202-92
1. CA-SEACOAST-GULF OF SANTA CATALINA
A POSSIBLE HOUSE TRAILER, CYLINDRICAL, APPROXIMATLEY 15 FEET LONG AND 8 FEET IN DIAMETER, GRAY IN COLOR WITH A SPEAKER IN THE FRONT, MATTRESSES, PONTOONS AND THE WORDS WAY TOO HIP PAINTED ON THE SIDE WAS SIGHTED IN APPOXIMATE POSITION 33-12.6N 118-04.2W. MARINERS ARE REQUESTED TO USE CAUTION WHEN TRANSITING THE AREA. NNNN

You never know what you'll see on the 518 kHz NAVTEX channel. This printout was submitted by Dennis Hanley (CA)

intercom, but it was sure fun to experiment with. If anyone's interested, sometime I'll describe the "rotisserie" code wheel I made for it!

■ Beyond Becaons

Interested in what's happening far below the beacon band? The *Geo-Monitor* newsletter might be just right for you. It focuses on very low frequency "natural radio" issues such as earthquake prediction, amateur geophysical monitoring, earth mysteries and related topics.

A subscription to the *Geo-Monitor* is $24 per year Bulk Rate, or $30 First Class. A one-time sample is available for $1.00 from *Geo-Monitor*, 65 Washington Street, Santa Clara, CA 95050.

While we're talking about radio and earthquake activity, I'd like to pass along information on a computer BBS dealing with the subject. It's called the Public Seismic Network and it can be reached at (408) 226-0675. I have not checked into this board personally, so write in and let me know what you think of this, or any other BBS dealing with VLF or related subjects. We'll put the information in here so others can access the boards.

■ Brand New Beacons

Ken Stryker of *The Lowdown* has reported the following newly authorized beacons. At this writing, the frequencies for all but one on the list (CHD, Chandler, AZ) remain unassigned. If you live near any the sites, take a listen for these IDs on the air:

ID	LOCATION
AWI	Wainwright, AK
CHD	Chandler, AZ (238 kHz)
FOZ	Big Fork, MN
GYZ	Guernsey, WY
HGP	Belle Plaine, IA
LLV	Lonely AFS, AK
PCA	Picacho, AZ

That does it for this month. I'll see you in October with more tips to help you enjoy your longwave monitoring times!

TABLE 1:Beacon Loggings

FREQ	ID	LOCATION
194*	TUK	Nantucket, MA
212	PMX	Palmer, MA
216	CLB	Wilmington, DE
220	IHM	Mansfield, MA
227	TAN	Taunton, MA
228	AC	Yarmouth, Nova Scotia
241	SFZ	Smithfield, RI
248	AC	Nantucket, MA
251	SKR	Bedford, MA
257	FFF	Plymouth, MA
260	ESG	Rollinsford, NH
269	TOF	Bedford, MA
279	CQX	Chatham, MA
288	NCE	Portsmouth Harbor, NH
293	MP	Montauk Point, NY
311	CH	Chatham Light Sta., MA
322	H	Seal Island, Nova Scotia
331	YFM	La Grande, QUE
338	DRY	Manchester, NH
342	HY	Hyannis, MA
346	LI	Boston, MA
347	YG	Charlottetown,Pr. Edwardls.
352	DKO	Ft. Devens, MA
362	FMH	Falmouth, MA
368	IMR	Marshfield, MA
375	BO	Boston, MA
382	LQ*	Boston, MA
389	DDP	San Juan, PR
397	OW	Norwood, MA
402	LW	Lawrence, MA
406	FLR	Fall River, MA

* Includes voice weather broadcast.
- Will soon change to 304 kHz w/ continuous DGPS data

Ike Kerschner, N3IK

Time for a Tune-Up

September is the traditional time of year when we start thinking about the upcoming radio season and begin to clear the decks for action. There are several things to consider, so it's a good idea to make a list and get cracking on it before the snow flies. Remember, in environments such as salt water or chemical pollution, equipment will deteriorate more quickly; and, coaxial cable—which should normally be replaced every four years—may need more frequent replacement for VHF, or if you run very high power at HF.

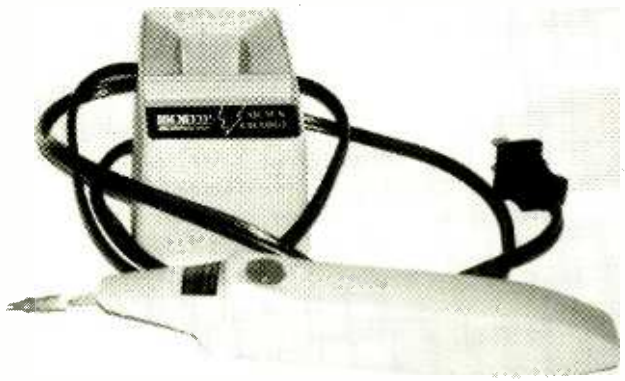


FIGURE 1: Iso-tip Soldering Iron

What to Look For

Wire antennas: It is best to lower the antenna for close inspection. If the antenna is badly discolored (black/green) and flakes of wire (i.e., rust) come off easily, replace the antenna. Lesser discoloration (small spots of green) can be handled by applying a coating of light automotive grease (do not leave large visible globs of grease on the antenna; just rub it in with a piece of leather). To solder green, oxidized wire you will need to clean it carefully with sandpaper and some solder flux (*non-acid type*).

Aluminum antennas: Aluminum also oxidizes; if there appears to be a heavy, dirty coating on the antenna, disassemble it and clean the elements with an aluminum cleaner. If any of the clamps holding the elements together are rusted, replace them now. Automotive stores carry a chemical to coat aluminum so it will not seize (become impossible to get apart). There are several names for the same chemical—locally it's called "no-seize for aluminum" (ask the sales person). If you are using a beam antenna, check the hardware holding the elements to the boom, and the boom to the mast. Any sign of rust calls for replacement (if possible use stainless steel replacement hardware).

Coax: This is the link between the antenna and the rig; no matter how much you pay for the rig and antenna, if the coax is bad you have a problem that must be corrected *now*! There are a lot of signs to tell you if the coax needs replacing. First of all, if the outer covering seems to have pits like little pin pricks *replace the coax*. If you see green discoloration on the shield of the coax orx the connector is black, *replace the coax*. Never just replace the connector. If the coax is more than four years old, *replace it*. Often water will run out of the coax when you unscrew the connector. If so, *replace the coax*!

There are several types of coax that will hold up better than others, but better always cost more. Any of the direct buriable coax cables on the market are super, and will hold up longer than normal cable. But in any case, it is important to seal the connector against water; use coax seal available at all ham radio stores and Radio Shack. Use enough to cover the entire connection for at least 4 inches and make sure it is completely covered.

Guy wires: It's a good idea to remove guys and grease them every year. If any part of the guying system of your tower shows signs of rust or weakness it should be changed. No matter how high your mast or tower is, the guys are very important and deserve careful attention. If they fail, not only will you lose your expensive antennas, it is possible the falling structure will cause serious damage or injury.

Towers and Masts: What ham doesn't dream of a 100-footer in his back yard? The important thing to remember, though, is that things that fall from 'way up above have a nasty habit of hurting like heck if they hit you on the head! We owe it to our family and neighbors to ensure our antenna supports are safe. When the tower or mast shows signs of weathering, clean it up and paint it as soon as possible. Any rusted hardware should be replaced (don't just paint over it and expect it to be okay).

When buying towers, be sure they are not damaged. I have seen several towers offered for sale at hamfests that were obviously damaged and unsafe. Never buy a tower that has repairs, open seams, slight kinks, or is rusted (no price is cheap enough). It's true that many times these towers are put up and stay up for years, but they are not safe!

Grounds: Every radio station needs a good ground. A good ground is not a hunk of 22 gauge wire connected to the screw in the wall socket. A good ground is a short, direct, heavy gauge wire (12 gauge or greater) connected to a solid ground—preferably a rod or several rods driven deeply (6 feet or more) into the earth. Any sign of deterioration such as discoloring, nicks, or rusted hardware should be attended to at once.

Clean out the shack, sweep the floors, dust the furniture, and be certain all connections to the gear are tight and proper. Now you're ready for a great season of radio.

ISO-TIP Cordless Soldering Iron

I have used a cordless soldering iron for many years while working in industry, and recently purchased one for home use. The ISO-TIP "Quick Charge" comes with two tips: the small one as seen in the photo and a heavy duty tip for larger soldering chores (great for coax connectors).

The really nice thing about this iron is that you can walk around with it to any place you need it, and no cord to 110 vac is required. The iron carries enough power to permit many connections (up to 125 per charge). There is plenty of heat. I have used it in the field to build antennas and it produced perfect solder joints every time. I have also used it to build gear such as a QRP transmitter, DC receiver, and a 2-meter FM transceiver. It

gave excellent results with no pesky power cord knocking things on the floor and getting in the way!

Best of all is the price: the ISO-TIP is available for about $36.00. One dealer offering this handy tool is Amateur Electronics Supply (5710 W. Good Hope Road, Milwaukee, WI 53223, phone 1-800-558-0411). Their price is $35.95.

Rob Leonard's Ham DX Tips

After you've checked that your rigs and antennae are in tip top shape, here are a few DX tips to test the equipment.

ANGOLA D2/YO3YX has been on 14268 or 21266 kHz at 2000 UTC. QSL to: YO3YE, P.O. Box 55-36, Bucharest, Romania. **CONTESTS** The 2nd and 3rd of the month, the *All Asian SSB DX Contest* will take place on 80, 40, 20, 15, and 10 meters. That same weekend the *Bulgarian DX Contest* will also take place with operations on CW and SSB portions of the same bands. The 9th and 10th the *ARRL September VHF Contest* will be occurring on bands 50 MHz and above, both SSB and FM portions. **DX-GET-TO-GETHERS** The annual *W9 DXCC Convention* will take place at the Holidome in Elgin, IL, the 8th, 9th and 10th of the month. There will be discussion groups, presentations, and social activities revolving around DX, DXpeditions, and DXers. For more information and pre-registration contact: Michael Zeug, K9EC, 9N317 Carron Rd, Elgin, IL 60123. That same weekend the Radio Society of Great Britain's *1995 International HF Convention* will be taking place in England. For information about the location and registration for this event, contact: Marcia Brimson, RSGB HQ, Lambda House, Cranborne Rd, Potters Bar, Hertfordshire, EN6 3JE, UK. **EGYPT** SU2MT (Mohamed Tarlouseh, P.O. Box 1616, Alexandria, Egypt) has been on 14030 kHz CW between 2100 and 0100 UTC every Friday. **FRANZ JOSEPH LAND** This may be your last chance to add this DXCC country to your logs for a long time, as the Russian research base here is being closed down for lack of funds. Yet, until the end of October, RX1OX/FJL will be active. He has been appearing on 14005 or 14025 to 14030 kHz CW at 0100 UTC most days. His QSL manager is: DL6YET, Nikolai Pfanenstiel, Pfarrer-Mueller Str 10, D-48268 Greven Reckenfeld, Germany **HUNGARY** Honoring 100 years of radio will be Special Events station HG100R (QSL to HA1KSA, P.O. Box 79, Gyor H-9002, Hungary). Operations will be on all amateur bands SSB, CW, and RTTY till 1 January, 1996. **PAKISTAN** AP2JZB has been appearing on 14240 kHz SSB at 0230 UTC most days. QSL requests should be sent to his QSL manager: K2EWB, Leon Katz, 4136 Lakespur Cir N, Palm Beach Gardens, FL 33410 **PROPAGATION BEACONS** *MT* reader Hank Holbrook reports that the following CW VHF propagation beacons are active: 50.060 MHz K4TQR in Grid Square EM-73 (send reception reports to: Bert Hays, 1109 Log Dr, Birmingham, AL, 35215); 50.065 MHz W3VD FM18 (Johns Hopkins University ARC, Johns Hopkins Rd, Laurel, MD 20707); 50.070 MHz KS2T FM29 (Jay Miller, 527 Woodriver Rd, Toms River, NJ 08753); 50.072 VE9MS in FN65 (report reception to: Mike Smith, 131 Smith Rd, Geary, NB E2V 2G3, Canada); 50.076 VE1PZ in Grid FN65 (operated by: Armand Ruderman, 10 Glenmore Ave, Halifax, NS B3N 1W4, Canada); 144.288 KL7GLK in FM18 (operated by: Larry Jack, 3 Barry Ave, Bay Ridge, Annapolis, MD 21403); and on 144.295 W3VD in FM18 (see address above). **SOUTH AFRICA** Honoring the 50th anniversary of Swarkop Air Force Base will be special station ZS45SQN on all bands SSB, CW, and RTTY September 16th to October 8th. **TRINIDAD ISLAND** PU1LOK is here operating as PU0TRI till October. He is active all bands 40 to 6 meters SSB and CW. He will respond to QSL requests when he gets home. Send reports to his home address of: Sergio S Mendes, Rua Visconde de Santa Isabel, 692 Apto 202, Grajau 20560-121 Rio RJ, Brazil **USA** The American Radio Relay League (ARRL) will celebrate the 126th birthday of its founder, Hiram Percy Maxim, September 1st to 10th with a special operating event. ARRL officials will be adding /126 to their callsigns and will be active on *all* amateur bands and modes (yes, FM repeaters too) making contacts with as many amateurs as possible. If you work or log (SWL) 25, 50, 75, or 100 of these amateurs you can receive a special certificate (endorsed for the number of these amateurs you worked or heard). See the August *QST* for details...the 21st to 24th N8FU (John Hugentober, 4441 Andreas Ave, Cincinnati, OH 45211) will operate K8SCH/4 from Tylee Island (IOTA NA-058). Check the IOTA frequencies: 14260 2160 SSB and 14040 21040 and 28040 CW...K4GLU (Alan Merriman, P.O. Box 734, Chincoteague, VA 23336) operates from Chincoteague Island (IOTA NA-083) on 10110 kHz CW 2200-0200 UTC weekends.

Enjoy the new DX season and good DX. 73 de Rob

Band Conditions

20 meters has been picking up steam the past few months, but that's not saying much considering how dead the band has been. The sunspot minimum appears to be here, and conditions will not be very good on the higher frequencies for some time yet (one to two more years). During this season, as last, 40 and 80 meters will be hot and worth some attention. 160 should have excellent openings for DX starting late this month.

That's not to say there won't be DX on 15 or 10 meters—it just won't be as frequent. Check these bands out whenever you are on, because sometimes there *will* be good openings.

Don't Panic...

... if you haven't received your *Monitoring Times* by the beginning of the month. Postal delays do occur, and we must wait until the 10th of the month before sending replacements for lost issues.

Be patient and wait until the 10th; if you still don't have your *MT*, call us at 1-800-438-8155 and we will be happy to send a replacement.

Pirate Activity Increases Again

Following a relative dip in North American pirate radio activity during the spring of 1995, station transmission levels increased substantially during the summer months. As you see in this month's column, *Monitoring Times* readers sent in loggings of thirty different pirate stations. Although erratic broadcasting habits are always the norm, your odds of hearing a pirate have increased once again.

Every month we hear from new listeners who are looking for tips on hearing a pirate. As the logs in this column indicate, nearly 90% of the recent pirate activity has been within 5 kHz of 6955 kHz. This obviously is the best place to look, usually two or three hours before or after local sunset on weekends. In addition, a majority of the stations have recently been using sideband transmitter modes, usually upper sideband but sometimes lower sideband. Some stations still use AM, and a few odd ones pick digital modes like Morse code CW or RTTY.

Pirates always seem to increase their broadcasting around major holidays. Labor Day is a major holiday this month, so this would be a good time to fire up your receiver for some pirate chasing.

Few North Americans heard the EDXC broadcasts

WINB Still in Limbo

Longtime licensed USA broadcaster **WINB** in Red Lion, Pennsylvania, has been missing from the shortwave bands since May. The station has announced that it is off the air "for repairs." But, an internal dispute is involved between Main Street Radio Network—a "patriot" programming service that bought time on the station until its silent period—and station owner John H. Norris. Norris has been unhappy with the content of some right wing quasi-clandestine and "patriot" shows that had bought time on WINB.

A July 2 article in the *Philadelphia Inquirer* pointed out that a related television operation, **WGCB-TV,** carries a fairly extensive lineup of "patriot" television programming. Thanks go to *MT* reader David Schmidt for a copy of this article.

KIWI Still Active

Although it's sometimes a very difficult station to hear in our part of the world, New Zealand pirate **KIWI** still seems to be noted a couple of times every month. Even if you're not a pirate fan, this one is a really good shortwave broadcast DX target. Regular *MT* reporter Gigi Lytle of Lubbock, TX, heard one of their shows during a July weekend on 7445 kHz at the relatively late hour of 1230 UTC. Graham Barclay welcomes your reception reports if you hear them, via PO Box 3103, Onekawa, Napier, New Zealand.

RNI Pulls the Plug

After a brief return to the shortwave bands via **WWCR,** Radio New York International has cancelled its weekly quasi-pirate program. According to Steve Coletti via station boss Alan Weiner, funds raised from the broadcast were insufficient to cover airtime and production costs, which allegedly were $90 per show.

Bethany Replaced by WHRI

The closedown of the old Bethany, Ohio, Crosley transmitter site of the **Voice of America** earlier this year was a sad one for many veteran DXers. *MT* reader Ulis Fleming of Maryland sends in a note from Rick Seifert of Technical Operations at the quasi-clandestine Radio Marti in Washington. The USIA's Radio Marti service to Cuba has been using **WHRI's** private 9495 kHz transmitter between 0100-0400 UTC.

Seifert says that the signal is heavily jammed in Havana, but that reports indicate that "the signal is well received elsewhere on the island." It is unclear if the USIA will renew its short term relay contract with WHRI, so you might want to check this out now.

Iran Clandestine Reaches Brasstown

Our own Gayle Van Horn reports a logging of the clandestine station **Voice of Human Rights and Freedom for Iran** on 11469.7 kHz between 0320 and 0340 UTC. A parallel frequency of 9380 kHz was also weakly audible. Gayle noted muddled audio with middle eastern vocals and lengthy talks by male and female announcers. Many DXers assume that this one, which used to identify as Iran's Flag of Freedom, has connections with USA intelligence agencies. If you hear them and want to write, try 18 bis Rue Violet, F-75015 Paris, France.

What We Are Hearing

Maildrop addresses used by pirate stations heard by our readers this month include PO Box 452, Wellsville, NY 14895; PO Box 146 Stoneham, MA 02180; PO Box 28413, Providence, RI 02908; PO Box 605, Huntsville AL 35804; 333 North 12th Street, Springfield, IL 62702; JRR, PO Box 39, Waterford City, Ireland; Postfach 510, CH-4010 Basel Switzerland; Postfach 220342, D-4237 Wuppertal, Germany; Boite Postale 130, F-92504 Rueil-Malmaision, Cedex, France; and Ostra Poeren 29, S-44254 Ytterby, Sweden.

When writing to pirates, you should enclose three 32¢ stamps for mail forwarding within the USA, or $1 US to foreign addresses. Your loggings are welcome for this column; send them in via PO Box 98 Brasstown, NC 28902. Frequencies are in kHz, with times in UTC.

Black Rider Radio- 6957 at 0000. The music featured on this one is eclectic, including rock, country, big band, and jazz tunes. Edward Teach of *PopComm's* "Pirates Den" has argued that rock is hardly a species of music, but this station proves otherwise. New NASWA pirate editor Chris Lobdell checks in with a log of this one. Addr: Wellsville. (Chris Lobdell, Stoneham, MA; Barry Williams, Enterprise, AL)

Black Liberation Radio- 91700 for 24 hours. A Richmond *MT* reader reports that this station, normally an FM pirate in Springfield, IL, has been

heard on an around-the-clock basis with "conspiracy theories and rap music" on the south side of Virginia's capitol city. Has anybody else been hearing this? Addr: Springfield. (W. C. G. Dettmar, Richmond, VA)

Down East Radio- 6954 at 2315. Oscar Guggins always programs long standup comedy routines about Maine farmers before a laughing audience. Guggins also plugs Maine tourism. Addr: Blue Ridge Summit. (Dick Pearce, Brattleboro, VT; Jesse Rose, Hampton, VA)

Freedom 40- 6956 at 2345. You may remember this on from last year's "Shortwave Liberation" pirate extravaganza, when at least one pirate transmitted on 31 consecutive days. It returned for the first anniversary of the event, and Nemesis said that he might do the same next year. Try for it during the 4th of July period in 1996. Addr: Stoneham. (William Hassig, Mt. Prospect, IL; Lytle; Williams; Lobdell)

He Man Radio- 6955 at 0130. He Man is most famous for his male advocacy programming, but he often discusses pirate radio issues. On a recent broadcast he relayed licensed oldies station **WMJI** from Cleveland, OH, so maybe his Ohio themes are genuine. Addr: Blue Ridge Summit. (Basil Shelley, Blythe, CA; Rose; Williams)

Jolly Roger Radio- 6955 at 0000. With their format of country music from a location in Ireland, they are one of the more unusual Europirate operations. The station has been heard much more frequently on this side of the ocean lately because of a new relationship with NAPRS. Addr: Waterford City. (Rose; Hassig; Williams)

KDED- 6956 at 0345. The Voice of the Grateful Dead always programs music by, you guessed it, the Grateful Dead. They have been fairly active all year. Addr: Wellsville. (Hassig; Williams)

KTLA- 6955 at 0145. Our QSL columnist bagged the first broadcast by this oldies rock station. Gayle says that their female announcer really blasted into Brasstown with music, genuine commercials, and several identifications. Addr: Providence. (Van Horn; Williams)

Modern Music Radio- 6955 at 0145. This one has a new North American relay for its European pirate programming, so its young boy announcer and hard rock music will be new to the ears of most DXers. Addr: Providence. (George Zeller, Cleveland, OH)

North American Pirate Relay Service- 6955 at 0315. Dick Pistek, after a few months off during a "retirement" vacation, is back again with frequent relays of other pirates, many from Europe. Addr: Wellsville. (Hassig)

Outlaw Radio- 6957 at 2345. This one had not been heard for a while, but they returned this summer with protest rock music and an air raid siren. Addr: Providence. (Williams)

Radio Airplane- 6955 at 2345. Jeffrey says that his full data "airplane over USA map" logo QSL arrived from Captain Eddy in 56 days. Most pirates are excellent verifiers through the addresses listed in this column. Addr: Wellsville. (Jeffrey Richardson, Dover, DE)

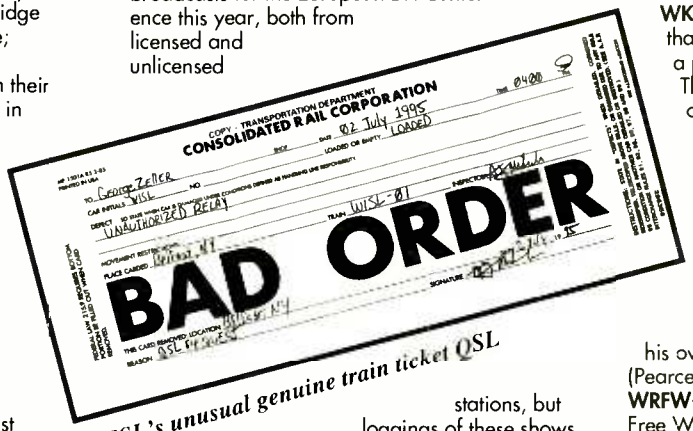
Radio Doomsday- 6956 at 0200. Nemesis is back with pretty elaborate productions of sound bite collages, pirate radio discussions, and commentaries. Given his suicide last year, he seems to be feeling pretty well. Note the odd European address, which is unusual for a North American pirate, but the station also is heard via Europirate relays. Addr: Ytterby. (Lytle; Rose; Lobdell; Williams)

Radio Is Not Radio- 6955 at 0015. The original parody of Radio USA (fake) has returned to the air with its sing-song, computer generated voice. The repeating loop on this station jokes constantly about pirate station names. Addr: Providence. (Zeller)

Radio Mirage International- 6955 at 0300. This one has joined the parade of European pirates with North American relay transmitters, often via **NAPRS**. As is typical of these stations, their format is rock music with jingles mixed in. Addr: Wuppertal. (Hassig)

Radio Piraña International- 13950 at 2000. Jorge seems to have permanently closed his Europirate operations, which were temporarily extended through early summer. This station's future plans include transmissions from South America, so we should keep our eyes on this frequency. Addr: Wuppertal. (Pearce)

Radio Sparks- There were several special broadcasts for the European DX Conference this year, both from licensed and unlicensed stations, but loggings of these shows from North America were extremely rare. We picture a Radio Sparks QSL from Colonel Sparks that everybody seems to have missed. Addr: Basel. (direct from the station)



WISL's unusual genuine train ticket QSL

Radio USA- 6955 at 0130. Mr. Blue Sky and Joe King have been transmitting on the pirate bands for more than a decade, so a recent broadcast of their 10th anniversary extravaganza was obviously a rerun. Well, it's summertime, so we should expect this. Addr: Wellsville. (Rose)

Revolution Radio- 6954 at 0000. Basil says that he has only been a pirate DXer for less than a year, but he snagged a really good catch in this one. They were sending out a rock music test at the time. Addr: Blue Ridge Summit. (Shelley)

Sunshine Radio International 6965 at 2045. This formerly rare Europirate rocker is now a relatively frequent catch in North America because of its relay relationship with NAPRS. Addr: Rueil Cedex. (Shelley; Lobdell)

Starshine Radio- 6957 at 2245. Although the identification is very similar to Sunshine Radio, Starshine is a different Europirate station. Barry heard their announcer singing over every song. I've heard this "singing" also, but the announcer has a voice that reminds us of the tone-deaf Ira of **WPIG.** Addr: Wuppertal. (Williams)

The Asylum- 6955 at 0045. This stream of consciousness station has returned with multiple broadcasts. The station operator says that his mental state, which is questionable given the programming content, drives him to go on the pirate bands. Addr: None, but verifies logs in *ACE* and *Pirate Pages*. (Zeller)

The Free Hope Experience- 6958 at 0000. This new one has made quite a few broadcasts already. It programs rock music, comedy, and audio clips. It unfortunately has not yet announced an address. Addr: Says it will verify logs in *ACE* or *Pirate Pages*. (Williams)

Up Against the Wall Radio- 6957 at 0115. Owlsley's distinctive programs combine 60's and 70's rock oldies, parody sketches, and his trademark oogah horn interval signal. Addr: Providence. (Shelley; Lobdell; Pearce; Williams)

Voice of the Daleks- 6957 at 0100. The computer who is in charge of public relations for the Daleks is the voice on this one. His remarks are heard over industrial music tunes. Addr: Wellsville. (Lytle; Williams)

WISL- 6964 at 0345. A. J. Michaels' station that promotes railroads has reappeared. Look for the slogan of "Whistle Stop Radio." They offer an extremely unusual QSL that we picture this month: a genuine Consolidated Rail Corporation "Bad Order" ticket, filled in with transmission details. Addr: Huntsville. (Zeller)

WKND- 7415 at 1215. Radio Animal says that he's a voice for the underdog, which is a pun for many of his canine references. The station has been doing a lot of work on transmitter construction, and based on loggings submitted to this column, they work! Addr: Blue Ridge Summit. (Bob Murphy, Pawcatuck, CT; and direct from the station)

WREC- 6958 at 0100. P. J. Sparx at Radio Free East Coast ran several repeats of his second anniversary show with guest host Phil Muzik of **KNBS.** But, P. J. is now back with his own voice on the air. Addr: Wellsville. (Pearce; Shelley; Williams)

WRFW- 6957 at 0245. Also known as Radio Free Wisconsin, their programming always includes discussions of pirate radio. Barry heard Bob Marley and Lyle Lovett songs on a recent broadcast. Addr: Blue Ridge Summit. (Williams; Lobdell)

WRV- 6955 at 0345. Pirate Pete is back at The Radio Virus, "The station nobody wants to catch." His shows usually feature rock music, but folk and pop are sometimes mixed in with comedy bits. Addr: Wellsville. (Williams; Hassig)

WHAT'S NEW?

BOOK REVIEWS AND NEW PRODUCTS

by Larry Miller

Guest reviewers: Bob Grove, *National Scanning*

Son of Skywire

The Skywire shortwave antenna has been one of the mainstays of the Grove product line since Bob Grove built his first spark-gap transmitter back in '01. The antenna works great. High performance and low cost always sell well, too. But the antenna has one inherent problem caused by the length of the so-called "short" waves—the antenna is 66 feet long. That means that unless you happen to own a chunk of the Ponderosa Ranch, you may have space problems putting it up.

Grove has now cut 26 feet off the length of the Skywire and come out with the Grove Mini-Skywire. The new Mini-Skywire is less than one-half the length of its big daddy.

If you've wanted a high-quality dipole for shortwave listening but didn't want to move to Montana so you'd have enough space to erect it, check out the Grove Mini-Skywire. It's just $29.95 plus 6.00 UPS from Grove. Their number, lest you have forgotten, is 1-800-438-8155.

To avoid signal overload, especially on portable shortwave radios, use the Grove ATT-1 attenuator ($9.95).

FCC Data on Plastic

Ten years ago, if someone had offered me a copy of every licensee in the FCC's master frequency file, I would have flipped. The very idea would have been inconceivable. How could anyone access that kind of data? Couldn't you be arrested for having that kind of information? Isn't it classified or something? And size? *Every* licensee? You'd need a wheelbarrow to carry all the paper.

Well, technology took care of the paper problem and replaced it with the CD. And Grove took care of the access and put all the information in one place.

Now anyone can get the complete FCC database and sort through it by fields like city, service, state, callsign, antenna height, output power, county and more! The program even can pinpoint the transmitter location on a map!

You'll want to check out the new Grove catalog, for more information, but hurry. The new 1995 V4.1 is now available. Incidentally, the FCC database is also available on high-density diskettes as well as CDs. For more information or to order up a copy of the catalog, call Grove at 1-800-438-8155.

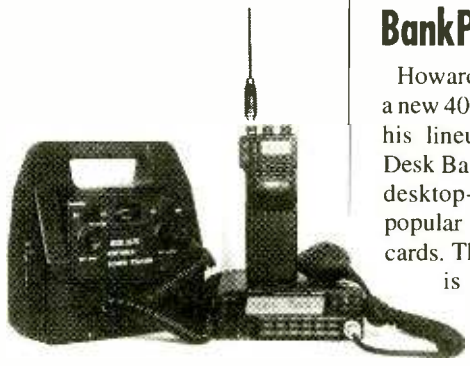
Increased Listening Power

As the summer storm season fades into memory, so does the prospect of those storm-related power outages. Of course, winter snowstorms are just around the corner, along with their wire-dropping snow and wind. So why take a chance of being without power for your radios at the very moment you want them most? Good back-up power is inexpensive but you have to take care of it now, before the lights go out.

The Power Station is a multi-function, portable, rechargeable power source. At its heart is a 7.0 amp-hour gell cell battery. (By comparison, the NiCad battery in an HT is probably rated at around 500 mAh, so The Power Station will give you approximately 14 times the listening that your battery pack provides.) The output is switchable from 12 volts to 6 volts to 3 volts; 3, 6, and 9 come from a 3.5 mm coaxial jack and the 12 from a female cigarette lighter socket at the end of a 8 foot cord.

Beside the obvious advantage of providing emergency power for your radios, The Power Station also has enough "juice" to jump start the car. All in all, it's a great addition to any radio room, house, or car!

The Power Station is $59.95 plus $6.50 UPS from DX Radio Supply. For more information call 610-273-7823 or write to Box 360, Wagontown, PA 19376.



Low-Cost Handheld

A new release from Radio Shack, the PRO-27, appears to be a repackaged Uniden BC-55XLT, covering 29-54, 137-174, and 406-512 MHz. Search limits are factory installed, allowing the automatic exploration of seven sub-bands within its frequency range. A seven-channel weatherband scan is additionally provided.

The small LCD window displays the 20 memory channel numbers but no frequency, although the frequency can be determined by pressing the REVIEW key which pulses the frequency digits one at a time for any channel selected. Temporarily-unwanted channels may be selectively locked out. All channels are delayed for two seconds after signal dropout before scanning resumes.

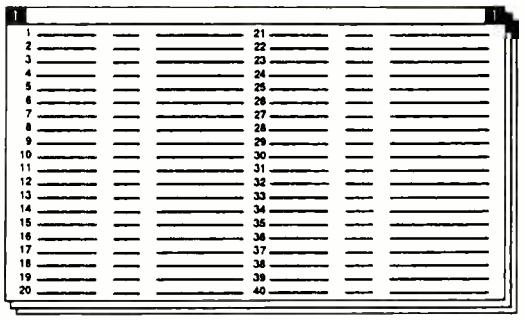
Power may be provided by four AA cells (NiCd or alkaline), 6 volt wall charger/adaptor, or a 12 volt automobile cigarette lighter.

The PRO-27 handheld scanner retails for $129.99 from Radio Shack outlets.

— BG

BankPak 400

Howard Bornstein has added a new 400 channel BankPak to his lineup of products. The Desk BankPak 400 is a larger, desktop-size version of the popular frequency organizer cards. The 400, says Howard, is "perfect for Radio Shack PRO-2004/2005/2006 scanner



owners who must keep track of hundreds of frequencies."

Get your BankPak 400 from Howard's Design EQ, P.O. Box 1245, Menlo Park, CA 94025. The price is $15.95 plus $2.50 shipping and handling.

Wind-up Radio

A radio that needs no electricity and costs nothing to run? You've got to be kidding!

It's no joke, however; the Baylis wind-up radio is going into volume production in South Africa. Made by Johannes-burg-based BayGen Power, the unit receives shortwave, medium-wave, and FM signals. One minute of cranking the handle winds a steel spring that drives an internal generator for around 45 minutes worth of airtime. The generator should last for 6,000 hours.

The Baylis wind-up radio is produced by disabled workers in a Capetown factory. For information, contact BayGen Power Co. Ltd., P.O. Box 783744, Sandton 2146, Braamfontein 2001, Johannesburg, S.A.

Dip Meter Adapter

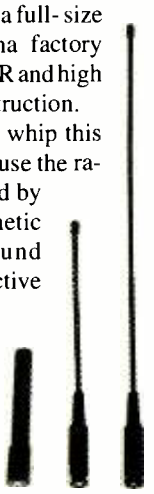
Getting tired of the guesswork involved in winding coils and measuring capacitance, velocity factor, and electrical coax lengths? I know the feeling. Nobody likes to guess, but now there's the MFJ-66 Dip Meter Adapter so you won't have to. A steal at $19.95, the adapter turns the MFJ SWR Analyzer into a sensitive and accurate bandswitched dip meter. Now you can determine resonant frequencies of tuned circuits and even measure the Q of coils. Two coils cover 1.8-170 MHz depending on your SWR Analyzer.

MFJ's full one-year unconditional guarantee is standard, so give them a call and order yours today. Contact MFJ Enterprises, P.O. Box 494, Mississippi State, MS 39762 or order toll-free 1-800-647-1800.

A Really Flexible Duck

If you're looking for the perfect rubber duck for your 144/440 MHz handheld, take a close squint at the MFJ-1717. Reaching out to 15-3/4 inches, this one is a halfwave on 440 MHz with 2.15 dBi of high gain. On 2 meters you're looking at a full-size 1/4 wave antenna factory tuned for low SWR and high Q, low loss construction.

Go ahead and whip this one around, because the radiator is protected by a durable, synthetic rubber compound with a hard protective safety tip. It will take abuse and keep performing.

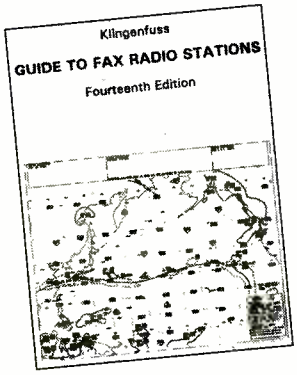


The MFJ-1717 is only $19.95. For

$16.95, you can pick up the MFJ-1716 which is 8-3/4 inches in length and 1/4 wave on 440, plus 1/4 wave on 2 meters. Need something shorter? How about the MFJ-1718, standing just 4-1/4 inches on your 2 meter handheld? It's $12.95.

For more info or to order, contact MFJ Enterprises, P.O. Box 494, Mississippi State, MS 39762 or order toll-free 1-800-647-1800.

Guide to FAX Radio Stations (15th Edition)



A hefty 450 pages, the 15th edition of the *Guide to FAX Radio Stations*, Klingenfuss' newest release, concentrates on the various facsimile transmissions monitorable on the shortwave bands. These include 20 telefax services, 41 weather satellites, and 76 radiofacsimile stations, covering 283 active frequencies monitored over the past year. Callsigns are given and common abbreviations are listed. Stations are cross-referenced by location and frequency; a schedule of broadcasts is also provided.

Additional chapters discuss equipment and sources, with illustrations, recommended for monitoring, along with detailed information on meteorological satellites and the techniques involved in transmitting and receiving facsimile messages. *Guide to FAX Radio Stations* is available from *MT* advertisers.

— BG

Radio Designer

While some cynics consider U.S. radio design a lost art, and it is true that RF design engineers are as scarce as selenium rectifiers, the knowledge is available and, thanks to computers, readily accessible through software like the new "Radio Designer" and *Introduction to Radio Frequency Design* from the American Radio Relay League.

For installing "Radio Designer" (two 3-1/2" floppies, one program and one database) you will need a 386, 486, or Pentium computer, preferably with a math coprocessor, 8 MB RAM, hard disk drive with at least 6 MB available, Microsoft Windows 3.1 or higher, and a mouse or other pointing device. Menu-driven with excellent graphics, the myriad programs will assist in crystal and LC filter design, gain stages, tuned circuits, component specification and selection, modeling and emulation, and much more.

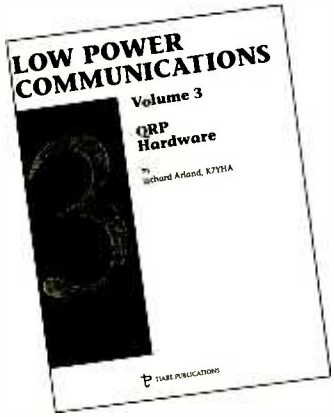
The 400 page user's manual is intuitive to follow and liberally illustrated. A superb volume for the technical-minded enthusiast and engineering professional alike.

Introduction to Radio Frequency Design, on the other hand, is more for the serious experimenter who wants better design tools for his radio hobby. Written by Wes Hayward, W7ZOI, the 400-page book and companion disk considers the receiver in overview as well as in its parts (filters, amplifiers, resonators, oscillators, mixers, and synthesizers). Transistor modeling, transmissions lines and Smith charts are explored in detail. Not for the mathematically faint of heart.

Order the "Radio Designer" ($150 plus $5 shipping) and *Introduction to Radio Frequency Design* ($30 plus $5 shipping) from the ARRL, 225 Main Street, Newington, CT 06111; $150 plus $5 shipping.

— BG

QRP 3



If you've been following Richard Arland's books, you know that he's on volume three of the QRP Trilogy. *Low Power Communications: QRP Hardware* is the final volume in the series and gets right down to brass tacks. Arland looks at both new and used equipment for the amateur who is planning or upgrading the station and he also gives much needed tips on actually buying and trading used equipment—an often touchy area when it comes to electronics.

If you're a believer in low power comms, you'll love the chapters on erecting an antenna tower the right way, how to start and maintain a QRP club, plus addresses of all supplier and manufacturers, a listing of QRP on-air nets, and QRP clubs worldwide.

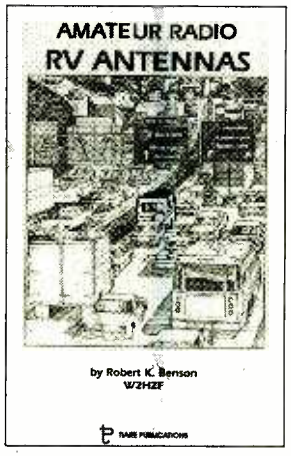
You can order this one for $14.95 ($2 s/h) from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147 or by charge card on the toll-free line 1-800-420-0579 (8am-6pm CST M-F). While you're at it, order the other two books in the series as well: *QRP Basics* and *Advanced QRP Operating*. You won't be disappointed.

RV Antennas for Hams

Mobile radio can be a challenge for listeners; for hams it's even worse. Longer and bulkier antennas, impedance matching, and proper location all can be problem areas for proper performance. RV mobileers have additional challenges because of the height and construction of their vehicles. Robert K. Benson, W2HZF, examines all of these trouble spots in his new book, *Amateur Radio RV Antennas*. From mobile antenna basics through practical application considerations, he discusses antenna types, coax requirements, corrosion, noise, mounting options, measurements, grounding, and matching.

Amateur Radio RV Antennas is $12.95 plus $2 shipping from Tiare Publications, PO Box 493, Lake Geneva, WI 53147; phone 800-420-0579.

— BG



Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 300 S. Hwy 64 West, Brasstown, NC 28902.

MT REVIEW

Par Intermod Filter

By Bob Grove

Digital pager signals saturate the land mobile frequency bands, often overloading scanners and two-way mobile radios, producing an offensive "beep-beep-glurk-glurk" interference to normal reception. Par Electronics has introduced a series of low-cost (under $70), high-performance filters to combat the annoyance.

Although the paging frequencies are scattered throughout the VHF/UHF spectrum, there are a few common frequencies used nationwide; Par focusses on those in the 152-154 MHz range.

Tiny and rugged, the filters are made from solid brass and may be ordered with either SO-239 (UHF) or BNC connectors for use with base, mobile, or hand-held receivers, scanners, and transceivers.

Pretuned and sealed at the factory, the cavity filters reject unwanted paging signals by as much as 50 dB. A unit we sampled here at *MT* headquarters was attached to an ICOM R7100; a local paging signal was reduced from above S-9 to S-1, with little attenuation of signals spaced further than 1 MHz from the 152-153 MHz band.

For transmitting purposes, the units exhibit an SWR of 1.15:1 with an insertion loss of only 0.1 dB at 150 MHz and a mere 2 dB at 1 GHz.

For further information and ordering, contact Par Electronics, 6869 Bayshore Drive, Lantana, Florida, 33462 or call 407-586-8278.

Going Digital

Let's face it, it's a digital world. If you haven't come up to speed with technology yet, Philip V.W. Dodds' *Digital Multimedia Cross-Industry Guide* is your key. Dodds covers broadcast TV, cable TV, computer hardware and software, consumer electronics, handheld devices, ATM deployment, and telecommunications. If you want to truly understand the opportunities and obstacles facing these industries, this book will help. Author Dodds is Executive Director of the Interactive Multimedia Association.

The Digital Multimedia Cross-Industry Guide is 350 pages available for $49.94 from Focal Press, 313 Washington Street, Newton, MA 02158-1626 or order toll free 800-446-6520.

A Tide of Products from Wavetek

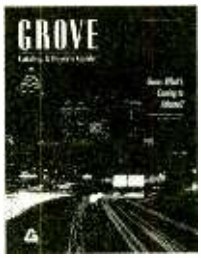
The Wavetek Corporation of San Diego, California, has released several products of interest to radio hobbyists. The DM73A is the company's new digital multimeter featuring great resolution in a compact package designed for use in tight spots. The pen-style DM73A features a 4200 count display, voltage level set, Auto Reading Hold, and Reading Record which records Max voltage and Min resistance. Plant engineers, customer engineers, and electronics technicians will appreciate the DM73A's troubleshooting capabilities. Available now, the unit lists for $69.95.

If you're interested in a multimeter that tucks easily into a pocket, try the DM78A, featuring a 3200 count display with 32 segment bargraph, Data Hold, and Auto Shut-Off for extended battery life. Great for field service work, the DM78A is $35.95.

Also new is Wavetek's 10 MHz DDS (Direct Digital Synthesis) Function Generator. The Model 29's many features belie its low cost: RS-232 and IEEE-488 interfaces for remote programming, frequency resolution accuracy of 10ppm over 1 year, standard as well as arbitrary waveforms, sine, square, and positive pulse, negative pulse, multilevel square, triangle, ramp up, ramp down, sin x/x, DC and pseudo-random noise. Screens are user-tailored for each particular job. Operating modes include trigger, burst, gate, sweep, AM, FSK, and frequency hop. Nine complete instrument set-ups may be stored and recalled from battery backed memory. US list price is $1269. An optional rack mount adaptor is available for an additional $125.

For info on any of these products, contact Wavetek Corporation, Instrument Division, 9045 Balboa Avenue, San Diego, CA, 92123 or call 619-279-2200. Tell them you heard about them here!

Call for your Free Grove Catalog

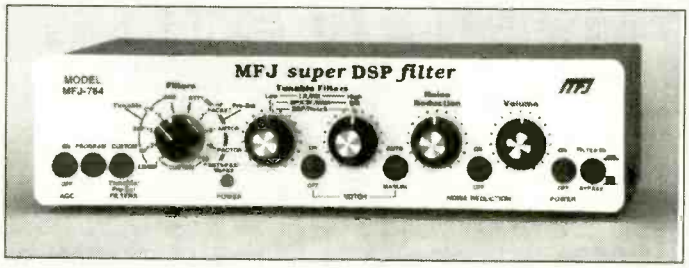


If you're not on the Grove Enterprises mailing list, call 1-800-438-8155 for a copy of the September/October catalog. It's full of new and proven radios and accessories. Some of the gadgets you may have missed include a single or double upright mount for your handheld radio(s), a bargain-priced external speaker for your handheld, weatherproof flex tape for sealing your coax without a sticky mess, and two-position antenna switch. You can listen to your scanner in the car using your car's antenna with the mobile antenna multicoupler, or there's the new 18" "stealth" magnetic mount antenna .... It's not too early to start thinking about dropping hints for Christmas!

MFJ-784 DSP Filter

By Bob Grove

Quite a number of audio filter accessories have hit the market in the last year or two, each with strengths and weaknesses, and prices to match. The MFJ-784 digital signal processor (DSP) is a welcome addition, with an incredible variety of tunable and fixed filters. Most noticeably, its "brick wall" digital filters separate the desired audio from interference with a vengeance—no gradual rolloff or toleration of residual interference. It's suppressed 50-60 dB immediately outside its selectable bandwidths!



Ten custom-programmable bandwidths for voice and data modes, plus a razor-sharp, automatic, multiple-pitch-tracking notch filter, are switch-selectable. Tunable functions include low and high pass filter adjustments, noise reduction, variable notch, and volume.

The adaptive noise reduction circuitry dramatically reduces background spike noise and static at the flick of a switch. An automatic gain control (AGC) circuit maintains constant volume level even during signal fading.

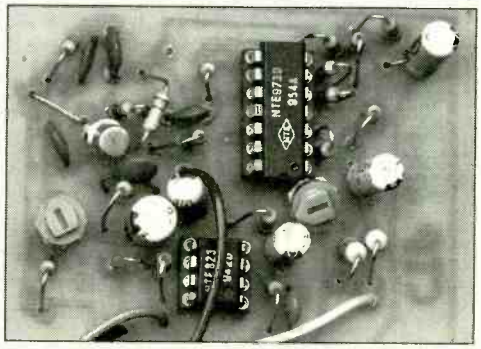
The unit is powered by 12 VDC (supply not included), and has rear-panel connectors for speaker (there is no internal speaker), audio input, and five-pin DIN jacks for a terminal node controller (TNC) when used for voice or data transceive operations.

No DSP accessory so far tested in the *MT* lab has fared better than the MFJ-784. The filter is $219.95 from *MT* advertisers.

CTP DS-49 Descrambler

An excerpt from a review submitted by *National Scanning*

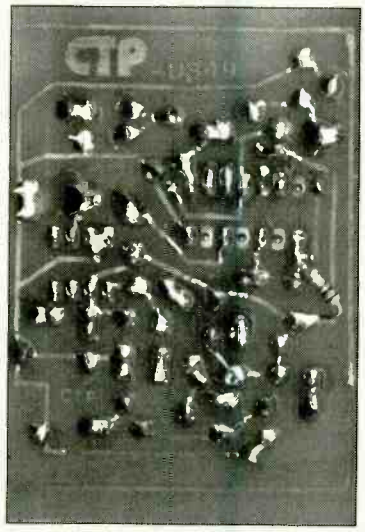
Does CTP have any connections with the same folks that made the old Capri descrambler? I ask this, because in examining the CTP circuit, it matches *exactly* the circuit *and* component values as shown on a copy of the schematic for the Capri that I have in my archive files. The only difference I found between the CTP and the Capri was in the color of two of the four wires used to connect signals and DC to the circuit.



While the design of the CTP is very simple and crude, it does show how a "low tech" circuit can be used to descramble inverted speech (thereby illustrating how little real security is provided by inversion scrambling).

One possible advantage the CTP enjoys is that you can adjust the pilot tone on the fly. (This would be similar to the BFO pitch, RIT, or clarifier control on an SSB receiver). This is useful in descrambling an inverted audio source that uses a non-standard pilot tone, although I would estimate that about 90% or so of speech inversion systems use either 3,333 or 3,500 Hz. (Cordless phones that have speech inversion use a pilot tone of 3,333 Hz, as far as I have observed.)

All this adjustability does have its drawbacks; namely, you must resign yourself to a certain amount of drift in both the pilot tone and the "balance"/nulling controls/circuits over time.



Construction of the CTP is fairly good except for the PC board (not exactly the least important part of the product). Several sections of the circuit trace look as though the board was overetched, which could easily cause the circuit to fail or become intermittent.

The install/adjust instructions that come with the unit aren't that great, either. The tone you hear in the background can be largely eliminated by careful adjustment of the null/balance pot, if the instructions would just tell you that.

CTP claims that their product can descramble more sophisticated signals than other descramblers can. Offhand I do not see how this is possible. However, it *might* be possible that, due to the lack of filtering, it can achieve some success in descrambling a few "split-band" systems—those that use pilot tones that are (closely) harmonically related. It will not work with more common, high-security, "rolling code" scrambling formats.

The CTP Descrambler/Scrambler is an OK first effort from CTP, with some limitations. The descrambler is $49.95 plus $3 shipping and handling. You can order by calling 304-525-6372 or by writing the company at 517 Lower Terrace, Huntington, WV 25705.

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Bob Parnass, AJ9S

The Radio Shack PRO-60 Portable Scanner

The portable Radio Shack PRO-43 scanner was introduced in 1992 and has proven a capable performer during its three-year market lifespan. It was the first Radio Shack portable to use up-conversion circuitry and to cover the 222 MHz ham and 225 - 400 MHz military air bands. (See "PRO-43 Product Review," by Bob Parnass, in the November 1992 RCMA *Journal*.)

The PRO-43 has been pushed into retirement by the new PRO-60, with a list price of about $350. Fans of the '43 will adjust easily to the new model and enjoy the benefits of expanded frequency coverage:

30 - 87.495 MHz (5 kHz steps)
87.5 - 107.95 MHz (50 kHz steps)
108 - 136.975 MHz (25 kHz steps)
137 - 224.95 MHz (5 kHz steps)
225 - 512 MHz (12.5 kHz steps)
760 - 824 MHz (12.5 kHz steps)
849 - 869 MHz (12.5 kHz steps)
894 - 999.9875 MHz (12.5 kHz steps)

Another interesting comparison: The PRO-60 (left) vs. the PRO-26.

Notice that the PRO-60 covers the 75 MHz industrial band, the commercial FM broadcast band, and has expanded commercial aero coverage down to 108 MHz. Both the PRO-60 and earlier PRO-43 are made by General Research Electronics. Most GRE scanners made for Radio Shack begin coverage at 30 MHz, while the Radio Shack models made by Uniden dip lower and afford coverage of the FM portion of the 10 meter ham band.

Other PRO-60 features are identical to the earlier PRO-43 and rather "plain Jane." It has only 200 channels divided into 10 banks. Individual lockout and 2-second rescan delay may be selected for each of the memory channels. Users may select between AM and narrow band FM on any frequency. Like the PRO-43, the PRO-60 scans at 25 channels per second and searches at 50 steps per second, and there is one selectable priority channel.

The PRO-60 has a conventional search function with only one pair of search limits and the step sizes are factory set. There are 10 "monitor" memories which can be written manually during a search. The PRO-60 lacks the handy Auto Store feature found in the more expensive PRO-26, reviewed in August *MT*, and BC3000XLT reviewed in April *MT*.

The PRO-60 Direct search is more flexible than in the PRO-43 and PRO-26. One can type in a frequency, press DIRECT, then use the Up and Down arrow keys to change the frequency one step at a time. If an arrow key is held down for more than second or two, the PRO-60 starts searching.

Physical Features

The PRO-60 is about the same height and width as a PRO-43, but the top half of the case bulges so it no longer fits in the same small pockets. The PRO-43 and PRO-62 style of belt clips are known to break, but the PRO-60 bears a redesigned plastic belt clip, curved in shape. It's too early to tell whether it will last longer than the older style clip. Wouldn't it be great if Radio Shack sold an optional metal belt clip?

The PRO-60 weighs about 14.9 ounces when loaded with alkaline cells, about 2 ounces heavier than the similarly sized PRO-26.

Keyboard and Display

The PRO-60 LCD (liquid crystal display) looks the same as the PRO-62 and PRO-43 displays, although there is a green color backlight which stays lit for a few seconds after pressing the LIGHT button. Truth be told, the digits on the PRO-26 display are much larger and easier to read.

All the buttons on the keypad are black rubber. The up and down arrow keys are actually shaped like arrowheads and are easy to find, but the rest of the keypad could benefit from a color coding scheme as found on the BC3000XLT. The KEYLOCK slide switch disables most keys, but the MANUAL and SCAN keys remain enabled.

Sensitivity, Image, and Intermod Performance

We used a PRO-60 bearing serial number 000164 for evaluation and tested it side by side with the PRO-26 we reviewed earlier. Our PRO-26 is more sensitive in the 30 - 50 MHz and 400 - 470 MHz ranges, but the PRO-60 is more sensitive on the VHF-high band. They are equally sensitive in the 850 MHz range.

Railfans take note—our PRO-60 hears paging signals in the 160 MHz range from stations actually transmitting 771.2025 MHz higher, in the 932 MHz range. Two VHF paging transmitters—one on 158.7 MHz and the other on 158.1 MHz—mix together in our PRO-60 to produce intermod on 316.8 MHz. Our PRO-60 also suffers intermod on 338.45 MHz from the 158.7 MHz pager mixing with audio from television channel 7 (179.75 MHz). Channel 5 audio (81.75 MHz) mixes with an FM broadcaster on 91.9 MHz and is loud and clear on 173.65 MHz. Our PRO-26 doesn't have the same intermod.

Higher Battery Consumption

The PRO-60 requires 6 AA batteries as does the older PRO-43. In both models, a battery clip slides up into the bottom of the radio case and a separate trap door slides over it. Alkaline cells or NiCd cells will bring the scanner to life. Like most other Radio Shack portables, there are two jacks on the side, one for battery charging and one for powering the scanner from an optional, AC operated "wall wart" power supply/charger.

It's useful to measure the current consumption when testing portable scanners because current consumption is an indication of battery life. We used fresh alkaline batteries to power our PRO-60, but they were drained sooner than expected—before we finished the evaluation. Current consumption test results explain why we had to replace the batteries so early.

Our PRO-60 requires more current than the PRO-43, PRO-26, and BC3000XLT. While scanning, our PRO-60 draws 99 milliamps. That's 13% higher than the PRO-43 and 23% higher than the PRO-26. Our PRO-60 consumes approximately 130 mA (milliamperes) while listening to a signal at moderate volume, about 20% more than the PRO-26.

While turned off, our PRO-60 draws slightly more than 2 mA from a 7.2 volt source and almost 3 mA from a 9 volt source. That's significantly more current than the 0.010 mA PRO-26, the 0.045 mA BC3000XLT, and the 0.5 mA BC200XLT. Let's extrapolate the figures to calculate how much charge would remain in a 600 mAH (milliampere-hour) NiCd battery pack if it were fully charged, then left inside our unused PRO-60 for one week.

The battery pack will discharge from two different sources: the current used by the PRO-60 and the current attributable to the normal self-discharge process. While powered off for seven days (168 hours), the PRO-60 will consume 336 mAH or 56% of the pack's charge. The self-discharge rate for a NiCd battery is about 1% per day at 70 degrees F, so self-discharge will rob our unused battery pack of about 7% of its charge, or 42 mAH during the week.

By the end of the week, we've used about 378 mAH (336 mAH + 42 mAH), depleting the 600 mAH NiCd battery pack by 63%! By contrast, the same battery pack left in a PRO-26 for one week would lose only about 7% of its charge, because the PRO-26 consumes only 1.7 mAH per week when powered off.

Will performance erode as the battery voltage falls? Using a signal generator which tuned up to 470 MHz, we were unable to discern any change of sensitivity as we varied the supply voltage between 5.7 and 9 volts. A low battery alert is enabled when voltage falls below 5.5 volts, causing a periodic beep while the entire display flashes.

The PRO-60 boasts an automatic battery saver circuit which starts after 5 seconds of inactivity while the scanner is in Manual mode. The battery saver reduces current drain to 30 mA during part of the cycle.

Improved Audio Quality

The PRO-43 and PRO-62 units we tested both had mushy audio which lacked high frequency response. The PRO-60 audio is crisp and much easier to understand, especially in the presence of other noise. Like other Radio Shack portables, an ancient monaural earphone jack sits atop the PRO-60. The Uniden/Bearcat BC3000XLT has a better earphone jack which can be used either with a single earphone or lightweight stereo headphones, in which case, the same audio is sent to both ears.

Summary

The PRO-60 is a handy package which works well. However, railroad buffs who live near 931 - 932 MHz transmitters may enjoy "cleaner" reception with a different model. Surely the biggest drawback of the PRO-60 is the battery drain of 2 mA when powered off. We hope the manufacturer reduces current consumption in later production units.

The PRO-60 is available from Radio Shack, Grove Enterprises (800-438-8155), and other dealers for $329.95.

PRO-60: Claimed Specifications

Sensitivity:
(FM 20 dB (S+N)/N at 3 kHz deviation):
30-512 MHz: 1 µv
760-999.9875 MHz: 1 µv
(AM 20 dB (S+N)/N at 60% modulation):
30-512 MHz: 2 µv
760-999.9875 MHz: 2 µv
(FM 30 dB (S+N)/N at 45 kHz deviation):
30-512 MHz: 3 µv
760-999.9875 MHz: 3 µv
Spurious Rejection: (FM at 328 MHz): 40 dB
Selectivity:
(FM/AM)
+-10 kHz: -6 dB
+-15 kHz: -30 dB
(WFM)
+-100 kHz: -6 dB
+-200 kHz: -50 dB
IF Rejection Ratio:
611.2 MHz at 512 MHz: 50 dB
IF Frequencies:
1st: 608.005-611.2 MHz
2nd: 45 MHz
3rd (WFM): 10.7 MHz
3rd (FM/AM): 455 kHz
Squelch Sensitivity:
Threshold (FM/AM): Less than 0.5 µv
Threshold (WFM): Less than 3 µv
Tight (FM/AM): (S+N)/N 25 dB
Tight (WFM): (S+N)/N 40 dB
Audio Power (10% THD): 180 mW nominal
Built-in speaker: 1-3/8" (36 mm) 8 ohm `1 dynamic

Lawrence Magne
Editor-in-Chief
Passport to World Band Radio

Lowe HF-250 Tabletop Receiver

The new Lowe HF-250, a tabletop communications receiver manufactured in England, covers 30 kHz to 30 MHz in the AM, LSB, USB, and CW modes. With its DU250 accessory installed, it also offers narrow-band FM, as well as selectable-sideband *and* DSB synchronous detection. The HF-250 has 255 tunable channel presets, which store frequency and mode—and which can be previewed or recalled directly.

For a premium tabletop receiver, the '250 is relatively small—just 11" (280 mm) by 4 1/8" (105 mm) by 8" (205 mm)—but in part this is accomplished by using an outboard AC adaptor, an approach usually associated with ordinary portables. In our tests, the receiver occasionally picked up some stray AC hum from that adaptor when using a non-coax-fed antenna, but not with an antenna having a coaxial feedline.

Large orange LCD characters are large and exceptionally easy to read in both daylight and darkness. There's a genuine analog S-meter, but because the numbers are so small it is much harder to read. There is a clock, too—but it can't be seen while the received frequency is being displayed.

The rest of the face of the receiver is dominated by a modest scattering of knobs and keys. The overall ergonomic effect is characteristically "Lowe," and whether you like it or not depends on how comfortable you are with the "fewer controls" approach Lowe has always championed.

The tuning knob itself has a very smooth feel, with a genuine flywheel effect that reminds graybeards on our test panel of the great tube-type receivers of yore. It works well, although during bandscanning there is minor "braap" chugging within some frequency clusters.

■ First-rate audio quality

Atop the receiver, there is an acoustical port for the internal loudspeaker. This built-in speaker works well enough, and it's aided by a really effective tone control. However, as the owner's manual rightly points out, a worthy external speaker noticeably improves audio quality.

To no one's surprise, the '250 excels in audio quality when an external speaker is used and the synchronous detector is holding lock successfully. Just as Grundig is the audio champ with portables, so Lowe is with tabletop and portatop models. The '250's audio quality is right up there with the high standard set by the HF-150 and other Lowe models.

As with the HF-150 (above) the new HF-250 continues Lowe's tradition of providing a minimum of controls for simplified operation.

■ Superior lab results

In most measurements of receiver performance, the '250 earns a good-to-excellent rating, with occasional superb ratings, particularly in the area of audio distortion. The receiver is equipped with four bandwidths, which we measure as 2.5 kHz (nominally 2.2 kHz), 5.7 kHz (nominally 4 kHz), 6.7 kHz (nominally 7 kHz) and 10 kHz (nominally 10 kHz)—plus a 200 Hz *audio* filter for CW reception. Despite the inexplicable divergence of the measured narrower bandwidths from their nominal values—Lowe receivers have suffered from this annoyance for years, and it should have been corrected by now—the 5.7 kHz bandwidth is well-suited to general world band listening, and the 6.7 kHz setting works well with stations in the clear.

The biggest improvement in the '250 over the less-costly Lowe HF-150 is that the former has a genuine front end. So with the '250, if you live near any local AM transmitters, you're unlikely to hear local jocks mixing in with your favorite shortwave shows.

■ AGC mixed results

The '250 comes with a single and slow AGC decay rate. It usually sounds good, but it's a disadvantage for DXing during heavy static, and for bandscanning when the band has a mix of very strong and very weak signals. The synchronous detector, which is otherwise excellent, sometimes "gurgles" on fluttery signals—flutter fading is encountered much more often in North America than in Europe, where the receiver was designed—possibly because the slow AGC decay makes it difficult for the detector to hold lock. In addition, during our testing we could often hear a 5 kHz tone even when there was nothing on either adjacent channel. Lowe hasn't encountered this in its other units, so almost certainly this was caused by an anomaly in our particular sample.

■ Disappointing keypad may be revised

Instead of a mouse-like external keypad that connects to the receiver via a cable, as on the HF-150 and HF-225, the '250 has a wireless remote keypad. Unfortunately, this keypad doesn't include a volume control, although it does include a mute button in case, say, the phone rings. The keypad cannot be used flat on a desk when the elevation feet are in use; Lowe tells us they will fix this by re-aiming the diodes in the remote.

The new keypad design also incorporates a non-standard key layout: 4 over 4 over 2. As a result, you have to carefully pick out the frequency you want from an unfamiliar key configuration. In addition, if you make a mistake—not difficult with the unusual layout and key pushes that occasionally don't "catch"—there is no "cancel" key. Such a key would have been helpful, as would have been a confirming beep whenever a key is depressed.

In all, the keypad as we tested it is a nice try, but no cigar. The mouse-type keypad on other Lowe models are the best available on any receiver, period. That for the '250 is not yet in this league. But Lowe is aware of our findings, and seems anxious to improve things in short order.

The keypad has some other interesting features. For one thing, a key allows you to toggle through the bandwidths, carousel-style. For another, press the "mode" key, and the mode indicator flashes on the receiver's face. Then you can use the up and down

arrows on the remote to carousel among modes. When you're done, press the mode button again. Now, the up and down arrows can be used for slewing the frequency. But there's a rub, and it's a lollapaloosa: it takes nearly *20 seconds* to move up or down one channel (5 kHz)!

Also disconcerting is that synchronous detection stays on when you move the tuning knob, howling in protest as you try to change frequency. What's strange is that Lowe already solved this problem in the HF-150, which has a neat system that automatically unlocks the sync when the tuning knob is moved. It stays unlocked while you traverse the bands, then re-locks when the tuning knob has been stationary for a moment. But not so with the HF-250. If you're using synchronous and you want to tune around, you have to switch to regular AM, do your tuning, and then re-engage synch if you want it again.

■ Overall: worthy receiver, high price

Electronic Distributors Co., the firm that distributes Lowe products to dealers throughout North America, tells us that the HF-250 is expected to have a suggested retail price in the United States of $1,489.95, complete with everything. While this is a very nice-sounding radio, and once the kinks are ironed out should be a true step up from the HF-150, that price, even after discounts, may be more than most will be willing to bear. We asked several persons who had tried out the radio, both in the United States and at the EDXC Convention in Denmark (where an even earlier version of the '250 was demonstrated), what they felt the price should be. Virtually all answered anywhere from $800 to $995.

While the Lowe HF-250 offers worthy performance in an attractive package, the receiver as we tested it is one step forward, a step-and-a-half backward. Lowe tells us that our sample was one of the first to come off the production line in what appears to the first run, and that they plan improvements in subsequent production runs. Let's hope so, because in many ways this is just the receiver Lowe fans have been waiting for.

This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.

John Catalano, PhD

ScanStar™ — A Star of a Program

In the past few columns we have been looking at total monitoring environment programs which provide radio control, frequency database, and interface capability to a digital decode unit such as the PK-232. No review of such programs would be complete without the inclusion of ScanStar from Signal Intelligence. We haven't looked at this program since March 1993, but this month we will fire-up ScanStar version 3.61 - Professional Edition.

Star Gazing

The program comes on a single high density disk and requires 386/486 with 4 Meg RAM, hard drive, VGA monitor, serial ports, and DOS 5 with HIMEM and SMARTDRV or OS/2 version 3.0. HIMEM and SMARTDRV must be in your config.sys file for ScanStar to operate properly.

Two type-written pages are all the written instructions that come with the program, but they cover the start-up and installation quite well. The installation does utilize a form of copy protection by making the user enter an "activation key" which is supplied on the proof of license certificate. This is only required when you install the program to your hard drive.

The user interface is purely text based with no graphical, or point-and-click control. Command choices are made via arrow keys, letter selections, or F (function) keys. Data is entered at cursor locations.

The initial configuration screen, which is the first screen the user sees after installation, is where system information is given to the program such as receiver type and serial port allocations. This screen can be accessed at any time from the main menu. See Figure 1. ScanStar Pro supports the following receivers: OS456, R7100, R7000, R9000, R8, NRD-535/525, AR3000, FRG-9600, MR-8100, and DC-440 decoder. However, not all features are supported for all radios. To our disappointment we found out that Monitoring Assistant—a very powerful logging feature—is only available on R7000, R7100, R9000, R8, and NRD-535. We ran the program with an FRG-9600, a 486DX2 66 MHz with 8 Meg of RAM and a PK-232MBX.

FIGURE 1: Main Menu

Instructions? We Don't Need No Stinking Instructions!

At this point I was madly digging through my desk looking for a user's manual without success. ScanStar does not include a written user's manual. Instead the author has chosen to leave that exercise to the buyer by including a user manual file on disk that can be printed by the user. The manual is accessible from the main menu via the Configuration & Information sub-menu and can be scrolled to read a screen at a time. The manual is quite complete with every conceivable aspect of ScanStar being covered.

One thing becomes very apparent after looking through the manual. This program has *lots* of hardware/software parameters which other programs—to simplify operations—have not made accessible to the user. ScanStar has boldly chosen not to follow this " plug and play" approach. You'll see what I mean. To be fair to the concept of the program, and to show you how deep the user can go into control parameters, we are going to deviate from our usual review approach.

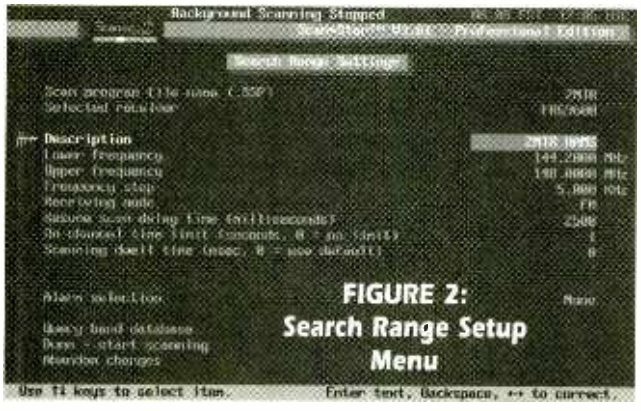


FIGURE 2: Search Range Setup Menu

Search and Evaluate

Instead of showing you most of the functions of the program we will concentrate on one feature and illustrate the extent of hardware control and customization which ScanStar affords the user. Let's try the Frequency Scan & Search function by pressing F (the first letter of "Frequency") from the main menu. Not much appears on the screen except ten function "buttons" on the bottom of the screen and a prompt to press F2 (open file) or F4 (create new file).

Let's say we wanted to search the two meter ham band (144 to 148 MHz) for activity. Pressing F4, we bring up the Select Program Type screen from which we will choose Search & Store. Then we choose the receiver type and give the scan program a name. Let's choose 2MTR, representing two meters. We then define the frequency range to be scanned, frequency step, mode, delay time, and on channel limit. See Figure 2.

So far, this is pretty standard information which most other scan programs require the user to input. But we are not done with the parameter control that this program offers the user. Under the Radio Setup menu a sub menu called Scan Control Parameters is accessible. Here the experienced/advanced user can customize ScanStar to match his/her receiver, computer, monitoring environment, and type of signal-of-interest. This is pretty powerful stuff.

Even the squelch setting is at the control of the user, using the Receiver Setup sub menu via a parameter "Scan stop input." Eighteen (18) different serial/control port configurations are possible. This allows the user to choose the one which best suits his/her hardware, cables, and interfaces—again making ScanStar very customizable.

As we begin to scan, the frequencies which break the squelch are written to the screen. See Figure 3. While scanning, hitting the space bar stops the scanning and puts us into manual. Here, using the up/down arrow keys, we can manually scan the "hit" list on the screen. These hits can be logged to a file, Figure 4, for later use or printing.

What Else Can It Do?

Gee, you people are tough! Well, the wide range of user-accessible parameters continues throughout ScanStar. A Terminal Window is called up from the main menu which worked nicely with a PK-232 for monitoring 2 meter packet repeater stations. User-created file groups can be manipulated and printed using the Edit Group File menu, see Figure 4. The Configuration & Information menu lets the user install a DC-440, or OptoScan 456 tone reader.

Since we tested the program on an FRG-9600, the Spectrum Analysis and Monitoring Assistant parts of the program could not be tested since the FRG-9600 is not one of the radios supported by that feature.

Wishing On A ScanStar

What changes do we think would make ScanStar-Pro even better?

The on-line Help system of ScanStar is very nice. By hitting F1 when you are in one of the main menu screens it tells you what keys do what on that screen. It works quite well. But, sorry, on the sub-menu screens which contain much of the powerful, but complex, user configurable parameters, the Help key doesn't help! Changing this would make the power of the program more accessible to all users, not just the advanced/experienced ones.

Since the HIMEM and SMARTDRV files are so important to the proper operation of the program, the manufacturer should provide an installation procedure which makes sure these files are in the start-up path of the computer.

Compared to its competition, the number of supported, or even partially-supported radios, is much too small and should be expanded.

You can find yourself exiting the program if you hit the Escape key too many times. There should be a catch screen; "Are you sure you want to exit ScanStar? Y/N." Reloading is a quick, but unnecessary pain.

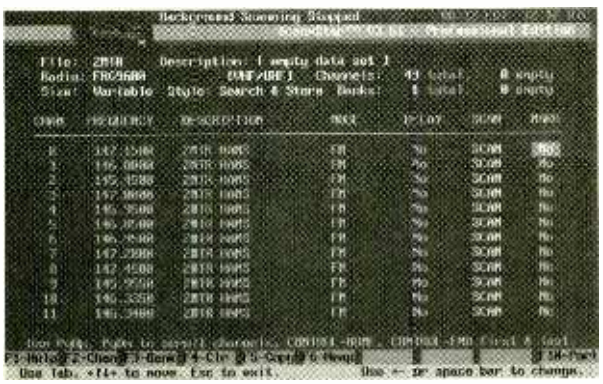


FIGURE 4: Page One of Logging File

And finally, the lack of a hard-copy instruction manual to accompany a program of ScanStar-Pro's flexibility and $80 cost, doesn't allow it to show off all of its features to best advantage.

The only programming problem we found in ScanStar was on the Receiver Configuration Menu where two menu choices have been inadvertently been given the same command letter "R." This minor mistake presents no operational problem if the choices are made with arrow keys instead of using the first letter command keys. With these exceptions the program ran without a glitch.

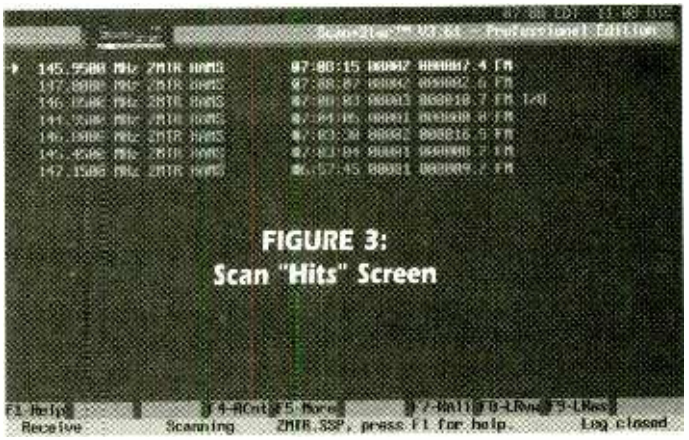


FIGURE 3: Scan "Hits" Screen

Well? So What Didyah Think?

I took a while to warm to ScanStar-Pro, but I have reached a positive conclusion. Finally, with ScanStar-Pro, the user has almost total control over critical software/hardware parameters. In other programs these parameters are optimized to the program writer's satisfaction, and either fixed, or not easily accessible to the user. I found that the "out of the box" operation of ScanStar took some parameter modification to run satisfactorily. Competitor programs run "as-is" out of the box. But if the user takes the time and effort to learn the function of each ScanStar-Pro parameter and its effect on the monitoring system, a more fine-tuned match to the user's hardware and listening targets can be obtained.

In short, ScanStar is no "open the box and go" program. Nor is it for the first time, or casual monitor. It is geared more toward the experienced, technical user where it excels. ScanStar V3.61 Professional is available from Signal Intelligence for $79.97 plus tax and shipping on (408) 926-5630. It is also available from Grove Enterprises on (800) 438-8155. Look for Signal Intelligence's ad for the latest version and other products.

UpDate — Scan Manager 1.0 Pro

The long loading time reported in last month's column for this product is reduced *significantly* to 14 seconds, if your Windows program is set up for SVGA and the number of colors is higher than 256. This configuration is possible if you have an SVGA card with 1 Meg of video card memory. The price of such cards are now in the $65 range. I tried it, and it seems to make the whole program move even faster.

The Unlikely Is Coming

Next month we will review the first home-use radio monitor software product from a truly international corporation with a long history of military and high-end commercial hardware products. Who? What? Where? In *MT*'s Computers and Radio, of course.

Many of you have written in expressing an opinion on radio monitoring and the Internet. Your comments have been very insightful. I'll collect them up and go over them in a "reader's letters only" column in the near future. Keep them coming.

I'm looking forward to meeting many of you again, and some for the first time, at the Grove Communications Expo'95 in October. I'll be rounding up for you all the factual and voodoo causes and cures for computer generated RFI (radio frequency interference). See you there.

Doug Demaw, W1FB

Beginner's Aid to Circuit Design

This monthly column has been devoted in large measure to basic circuit design for beginners and experimenters, but nothing has been said about computer-aided design for those who have minimal technical skills. This month we will explore the interesting world that is built around the VE3ERP HAMCALC 9.4 software which you can purchase for a modest $5.[1] George Murphy's 3.5-inch diskette contains countless design programs that can be used and understood without being a technical heavyweight or computer scientist. All that's required is a healthy interest in experimenting and an IBM-compatible PC that can handle a 1.44 megabyte disk.

The nice thing about the VE3ERP software is that the programs are user-friendly—all 79 of them. Murphy wrote the programs in GW basic, using information sources such as the *ARRL Handbook*, *ARRL Electronics Data Book* and *QST* magazine. Other amateur publications also provided information for his programs. For example, you can quickly design all manner of antennas for any frequency, such as shortened dipoles, inverted Vs, miniature receiving loops, loaded mobile antennas, Log-Yagis and parabolics. You can also design antenna matching networks with this software.

Many Programs Available

HAMCALC 9.4 includes basic design procedures for audio circuits, B & W Miniductor coil charts, coaxial cable characteristics, designing antenna traps, tuned circuit design, sunrise/sunset calculator, and dimensions for telescoping aluminum tubing. If you work with toroids you will love the toroid-inductor calculator. Likewise for the transformer-winding calculator.

There is an excellent program on the disk for designing your own coils, and this is complemented by the copper-wire tables that are included. You can call up and use the Great Circle Paths program when listening for that rare DX. Murphy even shows you how to make big coils from electric clothes-dryer hose!

Power supply design is also on the disk, plus satellite-orbit parameters. If designing with Zener diodes has been a problem for you, take heart, because that subject is covered also. If you like to play with quadratic equations, that subject is treated too. The list goes on, but let's not dwell on that here.

A Program Design Example

Let's suppose you lack the space for a medium-wave dipole computer programs for, say, 1750 kHz. A full-size one would be 267 feet long. You pop the VE3ERP diskette into your A or B drive, bring up the A: or B: prompt, hit ENTER, then type VE3ERP and hit ENTER again. You now have your choice of three menus.

You choose menu B and select Short Dipoles for Restricted Space. The document screen asks you for various bits of information, such as the frequency, wire size, and where you want to place the loading coils in the two legs of the dipole. Once the computer has this data, the program spits out the required inductance for the two loading coils (see Figure 1).

From that point the program leads you to the coil design steps for which you must specify the coil form size, coil wire gauge, and the required inductance. You then learn how long the coils will be, how many turns are needed and the length of the coil wire before it is placed on the blank coil form. Simple and quick, to say the least!

I chose 2-2/3-inch OD PVC tubing for the coil form in the 1750-kHz design example illustrated in Figure 1. Larger PVC stock is available (2-3/4-inch OD) if you have some on hand. The best Q and antenna performance will result if you try to maintain a form factor (diameter to winding length) of 1:1 to 1:2. Use the largest wire gauge you can to achieve this, because the larger wire has lower loss.

The Figure 1 caption also describes a small coil that has a 1-inch OD. It is within the 2:1 form factor recommended earlier in this article. The larger coil would be necessary if the antenna were used for transmitting. The difference between the efficiency of the large and small coils would not be noticed during receive.

Designing a Regulated DC Power Supply

Everyone needs a dc power supply for the workbench, so let's use the software to design a unit that provides variable output from 2.9 to 17.3 volts at up to 1 ampere. We call up the power supply program from menu B in Murphy's software. The circuit diagram for an unregulated supply appears on the screen. We key in the parameters we require and the parts values come up on the screen. Next, an LM-317 voltage regulator circuit appears. We answer a couple of simple questions and the parts values for the regulator appear on the screen. The regulator circuit is added to the basic dc power supply circuit we developed first, and the building can commence.

Figure 2 contains the circuit for a power supply of the foregoing characteristics, as designed with the 9.4 software. It took only five minutes to complete the design! It could

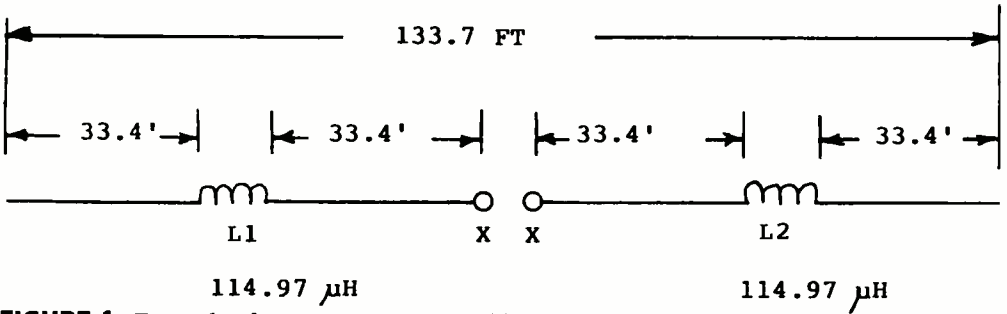


FIGURE 1: *Example of a computer-generated half-size, loaded dipole design for 1.75 MHz. L1 and L2 require 53 turns of no. 18 enamel wire, closewound on a 2-3/8 inch piece of PVC tubing. The coils can be made smaller by using 99 turns of no. 28 enamel wire, closewound, on a 1-inch OD form. The large coils each require 33 feet, 2-3/4 inches of wire. The smaller coils use 26 feet, 4-1/2 inches of wire. The computer program is suitable for any antenna frequency of interest.*

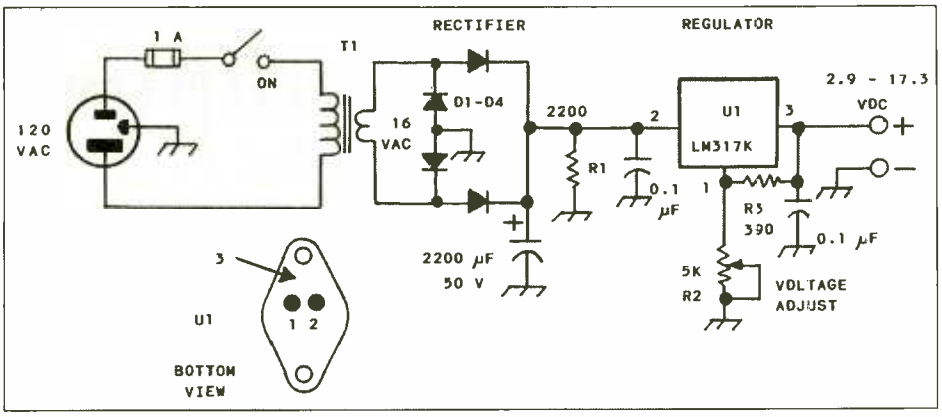


FIGURE 2: *Computer-generated power supply circuit that provides 2.9 to 17.3 volts of dc output at up to 1 ampere. D1-D4 are 2-A, 50-PRV rectifier diodes. R1 is a 1-W resistor. R2 and R3 are 1/2 W units. R3 is a linear taper carbon or wire-wound control. The LM-315 regulator (U1) should be mounted on a small heat sink. T1 has a 16-V ac secondary that is rated at 1 A or greater.*

have taken hours or days for an inexperienced designer/builder to produce the same circuit. This program allows you to specify various capacitor, resistor, and transformer values to accommodate some of the parts you may already have stashed in your "goodie trove."

Some Closing Thoughts

It is conceivable that a person with very little electronics experience and knowledge could learn a fair amount of theory by tinkering with the VE3ERP software. Those who have extensive backgrounds in electronics need not regard the programs as mundane, since solutions to basic design problems are swift when using 9.4. I prefer this to fiddling with a scientific calculator and writing down pages of data. The design results from Murphy's programs can be printed via the computer by hitting the no. 1 on the keyboard—a real time saver.

The VE3ERP software appears to be copy-protected, since I was unable to make a duplicate copy. For $5 apiece, buy two if you need two copies!

[1] HAMCALC 9.4 is available for a handling fee of $5 (check or money order only) from George "Murph" Murphy, VE3ERP, 77 McKenzie St., Orillia, ON L3V 6A6, Canada. Phone: (705) 326-9612.

EXPERIMENTER'S WORKSHOP

TWEAK, TUNE, AND MODIFY!

Bill Cheek

Internet: bcheek@cts.com
BBS & FAX: 5:30-1:30 p.m. PDT: 619-578-9247
Compuserve: 74107,1176; FidoNet: 1:202/731

Rolling Your Own Resistors

Last month, I promised you hackers a slick project, and here it is. We're going to measure and fabricate ***precision, low-ohm resistors*** for an infinite variety of uses.

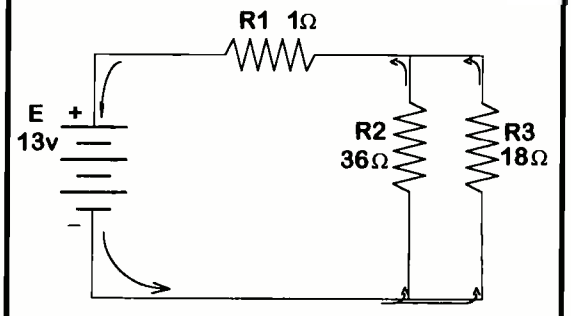
First, for the benefit of new readers and budding experimenters, let's define a resistor and look a little deeper into these innocuous, cheap, uninteresting components. *Uninteresting?* Well, after you've handled millions of them, resistors are not very exciting. They're as common as fleas on a junkyard dog and you don't pay them any mind, until the day you need one of a certain value and neither your junk box nor the catalogs has anything even close. I'm about to show you how to locate or make almost any low value resistor you may reasonably need.

What is a Resistor?

Imagine a jug of water with two holes in the bottom of it—one a pin-hole and the other the size of a quarter. Through which one flows the greater volume of water? That's the concept of electrical resistance. A resistor is just a "hole" of some fixed or variable size, through which electrons can flow. Now imagine a water faucet; it can be compared to a variable resistor—sometimes called a potentiometer, trimmer, trimpot, rheostat, volume control, etc. Just as a water faucet controls the flow of water through it, so, too, does a variable resistor control the flow of electrons.

Holes and faucets; fixed resistors and trimmers; get the idea? The purpose of a resistor is generally to limit current flow to that of some specified value. The purpose of two or more resistors in a circuit is to not only limit current flow, but also to ***divide*** a higher voltage into two or more lower voltages.

FIGURE 1



Problem: Solve the unknowns in this circuit

1. Calculate effective resistance (Re) of R2 & R3:
$$Re = \frac{(R2)(R3)}{(R2 + R3)} = \frac{648}{54} = 12\,\Omega$$
2. Calculate effective series resistance (Rt) of R1 + Re (R2 & R3)
Rt = R1 + Re = 1 + 12 = 13Ω
3. Calculate total circuit current: It = E/R = 13/13 = 1-amp
4. Calculate voltage drop across R1: E = (It)(R1) = (1)(1) = 1 volt
5. Calculate voltage drop across R2 & R3: (Note: R2 & R3 are in parallel, so the voltage across R2 must equal the voltage across R3) Given than 13-volts is supplied to the circuit and 1-volt is dropped across R1, the balance of 12-volts must be dropped across R2 & R3. Voltage across each of R2 & R3 = 12 volts.
6. Calculate current flow through R2 & R3:
Current through R2 = voltage across R2/R2 = 12/36 = 0.333 amp
Current through R3 = voltage across R3/R3 = 12/18 = 0.667 amp
Proof: Total current is 1-amp. Current through R2 and R3 = total current and 0.333-amp + 0.667-amp = 1 amp.

CONCLUSION: The circuit of R1 and (R2+R3) is a voltage divider

Fixed resistors are most commonly made in three types: carbon, carbon film, and metal film, but carbon resistors are pretty much history now in favor of the cheaper and more precise carbon film types. Radio Shack's 271-13xx and 271-11xx series are examples of carbon film resistors and are rated to be within ±5% of the specified value. This 5% tolerance is adequate for most needs, but when tighter accuracy is needed, we use precision metal film resistors. Radio Shack's #271-309 assortment pack offers examples of 1% tolerance metal film resistors, though the assortment lacks variety. DigiKey, Newark, and other supply houses carry large selections of precision metal film resistors.

TABLE 1

Common Carbon Film Resistor Values Ω

1	100	1-k	10-k	100-k
4.7	150	1.2-k	12-k	150-k
5.6	180	1.5-k	15-k	220-k
10	220	2.2-k	22-k	330-k
15	270	3.3-k	27-k	470-k
22	330	3.9-k	33-k	560-k
33	390	4.7-k	47-k	680-k
47	470	5.1-k	56-k	1-M
68	560	5.6-k	68-k	2.2-M
82	680	8.2-k	82-k	10-M

Common Resistor Values

Carbon film and metal film resistors come in more or less standard values. Metal film resistors are more expensive and generally not needed except where more exacting values are required and those cases are uncommon. Most hobbyist requirements will be satisfied with carbon film resistors; the most commonly available values are listed in Table 1. Metal film resistors come in a much wider range of values, too numerous to list here.

Unfortunately, 1-Ω is about the lowest resistance that's available in either type. Lower values of resistance are usually special purpose types such as *wirewound*, but fractional ohm resistors are almost impossible to find in values lower than 0.22-Ω. And when you do find them, they're called *meter shunts* and cost an arm and a leg.

Last month, however, we saw an application for a resistor with a value of 0.03-Ω. Well, I can tell you right now, you're not going to find anything of that nature for under a fistful of cash and a lot of hunting. But what if you can make your own for free? I'll show you how in a minute. Stick with me.

Burn Your House Down

Fractional value resistors are not widely known in hobby circles. The reason for relative obscurity is probably because a low ohm resistor cannot serve as a practical current limiter in hobbyist projects. Look at Ohms Law: ***Current (I) equals Voltage (E) divided by Resistance (R)***. Suppose we have a 12-volt power supply feeding a 0.03-Ω resistor:

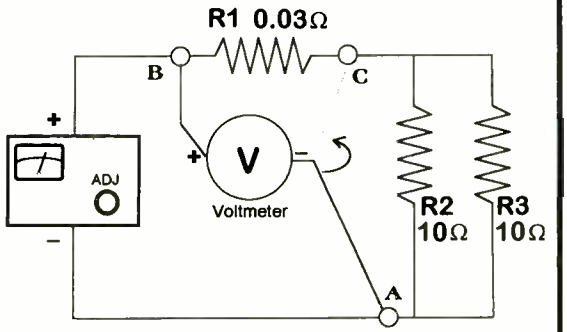
I = 12 ÷ .03 or, 400-amps.

Hey, arc welders don't produce 400-amps! See what I mean? The casual experimenter armed with a 12-v/400-amp power supply might burn his house down. There are situations, however, where fractional ohm resistors are used as *voltage dividers* or *current sensors* such as in last month's current-sensing IC project.

A simple voltage divider and its math analysis is presented in Figure 1. Study it for a moment so you can see how it works, and then consider how *sometimes* we may want to use a circuit that, in effect, is a voltage divider, but where we don't want any appreciable voltage division! Last month's require-

ment for a 0.03-Ω resistor is one example. It was used to "sense" current flow and to provide a proportional sample to an external analyzer circuit. At 1-amp, the voltage drop across a 0.03-Ω resistor will be 0.03-v, hardly enough to cause a problem in even most critical circuits. So yes, it's a voltage divider, but used as a current sensor.

FIGURE 2



1. Set Power Supply for 5.00 volts measured from A to B
2. Move voltmeter (-) from A to C and record the voltage drop across R1. Should be 29.8-mV (0.0298v) if R1, R2, R3, and the meter are accurate.

Roll Your Own

You can't just boogie down to Radio Shack and buy a $^3/_{100}$-Ω resistor, so you're going to have to make your own and here's how. First check your hobby electronics manuals for a Wire Table (common as colds) or refer to the specs below for a few solid copper wire sizes:

Wire Ga	Dia (mils)	Ohms per 1000-ft
0000	460.0	0.04901
28	12.6	66.17
29	11.3	83.44
30	10.0	105.2
31	8.9	132.7
32	8.0	167.3

These values were taken from the 1986 ARRL *Radio Amateur's Handbook*, and may differ slightly from other wire tables. Don't be concerned about differences of less than 5%.

You're thinking you don't want to mess with a thousand feet of wire, and no, you don't, but how about a *few inches* of common 30-ga wire-wrap wire (RS #278-501,2.3)? The resistance per 1000-ft has a linear distribution, so we can use an easy ratio and proportion equation to calculate exact lengths for low value resistors, like $^3/_{100}$-Ω, for example. The logical thought pattern is this: If there are 105.2 ohms per 1000-ft, then a wire with $^3/_{100}$-Ω is how long? Here's the simple math:

$$\frac{105.2}{1000} :: \frac{0.03}{X}$$

(Verbalized as: *"105.2Ω is to 1000-ft **as** 0.03Ω is to X-ft."*)

Cross multiply: (105.2)(X) = (1000)(0.03)
(105.2)(X) = 30
X = 30 ÷ 105.2
X = 0.285-ft
X = (0.285)(12) = 3.4"

Yes! 3.4-in of 30-ga copper wire has a resistance of 0.03-Ω. To make this resistor, allow $^1/_4$" at each end for the solder connections, so cut a piece of 30-ga wire exactly 4" long, or a fraction less. Wind it tightly into a coil around a $^1/_8$" drill bit shank or a ballpoint-pen refill. Slip the coil off; bend out the ends $^1/_4$"; spread the coils slightly so they don't short out to each other, and *voilá*! Squirt a glop of hot glue between the windings to make the resistor permanent. There's your 0.03-Ω resistor, ready to go!

Don't believe me?

Let's Test It

You'll need a variable DC power supply of about 13.8-v, at 1-amp, and a known good fixed resistor of some reasonably low value like 5Ω or less. You can use two of Radio Shack's 10Ω/10-watt resistors, #271-132. Wire them in parallel with each other and in series with your new homemade resistor as shown in Figure 2. The two 10Ω resistors make an effective 5Ω resistor in series with your 0.03-Ω resistor, and the analysis is then done as shown in Figure 1.

Circuit current will equal 5v ÷ 5.03Ω or .994-amp. Voltage across R1 = (.994)(0.03) or about 29.8-millivolts (0.0298-v). If you have a fairly accurate digital voltmeter, and if you made the resistor correctly, then that's what the meter will read. Wrap it up; time to party!

Time Out for Theory

The resistivity of a material varies with its temperature. Copper wire isn't too bad in this respect, but if your low ohm resistors are to be used from below freezing to above boiling, it would be a good idea to know how the resistance will vary over that spread.

Low resistance is a science unto itself. Zero ohms simply do not exist, but there is a whole universe between zero and 1-ohm, and another universe between 1-ohm and ∞ (infinity). Don't even try to use an ohmmeter to measure low value resistors. *Contact resistance* alone will screw up the validity of such measurements.

Contact resistance? You bet! Set your ohmmeter to its lowest scale and short the two leads together to make zero ohms, right?Wrong. The resistance of mechanical contact varies from a few hundredths of an ohm to a half ohm or more. Ohmmeters almost always involve four mechanical contacts: two where each lead plugs into the meter, and the other two ends that connect to the device. Each contact can be assumed to have about a tenth of an ohm.

Know why babies are rarely killed when they stick things into wall sockets? Dry skin contact resistance is usually several thousand ohms. Know why not too many adults survive the same 117-VAC when a lamp drops into the bathtub with them? Wet skin has a contact resistance of only a few ohms or less. Current kills; not voltage.

Do you know why power companies use 500,000-volts/up transmission lines for long distance? Money! 500-mi of 4/0 copper (0.04901Ω per 1000-ft) has 129Ω. If the current were 100 amps, the power loss would be (I^2R) 1,290,000 watts at a rate of about $150 per hour. That's cheap by comparison to the $15,000/hr loss if the power were transmitted at 50,000-volts. The principle is this: for a given amount of power, ten times the voltage means one tenth the current. One tenth the current over a fixed resistance is 100 times the savings! The moral is that YOU can use fractional value resistors around shop and shack for a variety of sensors and not pay a steep price in circuit losses.

Next month, more propagation analysis and a neat idea from our first *Ultimate Scanner* recipient

Contest Time

Remember my offer for the next ten months: submit an idea or a project for this column and if selected, you'll receive an autographed copy of my latest book, *The Ultimate Scanner.*

W. Clem Small, KR6A, CET

Signal Fading and Diversity Reception

The automatic gain control (AGC) built into your receiver does its best to keep signals constant as they fade, but there's a limit to what AGC can do. That limit occurs when the received signal fades so low that it cannot be heard with the RF and AF gain turned all the way up. When this happens one recourse is to utilize some form of diversity reception. Diversity reception is the utilization of more than one (i.e., diverse) means of receiving a signal, and this month we will discuss several kinds of diversity.

Diversity Systems

Space Diversity: In space diversity the receiver has more than one antenna potentially available, and these antennas are spaced far apart (in terms of signal wavelength). When the signal fades on one antenna it is quite possible that this same signal will be strong enough to be received well at the location of one of the other antennas. To capitalize on this fact, as the signal fades, the space-diversity receiver-system has a means of automatically comparing the signal strength on each antenna and selecting the antenna with the best signal level. That antenna is then automatically connected to the receiver.

Polarization Diversity: Antennas possess what is called "polarity" in that they respond best to signals whose electrical fields are oriented in the same plane as the antenna's active elements. Antennas with main elements which are predominantly horizontally oriented have horizontal polarity, and those with predominately vertical elements have vertical polarity. If the elements are slanted between horizontal and vertical then their polarity is somewhere in between horizontal and vertical.

A horizontally oriented halfwave dipole will therefore receive horizontally polarized signals better than it will receive vertically polarized signals. As a matter of fact, the response, in terms of output, to signals with the same polarity as the antenna are usually in excess of 20 dB greater than to signals with polarity 180 degrees to that of the antenna. Thus the horizontal dipole just mentioned could give over 100 times more output in response to a horizontally polarized signal than it would to a vertically polarized signal.

As shortwave signals pass through the ionosphere they are caused to vary in polarity (the orientation of the signal's electric field). As you can guess, this varying polarity can cause varying levels of signal fading when the signal's polarity does not match that of the receiving antenna. Polarization diversity can reduce this fading. For polarization diversity we generally have one vertically and one horizontally polarized antenna and a means to continually and automatically select the antenna which is giving the best signal output.

Other Kinds of Diversity: Space diversity and polarization diversity both depend on antenna factors. There are also other kinds of diversity that don't depend on antennas, but on differences at the transmitter. One of these is frequency diversity, in which information (a shortwave program, for instance) is transmitted simultaneously on more than one frequency; each frequency is monitored by a separate receiver and the frequency having the best reception is automatically selected by the diversity circuitry.

Another kind of diversity is time diversity in which the transmitted information (such as a shortwave-broadcast program or a "packet" of information in packet radio work) is transmitted more than one time. This gives more than one chance to receive the signal, and improves reception reliability.

Variations

In practical terms monitoring station operators can sometimes benefit from what I'll call "quasi diversity." Most diversity systems are quite complex and expensive; many require special receivers or attaching adapters to specific circuits inside your receiver. We will avoid that—for this present column anyhow—and concentrate on simpler ways in which we can employ diversity to help with fading problems.

Space diversity generally gives more improvement on fading signals than does polarization diversity, so choose space diversity if you have some space. Put up two antennas separated by as much distance as is practical. Ideally they would be separated by 5 to 10 wavelengths, but most of us can't manage that so do the best you can. Connect both antennas to one switch (fig. 1) and when the signal fades switch antennas. On HF most any switch will work OK for switching receive-only antennas.

For quasi polarization-diversity use the same technique described in the last paragraph, except the antennas can be close together—one oriented for horizontal polarization and the other for vertical polarization.

Happy diversifying; drop me a line and tell me your experience with this diversity setup.

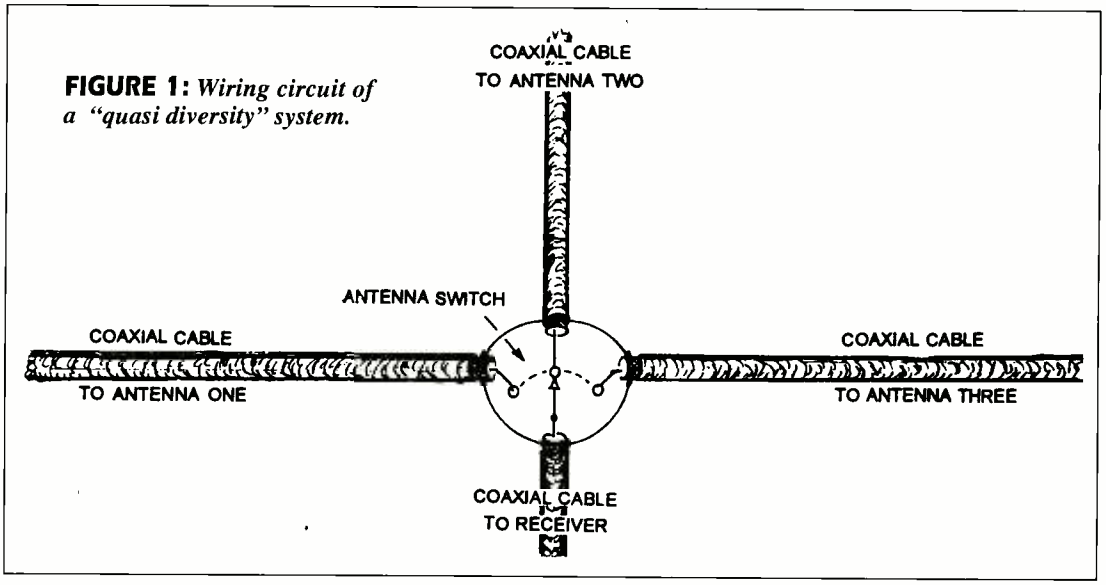


FIGURE 1: *Wiring circuit of a "quasi diversity" system.*

A Limp Radial Quarterwave Antenna

Randy Fouch (4021 B Park Center, Fremont, CA 94538) sells some unique, full-length, quarterwave whip antennas with a built-on limp radial. I tested his two-meter model against the rubber duck antenna in my handheld and got a 7-dB increase in transmitted power; the same gain should be found for receiving. When I added a limp radial to my rubber duck antenna the Fouch antenna was still half an S-unit ahead (3 dB). The antenna is nondirectional and made with a strong, light, tough, twisted-wire, vertical element. You can order these antennas for any VHF or UHF scanner frequency. There are also some dual-band designs as for the 440 MHz and 1.2 GHz ham bands. Profits from these antennas go to help the Alameda California County Emergency Service. Cost is $10.00 plus $2.00 S/H.

RADIO RIDDLES

Last month:

Last month I said " ... when an antenna technician or engineer talks about an "electrically short antenna" they could be talking about an antenna an inch or less long or a mile or more long! How can this be?"

Well, most antennas are designed with resonant elements, the most common being a halfwave in *electrical* length. The electrical length of a half-wavelength element is just that: a half wavelength long. But a halfwave antenna's *physical* length—the kind you measure with a yardstick or meterstick—varies depending on the operating frequency of the antenna.

The *physical* length of a dipole which is *electrically* a half wavelength long at 100 MHz is 4.68 ft; at 10 MHz it is 46.8 ft; at 1 MHz it is 468 ft; and at 10 kHz it is over 8 miles long! Radio communications can be (and is), accomplished with some really low frequencies so let's consider a half wavelength at 1 kHz: over 80 miles long. Thus, an electrically short antenna at 100 MHz would be some fraction of the 4.68 ft half wavelength, but an electrically short antenna at 1 kHz would be a fraction of 80 miles, this "short" antenna could be miles long!

It is of interest to mention here that, in regard to short antenna performance, one reason for the success of small antennas on the shortwave band is that quality of reception is largely determined, not by the length of the antenna, but by the ratio of the signal level to the level of electrical noise present with the received signal. Since this signal-to-noise ratio, rather than absolute received-signal level, largely determines quality of reception, we find that electrically short antennas often function quite well as receiving antennas on the shortwave (HF) band.

This Month:

MT reader Michael Ormandy recently wrote to ask a question which inspired this month's Radio Riddle: if a 1/4 wave antenna has reasonable gain, a 5/8 wave even more, then why not use a full wave antenna for even more gain? He asks "Would not it be better in theory? If not, why not?"

We'll have the answer to this month's riddle and much more in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, and 73.

ASK BOB

ANSWERS TO YOUR RADIO QUESTIONS

Bob Grove, WA4PYQ

Q. *When you know the ERP (effective radiated power) of two transmitters which are causing intermod, can you compute the ERP of the resultant intermod signal? (Heather Peel, Oakville, ONT)*

A. No. The ERP of the transmitters is a combination of their power output and the gain of their antennas. The amount of intermodulation you may experience is determined by your location respective to the two transmitter antennas, the gain and directivity of your antenna, and the dynamic range of your receiver.

Theoretically, if you could compute all of the variables that contribute to your intermod, you could trace it back to the ERP levels of the original transmitters, but there is no general equation that would work satisfactorily in all cases.

Q. *I recently bought a used SBE OptiScan (Model No. SBE-12SM) manufactured by Linear Systems in Watsonville, CA. I wrote for information, but my letter came back undeliverable. Where can I get information on operating and programming this scanner? (Wesley Loven, Spruce Pine, NC)*

A. Unfortunately, Linear Systems went belly-up nearly two decades ago. If any of our readers can help Wesley out by providing hints on programming or how to make his own programming card, we'll be happy to forward the information to him.

Q. *Why aren't longwave frequencies used for broadcasting anywhere besides Europe? (Hugh Waters, Singapore)*

A. There are quite a few in the former Russian republics, Turkey, Poland and even the U.K., but these lower frequencies require enormous antennas for reasonable efficiency, and in the tropics, atmospheric noise is prohibitive. Since early experiments in broadcasting were conducted at the lower frequencies, they are maintained more out of tradition than performance.

Q. *What are "mail drops" as referred to in the MT "Outer Limits" column? (Michael Foley)*

A. Because pirate broadcasting is illegal, mail to them is "laundered" through a forwarding service, usually a sympathetic volunteer who, in turn, either delivers it or mails it to the pirate. This is why three stamps are requested if you wish a QSL: one for the drop to the pirate; one for the pirate back to the drop; one for the drop back to you.

Q. *Why does single sideband sometimes sound better on my Drake R8 receiver when I listen in the CW or RTTY mode? (Donald Kidder, Ashland, ME)*

A. The R8 audio tone control affects bass, not treble; when we choose a narrower filter for

Bob's Tips of the Month

Tuning Improvements:

Radio Shack DX390 (Sangean ATS818) and DX440 (Sangean ATS803A)

MT reader Jon Schwartz forwarded two useful mods which he found in the DX Ontario newsletter, Pacific Northwest-British Columbia DX Club newsletter, and a previous issue of *MT*. We assume no responsibility for damage caused by attempting these procedures.

Defeating Audio Mute when Tuning the DX390/ATS818

Tools required: Small screwdriver, wire cutters.

1. Remove any batteries and the five screws from the back of the radio, including one behind the battery cover. Gently remove the back and place the radio face down on a cloth to avoid marring its face.
2. Locate the two wire bundles under the large circuit board and find connector CNT1 on the shorter, 12-wire bundle.
3. Select the green wire, third from the end, and cut it midway so that it can be resoldered if desired later.
4. Reassemble the radio; your modification is complete, enabling you to turn the tuning dial without muting the audio so that you won't miss weak stations.

Non-Chuff Tuning for the DX440/ATS803A

1. With the radio face down on a soft cloth, remove the D cells and six screws holding on the back, including one in the battery compartment. Remove the back carefully so as not to damage the antenna wire.
2. Locate the grey, eight-wire ribbon cable running from the circuit board above the loudspeaker to the center of the radio. Carefully pry the connector loose.
3. Identify the second wire from the left (the side farthest from the speaker) and bend the wire pin at right angles so that it will not connect when the plug is reattached.
4. Reinsert the plug carefully and reassemble the radio. The dial may now be tuned without the annoying "chuffing" sound which characteristically accompanies the dial turing.

Questions or tips sent to "Ask Bob," c/o *MT*, are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of *MT*.

SSB reception, we lose even more treble which is at the outer edges of the signal, muddying the sound further. The CW and RTTY detectors, however, shift the filter to the outer edge of the signal which emphasizes treble, crisping the sound. The new Drake R8A has addressed that problem with an excellent tone control.

Q. *If a licensed radio amateur is imprisoned, does he lose his right to use ham radio? (Hugh Waters, Singapore)*

A. Only if restricted by prison officials, or if the amateur was found guilty of using his radio for illegal purposes, contributing to the sentence.

(Continued from Page 4)

of the new book, *The Zenith Trans-Oceanic, The Royalty of Radios*, learned its history and how to tune its circuits. With this 30 year old set I have been tuning in those 'fed bashing' shortwave stations to find out what the President is so upset about.

"I thought that I had a magazine that would promote the activity of listening to shortwave radio and certainly would promote the First Amendment rights of shortwave broadcasters. I was disappointed in the Glenn Hauser article, "OKC: The Radio Aftermath."

"I expect *Monitoring Times* to promote the shortwave listening hobby, its broadcasters, merchandisers, and aficionados all. I notice you give factual and light-hearted reportage to the pirate stations that are in fact breaking the law and do not deprecate these individuals. Please do not involve *Monitoring Times* in the politically correct crowd's bashing of individuals who disagree with their point of view."

• Thanks for your views on the matter. I do have one thing to add: While at first glance it might seem that any curbing of programming is an infringement on a broadcaster's constitutional rights, that isn't necessarily so. They do have a responsibility which differs from that of a domestic broadcast. Bob Grove directs our attention to the international agreement, Part 73.788 of the Code of Federal Regulations:

> "A licensee of an international broadcast station shall render only an international broadcast service which will reflect the culture of this country and which will promote international goodwill, understanding, and cooperation. Any program solely intended for and directed to an audience in the continental United States does not meet the requirements for this service."

Measured by this yardstick, many programs now being aired stand up very poorly. Some talk shows betray themselves when the only phone number they publicize is an 800 number usable only in the United States. And all of us can call to mind programs which neither promote international cooperation, nor are directed to an international audience. ... But that's enough politics for today.

Where Has All The DX Gone?

Speaking of what the hobby is, was, or should be, Simon Scheiner of Cherry Hill, New Jersey, muses about the future of the DX hobby and its clubs. "I think there simply isn't as much excitement available in the way of DXing these days. Gone are the days when every third world country, island paradise, etc., had at least some tropical band broadcasting. I sometimes tune through 60 meters at night and where there once were, for example, many Brazilians and other Spanish language stations, there are *very* few and increasingly fewer such transmitters.

"If you've just bought your first HF receiver, I suppose for a time it's exciting to receive even the BBC, but that's not the 'meat' which traditionally has been what attracted DXers and formed the backbone of club publications.

"There's always utility DXing, but HF is not a primary source of communication for most of the world today. It's so easy to use a satellite, and much more reliable.

"Well, there's always VHF/UHF, but, though *MT* has tried to create an impression that there might be excitement tuning, for example, 'exotic' US government law enforcement, etc. Hobbyists and scanner owners are unlikely to hear anything in the clear more 'exciting' than a beginning or ending mileage report!

"I think it is more than likely that technology has passed well beyond the modes that hobby units can process. I shake my head in disbelief when I see articles written about effectively 'DXing' PL tones and the like!" Do hobbyists try to eke out some excitement from data transmission because that's about all they have left to them? "I think satellite 'DXing' might still offer some excitement, though analog voice changing to digital may dampen this, too, in time."

I think what simon has discovered is typical of any hobby based on technology; to keep the excitement going you can't stand still. You either stay on the cutting edge of the hobby, as radio amateurs traditionally have, or find your excitement in other ways, such as in kit-building or reviving old radios. It's like we tell our teenage daughter—you don't have to be bored unless you choose to be.

Tail 521, Where Are You?

Ray Knuth of Oscoda, Michigan, is a self-confessed "CW freak."

Ray's love of CW has little to do with amateur radio. He flew in C-130 B model aircraft as a Morse code interceptor, and monitored Soviet, Chinese, North Korean, and Vietnamese traffic. "Most of our planes came from Greenville, Texas. Our crews were known as 'Bats'—not to be confused with 'Ravens,' who were strictly ECM guys who usually flew RB-66s.

"I still sit here at home with my Realistic Astronaut 8 shortwave and listen to CW from all over the world, including the Soviet Union. I'm a retired policeman and going to take a test for my ham license. I've only been putting it off for 30 years. It's been driving me crazy not to be able to get on the old key and converse around the world."

Ray's question of other *MT* readers is if anyone has a picture of Vietnam-era planes with tail number #521-535. If you do, write him c/o the Editor, and we'll be happy to put you in touch with him.

Make your plans now to attend the Grove Expo '95. With scanning, shortwave, and satellite seminar tracks, it's the best of monitoring, times three!

Letters to the Editor are always welcome at PO Box 98, Brasstown, NC 28902. Letters may be edited for clarity and brevity.

October 13-15, 1995. See pp. 18-19 for details.

When Your Equipment is Ailing or Needs a Mod

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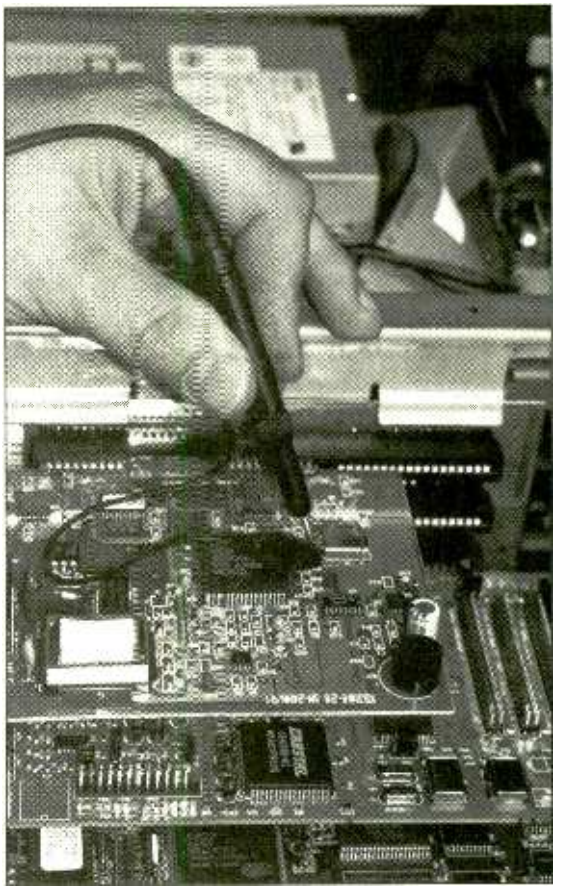

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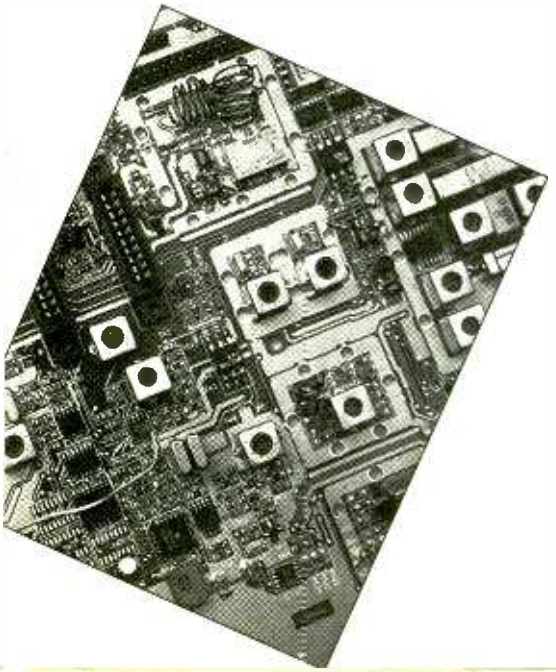

Here's All You Need to Do:

1. **Call the Grove Technical line at 704-837-7081 to discuss your request.**
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Grove Enterprises, 300 S. Highway 64 W., Brasstown, NC 28902

All Ohio Scanner Club: Dave Marshall, 50 Villa Rd., Springfield, OH 45503-1036. U.S. northeast of the Mississippi; VHF/UHF/HF utilities. Net Mon 9:30pm 146.940. *American Scannergram.* $18 U.S, $21 Can/Mex, $28 ww. $3 sample. Annual summer meeting.

American SW Listener's Club: Stewart MacKenzie, WDX6AA, 16182 Ballad Lane, Huntington Beach, CA 92649, (714) 846-1685. Western US, Pacific, Asia. SWBC, utilities, longwave, clandestine.*SWL.*$20 US, $22 Can/Mex. $1 sample ($2 ww). Meets1st Sats 10am address above.

Association of Clandestine Enthusiasts (A.C.E.): Kirk Baxter, P.O. Box 11201, Shawnee Mission, KS 66207. US, Europe and Middle East; Pirate and clandestine. *The A.C.E.* $18 US, $19 Can/Mex, $25 ww.

Association of Manitoba DX'ers (AMANDX): Shawn Axelrod, 30 Becontree Bay, Winnipeg, Manitoba, R2N 2X9 Canada, (204) 253-8644. Manitoba; LW, MW, SW, and VHF/UHF. Meets monthly. $2.

Bay Area Scanner Enthusiasts: Bruce Ames, P.A.O., 105 Serra Way #363, Milpitas, CA 95035, (408)267-3244. Western U.S.; 25+ MHz. *Listening Post* (bi-monthly). Meets 2nd Mons. 7:30 Milpitas Police Admin Bldg. $25 US, $2 sample, or SASE for info.

Bayonne Emergency Radio Network (BERN): Ray Baron/Bob Frasca, P.O. Box 1203, Bayonne, NJ 07002-6203, 1-800-286-2876. Metro NJ, NY; Fire/disaster, pub safety.

Bearcat Radio Club: Larry Miller, Box 360, Wagontown, PA 19376, 1-800-423-1331. National. Scanning only. *National Scanning Report* (bi-monthly). $17.50 or $29.90, $5 more Can. $3 sample.

Boston Area DXers: Paul Graveline, 9 Stirling St., Andover, MA 01810-1408, (508)470-1971, 50 mile radius Boston; 3-30 MHz. Meets 3rd Fris 7:30pm, The Lexington Club, Rte 4/225 1/4 mi W of Rte 128.

Canadian Int'l DX Club: Sheldon Harvey, 79 Kipps St., Greenfield Park., Quebec, Canada J4V 3B1, (514)462-1459. Canada nationwide/ membership open to all; General coverage. *The Messenger.* $26 Can, $25 US, $US28 or $Can35 ww. $2 sample. Meets 2nd Tues 7pm Montreal; several annual events.

Capitol Hill Monitors: Alan Henney, 6912 Prince Georges Ave, Takoma Park, MD 20912-5414, (301) 270-2531/5774 fax. DC, MD, No.VA, So.DE. Scanner bands. Frequency Forum BBS 703-207-9622 (8-N-1) Net 1st & 3rd Mons 7:30pm 146.91. *Capitol Hill Monitor.* $8. Meets irregularly.

Central Florida Listeners Group: Andy Fountain KD4OKJ, (407)898-6784. Central Florida; All bands. Net on 146.73 MHz Sun 8 pm. Meets 2nd Sats 12 noon. Conf#10 on Laser BBS (407)647-0031.

Central Indiana Shortwave Club: Steve Hammer, 2517 E. DePauw Road, Indianapolis, IN 46227-4404. Central Indiana; SW broadcasting, pirates, and the offbeat. *Shortwave Oddities.*

Central VA Radio Enthusiasts: Richard Rowland, POB 34832, Richmond, VA 23234-0832. Metro Richmond and vicinity. VHF/UHF. SASE: No newsletter, no dues. Meets quarterly in Richmond.

Chicago Area DX Club: Edward G. Stroh, 53 Arrowhead Dr., Thornton, IL 60476. 300 mile radius of Chicago; DXing all bands. *DX Chicago.* $17, $1 sample. Meets irregularly.

Chicago Area Radio Monitoring Association (CARMA): Ted & Kim Moran, 6219 N. Greenview, Chicago, IL 60660-1815. Chicago & midwest. Public safety & general coverage. SCUG/CARMA BBS (708)852-1292. *CARMA Newsletter.* Meetings (Sats) and newsletter bi-monthly on alternate months.

Colorado Shortwave Listeners Club: Rob Harrington N0NNI, P.O. Box 370593, Denver, CO 80237-0593, 303-756-9455. Longwave, shortwave. *Colorado Shortwave Listener* (4x) 35 cents each, or Internet nonni@filebank.com. Meetings cancelled remainder of '95.

Communications Research Group: Scott Miller, 122, Greenbriar Drive, Sun Prairie, WI 53590-1706. Wisconsin area. Scanning.

DecalcoMania: Paul Richards, P.O. Box 126, Lincroft, NJ 07738, (908)591-2522. Worldwide AM, FM and collecting radio related items. *DecalcoMania.* $10 US, $11 Can/Mex, $16 Eur, $17.50 Asia/Pac.

Drake SPR4 Int'l Club: Bill Swiger, Route 1, Box 142A, Bridgeport, WV 26330. Worldwide; Drake SPR4 owners.

Fire Net: Tom Kravitz, Box 1307, Culver City, CA 90232, 310-838-1436, internet mpage@netcom.com. All of California; fire, EMS, tied in with nationwide notification net.

Global DX Club: David Williams, P.O. Box 1176, Pinson, AL 35126-1176; Internet: XYVD51A@Prodigy.Com. Worldwide; all bands. *Radio Waves* (bi-monthly). $1 sample. Meets monthly.

Houston Area Scanners & Monitoring Club: Glen Dingley, 909 Michael, Alvin, TX 77511, (713) 388-1941. 75 mile radius of Houston, TX; scanning & SW. Paging network. *HASMC Newsletter.* Meets Jan & June.

Hudson Valley Monitors Association (HVMA): Patrick Libretti, P.O. Box 706, Highland, NY 12528. Mid-Hudson valley and surrounding counties; VHF/UHF, public safety. *The Hudson Valley Monitor.*

International 11 Meter Alliance: Allen Newton, Rt. 1 Box 187-A, Whitney, TX 76692, (817) 694-4047. Public safety, traffic handling, all bands, esp. 11 meters.

Int'l Radio Club of America (IRCA): Ralph Sanserino, P.O. Box 1831, Perris, CA 92572-1831. Worldwide; BCB/AM DX. *DX Monitor (34 x)* $25 US, $27 Can/Mex, $28.50 ww. $.29 or 2 IRCs sample.

Longwave Club of America: Bill Oliver, 45 Wildflower Rd., Levittown, PA 19057, (215) 945-0543. Worldwide; Longwave only. *The Lowdown.* $18 US, $19 Can/Mex, $26 ww.

Listeners' Nets

You are invited to post your North American amateur radio net in this bi-monthly listing if its primary emphasis is devoted to the radio monitoring hobby (not amateur radio).

Capitol Hill Monitors
146.91 MHz 1st & 3rd Mon 7:30pm ET, DC, Md, N.Va, S.Del; Scanning and amateur radio
Frequency Forum BBS 703-207-9622 [8-N-1]
Net Mgr: N3RDC, John Korman
Call Alan Henney 301-270-2531 or John Korman 301-299-5455 for info
Newsletter $8; 6912 Prince George's Ave, Takoma Park, MD 20912-5414

Central Florida Listeners Group
146.730 MHz, Sun 8pm ET, Central Florida; any radio communications outside amateur bands
Net Mgr: Andy Fountain, KD4OKJ
Telephone gateways announced; CFLG BBS conference on LASER BBS 407-647-0031
Call Andy Fountain, KD4OKJ, (407)898-6784 for info

Larkfield's ARC SW-Scanner Net
147.210 MHz, Fri 8pm ET, Long Island, NYC, NJ, Conn; Shortwave BCers & utes, MW, amateur radio, scanning
Net Mgr: Hank Lukas, N2GCN
Open to all amateurs on air; by letter for scanner listeners
Contact: P.O.Box 115, Plainview, NY 11803-0115

Listening Post
147.03, 224.96, 447.725 (W3DID/R), Sun 8pm, Baltimore and metro area; non-amateur transmissions DC to Daylight except ECPA-related items or tacticals
Net Mgr: Mike Agner KA3JJZ
Open to all amateurs on air; by maildrop at: 6710-F Ritchie Hwy #236, Glen Burnie, MD 21060.
Packet: KA3JJZ @ WB3FFV.md.ena.usa

Montreal DX Listeners Net
146.910 MHz, Sun 8:15 pm ET, Montreal PQ area; MW SW, & Scanner
Net Mgr: Sheldon Harvey VE2SHW
Telephone gateways announced

Monitoring the Long Island Sounds Net
146.805 Tues 8pm ET, Long Island, NY; Primarily scanning
Net Mgr: WB2RVA, 2134 Decker Ave, North Merrick, NY 11566

Monix SW and Scanner Listeners Info Net
146.835 MHz, Thurs. 9:30 pm ET; Cincinnati/Tri-State Area; All band
Net Mgr: Mark Meece, N8ICW, (513) 777-2909 (no collect calls)
Open to all amateurs; Telephone gateways to net mgr up to 1/2 hr before net; The Listening Post BBS (513) 474-3719

New York DX Association
146.880 Mon 9pm ET, NYC area; "DC to Light"
Net Mgr: Charles Hargrove N2NOV, 723 Port Richmond Avenue, Staten Island, NY 10302-1736
Voice mail 1/2 hr before net: 212-978-3375; Compuserve 73167,312

Northeast SW Listeners and Scanners Net; Rip Van Winkle Society
147.21 MHz (WB2UEB) Wed 8pm, Albany, NY, area.
Net Mgr: Ray Loeper N2RAD

Ontario DX Association - Listeners Net
442.375+ (VA3ODX; 103.4Hz CTCSS tone), Sun 8:30pm ET; Toronto area coverage; LW, MW, SW, FM, VHF/UHF topics discussed
Net Mgr: Stephen Canney, VA3ID
Open to all; repeater used daily by ODXA members

Rocky Mountain Monitoring Net
147.225, 224.980 Denver; 145.460 Boulder; 145.160 Colorado Springs Sun 20:00; communications monitoring
Brian Gould, KB0MEP, Mt. News Net

Shortwave Listeners Net, Association of North American Radio Clubs
7.240 MHz LSB, Sun 10am ET, Eastern US; Shortwave broadcasts and utilities
Net Mgr: KW3F, 238 Cricklewood Circle, Lansdale, PA 19446
Telephone gateways announced

Southern Wisconsin SW Listeners Net; MARA
147.150 MHz, alt 146.760 MHz. Madison, WI, area
First Sun 8pm CT. Shortwave, scanning, dc to daylight, equipment notes and comments.
Net Mgrs: N9LTD, KA9SRU, N9EWO
Contact: N9EWO, Dave Zantow, 1609 Ontario Drive, Janesville, WI 53545

SPECIAL EVENT CALENDAR

Date	Location	Club/Contact Person
Sept 1-3	Long Beach, CA	SW Div Conv / Sandi Heyn WA6WZN, 962 Cheyenne St, Costa Mesa, CA 92626, 714-549-8516
Sept 1-4	Aurora, CO	Nat'l Radio Club Convention / Location: Hampton Inn, 303-369-8400. I-70 to Denver Metro Area, I-225 to Mississippi Ave Exit, East to S. Abilene St. Reg $40
Sept 2	Indianapolis, IN	Evansville ARS / Marty Hensley KA9PCT, 6426 Maidstone Rd, Apt 206, Indianapolis, IN 46254, 317-387-9667
Sept 2-3	Alamogordo, NM	Alamogordo ARC / Mary Moore WB5ITH, 1830 Corte Del Ranchero, Alamogordo, NM 88310, 505-437-0145
Sept 2-3	Shelby, NC	Shelby ARC / June Melvin WA4JNJ, 902 Henry St, Kings Mountain, NC 28086, 704-739-2583
Sept 8-10	Arlington, TX	ARRL Digital Communications Conf, TAPR & Texas Packet Radio Society / TAPR, 8987-309 E Tanque Verde Rd #337, Tucson, AZ 85749-9399, 817-383-0000. Location: La Quinta Conference Center, Arlington, TX
Sept 9	Erie, PA	RA of Erie / Tom McClain N3HPR, 3954 Solar Dr, Erie, PA 16506, 814-833-1640
Sept 9	Rolling Meadows, IL	W9DXCC Conv / William McConnell N9US, 2511 Arlingdale Dr, Palatine, IL 60067, 708-397-9593
Sept 9	Ft Wayne, IN	Fort Wayne RC / Cliff Shreve, 3412 Parnell Ave, Ft Wayne, IN 46805, 219-483-2526
Sept 9	Spencer, IN	Owen County ARA / Kathryn Smith KB9INU, Rt 1 Box 368D, Poland, IN 46868, 812-829-2140
Sept 9	LaPorte, IN	Laporte ARC / PO Box 30, LaPorte, IN 46352, Location: LaPorte Co Fairgrounds, Talk-in 146-61- (131.8 PL) & 146.52 Simplex, 8am-2pm
Sept 9	Ballston Spa, NY	Saratoga RACES / Donn Slocum KF2AB, 12 Par Del Rio, Clifton Park, NY 12065 or Lenny N2KKP, 518-885-4933 (leave msg) Location: Fairgrounds, Ballston Spa, NY, Talk-in 147.24/147.84, 14700/146.40, open 7am, Adm $4
Sept 10	Joliet, IL	Bolingbrook ARS / Marti Barton KA9ZJJ, 345 Gehrig Circle, Bolingbrook, IL 60440, 708-759-6230. Location: Inwood Recreation Center, 3000 W Jefferson St (RT 52) Joliet, IL, Talk-in 147.33 +600 kHz, 224.54 -1.6 MHz, 146.82 -600 kHz, Open 8am, Adm $5
Sept 10	Gaithersburg, MD	38th Annual FAR Fest / Al Brown, 301-490-3188, Location: Montgomery County Agricultural Center (Fairgrounds) Gaithersburg, MD,Exit 11 off I-270, Talk-in 146.955-, 443.400+ & 146.52, Open 8am, Adm $5
Sept 10	Brewster, NY	PEARLFEST, Putnam Emerg & AR League / Shirley Dahlgren N2SKP, PO Box 677, Verplanck, NY 10596 (914) 736-3558. Location: JFK Elmentary, Foggintown Rd. follow signs Rt 84 exit 19. Talk-in 145.130-, $5 admission.
Sept 10	Butler, PA	Butler County ARA / Gerald Wetzel W3DMB, 784 Mercer Rd, Butler, PA 16001-1108, 412-282-6777
Sept 15-17	Peoria, IL	Illinois State Convention / Ron Morgan KB9NW, PO Box 3508, Peoria, IL 61612-3508, 309-694-5009
Sept 16	Hamburg, NY	Western NY Conv/Buffalo Hamfest / Harold Smith K2HC, 300 White Spruce Blvd, Rochester, NY 14623, 716-424-7184
Sept 16	Randolph, VT	Central Vermont ARC / Robert McCorkle WB1AJG, PO Box 353, Williamstown, VT 05679-0353, 802-433-6172
Sept 16-17	Portland, OR	Hoodview ARC / Mary Lou Zehender WQ7V, 15226 NE Clackamas St, Portland, OR 97230, 503-254-8086
Sept 17	Newtown, CT	Candlewood ARA Western CT / Keith Weigh KD1DD, Box 3441, Danbury, CT 06813-3441, 203-743-9181, Location: Edmond Town Hall, RT 6, Talk-in 147.12/.72, 9am-2pm, Adm $4 / Special Event: Will operate W1QI 1300-1700 UTC, to commemorate 55 years affiliation with ARRL, On or near 7.280 and 14.280. Send QSL and 9x12 in SASE to CARA, Same Addr, . Further info contact John Ahle N2DVX, 120 Fire Hill Road, Ridgefield, CT 06877, 203-438-6782
Sept 17	Cincinnati, OH	Greater Cincinnati ARA / John Haungs WA8STX, 10615 Thronview Dr, Cincinnati, OH 45241, 513-563-2822
Sept 17	Cambridge, MA	MIT Radio Soc & MIT Electronics Research Soc / Steve Fineberg W1GSL, PO Box 397082 MIT Branch, Cambridge, MA 02139-7082. Tailgate electronics, computer, amateur radio FLEA MARKET - 9am-2pm. Albany & Main St. Admission $2. Free parking. Talk-in 146.52, 449.725/444.725 - pl 2A - W1XM/R
Sept 17	Mt. Clemens, MI	L'Anse Creuse ARC / Mark Castiglione N8REZ, 26279 Fairwood St, Chesterfield, MI 48051-3031, 810-949-2508
Sept 17	Woodbury, NY	Long Island Mobile ARC / Neil Hantman WE2V, 2 Majestic Court, Dix Hills, NY 11746, 516-462-5549
Sept 22-24	Miltn-Freewatr, OR	Eastern Washington Conv / Jack Babbitt WA5ZAY, PO Box 951, Walla Walla, WA 99362, 509-525-7003
Sept 23-24	Virginia Beach, VA	Virginia State Conv / Art Thiemens AA4AT, 2836 Greenwood Rd, Chesapeake, VA 23321, 804-484-2857.
Sept 23-24	Grayslake, IL	Chicago FM Club / Richard Hersh K9FFY, 6614 N Francisco Av, Chicago, IL 60645, 312-764-5864. Location: Lake Co Fairgrounds, Rts 45 & 120, Grayslake, IL, Talk-in 146.16/76 MHz (PL 107.2 Hz) 8am-4pm, Adm $6
Sept 24	New Port Richey, FL	Suncoast ARC / Tim WD8MVU, PO Box 1992, New Port Richey, FL 34656-1992, 813-848-0353. Location: New Port Richey Recreation Ctr, US Hwy 19 to Main St, east 1.5 mi to Van Buren, left 1 mi on right, Talk-in 147.150 Dist & 145.350 Loc, 9am-3:30pm, Adm $5
Sept 24	St Charles, MO	St Peters ARC / Jay Underdown W0OGS, 58 Judy Drive, St. Charles, MO 63301, (314) 723-4200. Location: St Charles Community College.
Sept 24	Yonkers, NY	Metro 70cm Network / Otto Supliski WB2SLQ, 53 Hayward St., Yonkers, NY 10704, 914-969-4897
Sept 24	Cleveland, OH	Hamfest Assoc of Cleveland / Glenn Williams AF8C, 513 Kenilworth Rd, Bay Village, OH 44140-2476, 216-835-4897
Sept 30	Peru, IN	Miami County & Cass County ARC's / Byron Wilson K9SBW, Rt 5 Box 337, Peru, IN 46970, 317-473-5060

Monitoring Times is happy to run brief announcements of radio events open to our readers. Send your announcements at least 60 days before the event to:

Monitoring Times Special Events Calendar

P.O. Box 98, Brasstown, NC 28902-0098

INDEX OF ADVERTISERS

STOCK EXCHANGE

Monitoring Times assumes no responsibility for misrepresented merchandise.

Ads for **Stock Exchange** must be received 45 days prior to publication date. All ads must be paid in advance to *Monitoring Times*.
Ad copy must be typed for legibility.

NON-COMMERCIAL SUBSCRIBER RATES: $.25 per word — *Subscribers only!*
All merchandise must be personal and radio-related.

COMMERCIAL RATES: $1.00 per word. Commercial line ads printed in bold type.

1-3/4" SQUARE DISPLAY AD: $50 per issue if camera-ready copy or, $85 if copy to be typeset. Photo-reduction $5 additional charge. For more information on commercial ads, contact Beth Leinbach, 704-389-4007.

"TINY-TENNA!" See display ad page 91 this issue.

R-390-A SALES —SERVICE. Information SASE Miltronix, P.O. Box 80041, Toledo, OH 43608.

GE SUPERADIO III, custom designed with up to four noise-free SCA channels. Performance guaranteed. Credit Card orders accepted. (800) 944-0630.

FM BROADCASTING. Excellent sound. Transmit many miles. 80-108 MHz. Kit or assembled. Not a bug. For full information (604) 642-2859. R. Scott Communications.

SURVEILLANCE/PRIVACY SECURITY PROTECTION. Catalog $5. Spy Emporium, 6065 Hillcroft, Suite 414, Houston, TX 77081. (713) 774-1000.

EXPERT RADIO REPAIR! $30/hour. Worldcom Technology, (407) 466-4640.

Reconditioned VHF and UHF pagers with charger/amplifier. Can be set up for Monitor Only ($89) or Tone Alert ($195). Excellent for use with FIRE, ESDA, and SKYWARN nets. One year warranty. FYRCOM, LTD. (708) 422-0922.

ICOM R1 scanner/receivers—no cell block—one year warranty—$655—The Spy Store, Inc. (509)626-5949.

We will pay your postage for free junk cordless phone, CB or amatiur equipment. Call CTP at (800) 660-1118.

Wanted: ICOM R7100-1 full coverage receiver. Call Bob, (607) 785-3420 after 4 pm (edt).

WANTED: Realistic PRO-43 scanner. Gerry, (718) 332-0030, evenings.

WANTED: Squires-Sanders SS1BS, SS1RS, SS1R, SS1V. Weber 4845 W. 107th St., Oak Lawn, IL 60453-5253.

FOR SALE: ICOM R1, full coverage, in excellent condition, $350 or best offer. Keith Bucher (304) 386-4332, early evening.

Phase Track Liniplex F2 Receiver, ext. speaker, power supply, best BBC reception via stereo rcvr. or stand alone. $600, negotiable. Tom, 302 Old Courthouse Road NE, Vienna, VA 22180. (703) 242-1226.

FOR SALE: VLF active antenna. 3 kHz to 530 kHz. LF Engineering Model L-400B. $50 plus shipping. Don, (610) 683-7373.

FOR SALE: ICOM R-9000, computer interface, voice synthesizer, accessories, excellent condition. $4300. Rob (609) 786-7581.

KIWA Electronics MW Air Core Loop Antenna, mint condition, $125. (518) 355-2233.

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2 meter HTX-202, 35W linear amp., speaker mike, 12 amp. power supply, mag. mount antenna, all like new or new. $350 or trade Kenwood R-600, mint condition. $250. Phone/Fax: (709) 944 5268.

Need radio stations recorded for me! Will pay! Need Houston, Seattle, Louisville, Colorado Springs, Atlanta, Phoenix, Wichita, Santa Rosa, Ft. Myers, Albuquerque. (800) 575-8646.

Wanted: Kiwa Loop MW in excellent condition. Bob (210) 333-1468.

Sony 2010 with both Kiwa Filters. $300. (216) 545-8308.

McIntosh MR-78, considered "simply the best" FM tuner ever made, (MT July '93, p. 48) $995; matching MC-2205 amplifier $1095; ARVIN R-725/URR upgraded 1968 version of R-390-a with superior filters, restored expertly by Miltronics, $675; Magnum-Dynalab FT-101 with full "Etude" upgrade, $650; F-205 "Signal Sleuth," $150; Pioneer TX-9500 Mk II tuner $160. Bill (412) 243-1569.

BC8500XLT CTCSS chip installed with manual. Mint condition. Not modified for cellular yet. $375 + S&H. (810) 623-6636, 3539 Warringham, Waterford MI.48329-1381.

FOR SALE: Allied SX-190 shortwave receiver and matching SP-190 speaker; $135. Rick (510) 687-2719.

AOR AR1000XLT, cellular, mint, complete, incl. hard leather case, $395. Rudy, (708) 358-1150.

FOR SALE: Grundig YB400, less than 1 yr. old, still under warr., perfect condition, AC adp. incl., $150, call (717) 399-9291.

CLOSING COMMENTS

Bob Grove
Publisher

A Look Back in Time

It seems that modern technology is propelling along at a whirlwind pace. The present is a blur, and the immediate past a distant memory. The future merges with the present. This is a bewildering time for most Americans who hear new buzzwords daily. The vast majority of us still don't know what is meant by the information highway, much less the World Wide Web.

As though it isn't hard enough to get a grasp on reality, we see daily conflicts of information —last week we read how the benefits of hormones were offset by increased risk of cancer, but this week new reports deny that link.

It isn't surprising that many Americans are taking respite in collecting antiques, gentle reminders of a less hurried lifestyle, where quality, not quantity, was the measure. I enjoy flea markets, yard sales and auctions; in fact I attend them regularly and often assume the role of auctioneer for several local charities.

Antiques draw considerable attention—and considerable bidding at auctions. It isn't unusual for the bidding to approach appraisal value on many items. Wary dealers are also present just to make sure no bargains slip by.

During the first part of this century, dozens of start-up companies produced radio receivers; names like Atwater Kent are still revered, highly prized by antique radio collectors. The Zenith Transoceanic series has a cult of its own. Even 1950s-1970s transistor radios are rapidly becoming collectible. Bidding on a jade green Regency TR-1 could quickly relieve you of about $600!

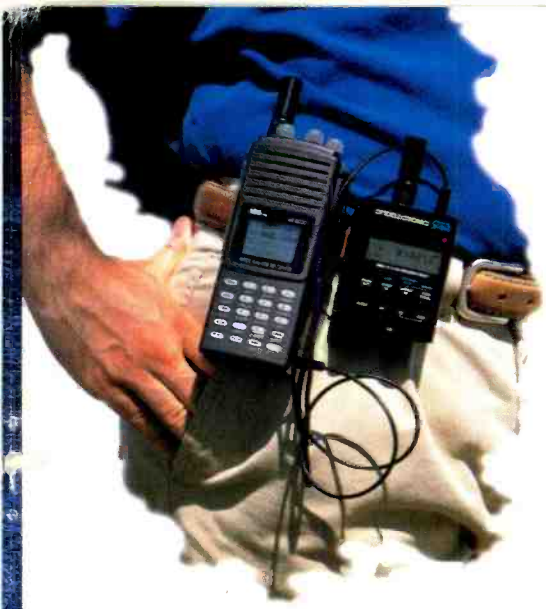
But my greatest interest, being an admitted eccentric, is quack medical apparatus, those buzzing, shocking, blinking, glowing busyboxes of yesteryear that promised a cure for every disease known to man! I collect them, and information about them; I am also writing a book which will catalog these deceptive devices. Equipment, books, advertisements, instruction manuals, and photos are eagerly sought.

While the Pure Food and Drug Act of 1906 laid siege to the quack medicine empire, the quack contrivances—the shock machines, induction coils, violet ray generators, magnetic belts, electric hairbrushes and combs, and many more—thrived for decades.

We tend to think of the past in glowing terms, remembering the endearments, forgetting the tears. It was a time of plagues, infant mortality, short life spans, world wars, extensive work weeks, sweat shops, child labor, malnutrition, class distinctions, depressions, racial atrocities, gross exploitation. Yes, regrettably some of these are still around, but nowhere nearly as pervasive as in "the good old days."

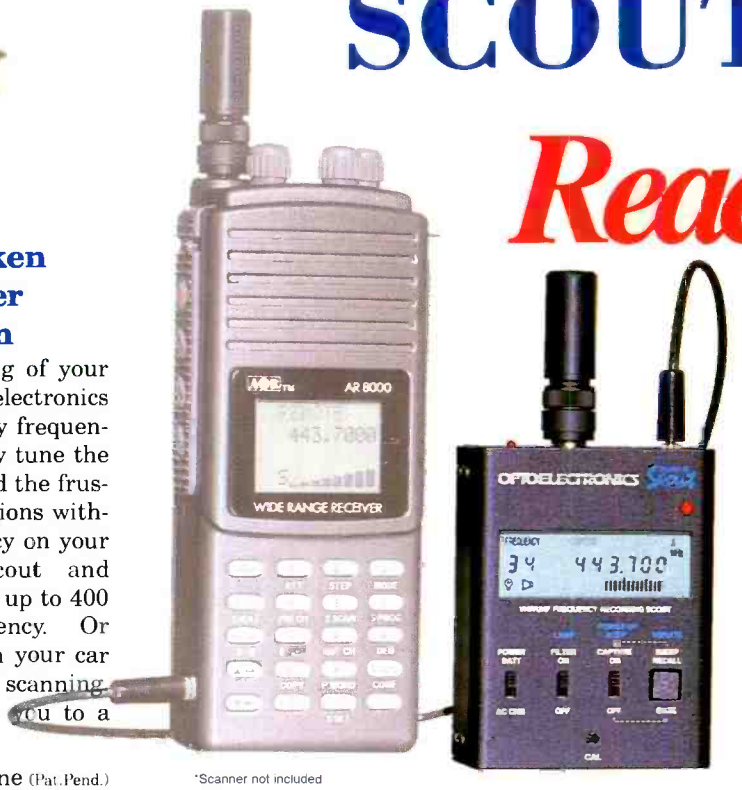
Our glamorous recollection of yesteryear, our infatuation with the past, is often based on historical revisionism, romantic novels, imaginative movies, and selective recall. It's comforting and reassuring to remember nice things, but let's keep them in perspective.

The light bulb is cheaper, more efficient and safer than the gaslight; antibiotics work better than Kickapoo Vegetable Compound; a Ford Taurus will run rings around a Model A; CD stereo sounds better than an Edison cylinder phonograph; paved roads beat mud roads. While new isn't necessarily better, the present is better than the past. And if we keep our wits about us, the future will be better yet.



You Won't Miss a Thing With SCOUT™

Reaction Tune



*Scanner not included

The SCOUT™ Has Taken Tuning Your Receiver To a New Dimension

Featuring Automatic Tuning of your AR8000 and AR2700 with the Optoelectronics Exclusive, Reaction Tune (Pat.Pend). Any frequency captured by the Scout will instantly tune the receiver. Imagine the possibilities! End the frustration of seeing two-way communications without being able to pick up the frequency on your portable scanner. Attach the Scout and AR8000/2700 to your belt and capture up to 400 frequencies and 255 hits per frequency. Or mount the Scout and AR8000/2700 in your car and cruise your way into the future of scanning. A simple interface cable will connect you to a whole new dimension of scanning.

The Scout's unique Memory Tune (Pat.Pend.) feature allows you to capture frequencies, log into memory and tune your AR8000/2700 at a later time. A distinctive double beep will inform you when the Scout has captured a new frequency, while a single beep indicates a frequency that has already been recorded. For discreet monitoring, a pager style vibrator will inform you of any hits the Scout captures.

The Scout will also Reaction Tune and Memory Tune Icom CI-V receivers: (R7000, R7100, and R9000) and (Pro 2005/6 equipped with OS456, Pro 2035 equipped with OS535). Download the Scout frequencies to a PC with the Scout Utility Disk and CX-12AR (optional), then compare them to the Spectum CD-ROM/PerCon FCC Database (optional).

Act Now!! Let the Scout Reaction Tune you into The World of Scanning

SCOUT™ $449

Features

- Automatically tunes these receivers with Reaction Tune (Pat.Pend.) CI-V receivers (ICOM's R7000, R7100, and R9000), (Pro 2005/2006 equipped with OS456, Pro 2035 equipped with OS535) or AOR models (AR2700 and AR8000).
- Records and saves 400 unique frequencies
- Records 255 hits on each frequency in memory
- Digital Filter and AutoCapture (Pat.Pend.)
- 10MHz-1.4GHz single frequency range
- View frequencies in RECALL mode
- 10 digit LCD with EL Backlight
- 16 Segment RF signal strength bargraph
- CX-12AR Computer Interface (optional)
- PC Utility Disk for downloading memory to PC
- Rapid charge NiCads with 10 hour discharge time
- Scout Spectrum CD-ROM/PerCon FCC database (optional)
- AC Adaptor/Charger
- DB 32 VHF/UHF mini-antenna shown with Scout (optional)
- Distinctive Beeper/Vibrator indicate frequency hits

At right: Scout shown with CLIPMATE™. A handy windshield mount for Scout, for quick access and visibility.

CLIPMATE™ $25.00

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Contact Factory for shipping prices. Visa, Master Card, & C.O.D.(cash or money order only)

All prices and specifications are subject to change without notice or obligation

MADE IN THE U.S.A.

ICOM BASE STATIONS

IC-275H

- Dimensions: 9.5" (W), 3.7" (H), 9.4" (D), 13.2 lbs.
- 100 W
- 144 MHz
- 99 Memory Channels
- Direct Digital Synthesis
- Lockup Times < 5 msec.
- Data Switch
- Built-in Preamplifier (10 db)
- High Stability
- Fast Squelch Circuit
- Passband Tuning
- Notch Filter
- Variable Tone Control
- Speech Compressor

IC-475H

- Dimensions: 9.5" (W), 3.7" (H), 9.4" (D), 13.2 lbs.
- 75 W
- 440 MHz
- 99 Memory Channels
- Direct Digital Synthesis
- Lockup Times < 5 msec.
- Data Switch
- Built-in Preamplifier (10 db)
- Fast Squelch Circuit
- High Stability
- Passband Tuning
- Notch Filter
- Variable Tone Control
- Speech Compressor

IC-575H

- Dimensions: 9.5" (W), 3.7" (H), 9.4" (D), 13.4 lbs.
- 100 W
- 28 MHz (10 M)/ 50 MHz (6 M)
- 99 Memory Channels
- Direct Digital Synthesis
- Lockup Times < 5 msec.
- Data Swtich
- Built-in Preamplifier (10 db)
- Fast Squelch Circuit
- High Stability
- Passband Tuning
- Notch Filter
- Variable Tone Control
- Speech Compressor

IC-970H

- Dimensions: 16.7" (W), 5.9" (H), 16.0" (D), 32.0 lbs.
- Multi Band, All Mode
- 144 MHz/440 MHz Built-in
- 1.2 GHz/2.4 GHz/ 50-905 MHz Rx Opt.
- 396 Memories
- 45 W (2 M), 40 W (440 MHz), (10W (1.2 GHz) Optional)
- Automatic Satellite Tracking
- 10 Satellite Memories
- Simultaneous Receive
- Built-in Power Supply

IC-820H

- Dimensions: 9.5" (W), 3.7" (H), 9.4" (D), 11.0 lbs.
- Dual Band, All Mode
- 45 W (2 M), 40 W (440 MHz)
- 1 Hz Tuning Resolution
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- Built-in Satellite Functions
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