

Scanning -- Shortwave -- Satellites -- Ham Radio -- Computers -- Internet

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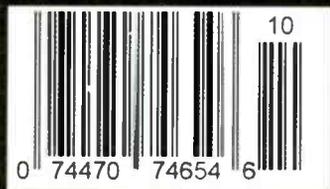
U.S. \$4.25

Can. \$6.50

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Monitoring Times

QSLing the World



Also in this issue:
Smoky Mountain Special
A Leaf Looker's Frequency Guide

"A versatile HF/6-meter receiver that offers a good measure of performance in a compact package. All mode capability for the ham and utility listeners and synchronous AM for the SWLs should make the IC-R75 a popular choice for a wide variety of radio enthusiasts." — QST, 1/00

The IC-R75 covers a wide frequency range, 0.03 - 60.0 MHz*, allowing you to listen in to a world of information. With innovative features like twin passband tuning, synchronous AM detection, DSP capabilities, remote PC control and more - shortwave listening is easier than ever. All this comes in a compact, lightweight package that can be conveniently used in your ham shack, den or car.



Winner of the "Best Value Receiver" Award in the 2000 Edition of WRTH
 -Editorial section, 2001 WRTH

IC-R75

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Expand the power of your WiNRADiO receiver.

These comprehensive, powerful WiNRADiO options complement the already sophisticated functions of WiNRADiO receivers with additional features, at surprisingly low cost.

WiNRADiO Options

Universal FSK Decoder

With several powerful analysis tools, the FSK decoder makes it easily possible to determine transmission characteristics of an unknown signal automatically using 1030, 1500 or 3000 Series WiNRADiO receivers.



WiNRADiO for Mac

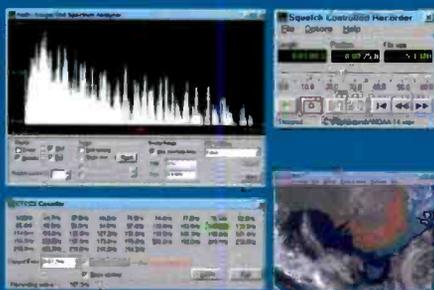
Introducing our Apple Macintosh support for the popular external WiNRADiO WR-1550e receiver. Frequency range 150 kHz to 1.5 GHz. (LS version excludes cellular frequencies 825-849 & 359-894 MHz).



(Computer not included)

Digital Suite

The WiNRADiO Digital Suite expands the power of your WiNRADiO radio receiver with numerous digital processing facilities, including weather fax ACARS, packet radio, audio oscilloscope and spectrum analyzer, squelch-controlled recording, and many others.



Portable Power Source

With rechargeable batteries, intelligent charging circuitry and a level-test switch, this option provides portability to external WiNRADiO 1000, 1500 and 3000 series models.



Database Manager

Access and maintain large selections of frequencies. Includes a database of 300,000 world-wide frequencies.

Frequency	Country	Mode	Category	Notes
110.100 MHz	USA	AM	Weather Fax	
110.200 MHz	USA	AM	Weather Fax	
110.300 MHz	USA	AM	Weather Fax	
110.400 MHz	USA	AM	Weather Fax	
110.500 MHz	USA	AM	Weather Fax	
110.600 MHz	USA	AM	Weather Fax	
110.700 MHz	USA	AM	Weather Fax	
110.800 MHz	USA	AM	Weather Fax	
110.900 MHz	USA	AM	Weather Fax	
111.000 MHz	USA	AM	Weather Fax	

PCMCIA Adaptor

Connect a WiNRADiO receiver to a laptop computer with a standard PC Card socket.



WiNRADiO Telephone Control Interface

Facilitates remote control of external WiNRADiO receivers using a standard land or cell phone line. The user controls the receiver remotely using DTMF (touch-tone) commands, which are confirmed using a digitized voice. Received audio signals can then be listened to by the user in real time.



Trunking Option

Join the trunked radio revolution with this option and a WiNRADiO radio receiver! The major trunking modes are included: Motorola SmartMet & MPT 1327.



USB Adaptor

Connect a WiNRADiO receiver to the USB port of a PC. This option fully complies with USB Specification 1.1.

AX-31B Antenna

A low-cost alternative to conventional VHF/LHF antennas, the AX-31B antenna is a compact indoor VHF/UHF directional antenna with a built-in amplifier. Suitable for any receiver.



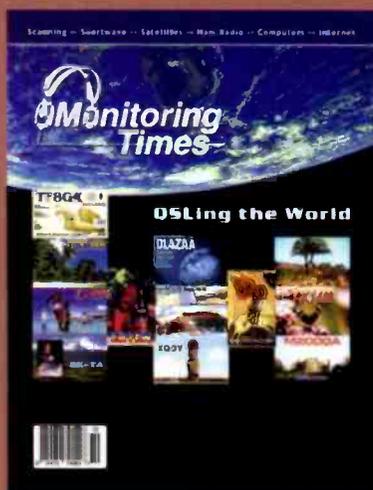
Please visit our website or email us for more product details:

www.winradio.com
info@winradio.com



Monitoring Times

Vol. 20, No. 10 October 2001



On our Cover

QSLing the Ham Bands

By Gayle Van Horn

With many shortwave broadcasters leaving the airwaves, country chasers may feel they are out of luck when it comes to logging countries such as Belize or Tahiti. Not so: most amateur radio operators on HF are glad to respond with a QSL, and hams operate worldwide. The upcoming annual CQ Worldwide DX contests will provide excellent opportunities to log many elusive countries via amateur radio.

There are some tricks to QSLing that are unique to hams, but can be used by non-hams. Here's how to make use of these tools of the trade, complete with contact addresses and practical advice. See story on page 10.

On our cover: If you're logging hams, they're everywhere! And even where they aren't, there's no spot on earth too small to host an amateur radio DXpedition. QSLs from the collection of Larry Van Horn.

Ham Licensing in Canada 14

By John David Corby

Licensing requirements and operating practices in Canada are slightly different from those in the U.S. — which can make for some interesting situations near the border. Still, the hobby faces the same obstacles and opportunities as hams everywhere. How are Canadians meeting the challenge?

The History and Future of Radio 18

By John Catalano

This month Dr John looks at radio history — How did radio theory evolve? Which applications worked, and which didn't? How did we get from crystal radio to software radio? Next month he talks to Bob Grove about the radio hobby market and speculates on what's coming next.

Service Search: MWARAs 22

By Larry Van Horn

If you're looking for an easy entry into utility monitoring, give aeronautical HF communications a try. Monitoring major World Air Route Area and Long Distance Operational Control frequencies can be a passing amusement or keep you busy for a lifetime.

Scan more than the great scenery on the Blue Ridge Parkway - see p.64.





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Reviews:

Two software programs that were top picks in Catalano's book when last reviewed, have recently received upgrades. The Propman 2000 propagation program and DXLOG 3.0 schedule and logbook program have both added bells and whistles, which make them even more useful as well as more fun (p.82).

Speaking of fun, Cobra is taking to heart the teenage trend of wearing FRS radios as a fashion accessory. Their new SNAP microTALK comes with interchangeable faceplates in all kinds of designs and colors (p.87).

Bob Grove addresses the hype surrounding bug detectors and tests three of the many models available: Plus Guard, EMR Detector, and MicroAlert. He finds they do have their uses, though not necessarily as advertised (p.88).

Continuing our series on mobile shortwave reception, we look at several in-car options. This month Ken Reitz looks at using your primary receiver in your car, and using an after-market, in-dash radio – including the Sony XR-C5600X which is reviewed by Alan Fuhrman (p.84).

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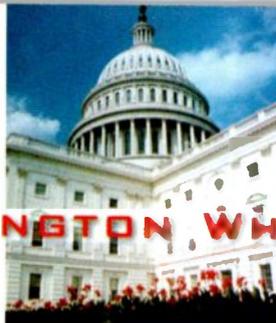
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The Cat-and-Mouse Game of Computer Security

The DefCon convention is the annual hacker's gathering that attracts underground programmers from all over the world. It was created nine years ago as a way for hackers to stay in touch, meet their "heros" and exchange ideas. Held every year in Las Vegas, it attracts thousands of hackers. This year's convention, held from July 13 to 15 at the off strip Alexis Hotel and Resort, drew about 5,000 hacktivists, crackers and virus writers.

Two days before DefCon Nine, the computer security industry's "Black Hat Briefings" trade show opened July 11th at the upscale Caesars Palace. Both shows are organized by the same people, but it costs \$1,000 to attend to the computer security show, only \$50 admission to DefCon.

The Black Hat show concentrates on the latest advances in detecting computer site break-ins, tracking down the guilty parties, next-generation email viruses, and the latest security strategies for wireless networking. But the real information gathering starts when it is over.

Most programming and security professionals (and federal agents) stay on and attend DefCon ...many posing as undercover hackers. Some have little trouble making the transition since many reformed hackers are now security professionals!

Black Hat's overpriced booth exhibits are replaced by DefCon's cheap, penny-pinching displays as the computer security industry changes overnight from corporate suits to T-shirts and faded jeans. Their goal then becomes to find out what the underground is up to and to learn the newest tricks of the programming trade.

It is a really a case of the criminals teaching the professionals ...sort of a "If you can't fight them, join them" concept. It is probably the only known staged situation where the "pros" go to learn from the "amateurs" ...who are usually the first source of real innovation (not to mention future employees.) The system seems to work.

Crazy as they are, hackers represent a key source of technology intelligence for the big players. They know it ...and are proud of it. Many of DefCon's sessions focus on a variety of hard-core technology topics, including hacker techniques ...such as writing "back doors" and "A Layman's Introduction to Quantum Cryptology" (by "Super Dave" who has an MIT degree in physics). Other topics covered include telephony and com-

puter network security, attacking control, routing, and tunneling protocols, data "mining," enabling "extra features" in hardware, defeating background investigations, penetrating firewalls, ...design, implementation, and distribution of international computer viruses ...and other (not so) "nice" stuff.

There was even a slideshow presentation by the CTO (Chief Technology Officer) of "HavenCo." This offshore tax and "datahaven" is located at the Principality of Sealand, a self-pronounced sovereign World War II fortress "country" in the North Sea off the east coast of England (see July 2001 column).

DefCon has a reputation as a wild underground affair that includes a lot of partying. (an interesting scavenger hunt included the strip hotels), mischief (the personal cell phone numbers of celebrities meticulously "researched" over a year's time were distributed), hacking (a supposedly secure wireless network was set up and destroyed), games (such as X-rated Hacker Jeopardy) ...and even a "Spot the Fed" contest to identify spies (federal agents.) Correct calls get to wear a "I spotted the fed!" T-shirt, and the "I.F." (Identified fed) must wear a "I am the fed!" shirt.

Hackers arm themselves with small portable radios so they can listen to their own pirate "DefCon Nine FM" radio station. Wandering reporters were getting up-to-the-minute gossip from people "@ The Con" and broadcasting it randomly throughout the day. Even though promoted in advance on their website, we saw no mention that the FCC closed it down ...or was even interested in doing so.

Check out <http://www.blackhat.com> and <http://www.defcon.org>.

Copy protection and the law

A favorite "fun" activity of hackers is to remove security safeguards from software. It is almost like a game to them ...and they are good at it. They consider it a challenge to eliminate copy protection from computer programs. And they never fail to do so. Up until last year there were no U.S. laws that made it a crime to write programs that "enhance" existing software.

The controversial 1998 Digital Millennium Copyright Act (DMCA) prohibits anyone from manufacturing products that bypass copy protection features. The music recording industry was a major backer of the legislation.

One of the DefCon presentations, entitled "eBooks security - Theory and Practice," included a demonstration of electronic books and their weak security. It featured a Russian programmer from the Moscow-based software company, ElcomSoft. They have developed a decoder program that allows electronic books to be read without paying the fee. It caught the attention of the FBI. The program simply removes the password protection and converts Adobe System's encrypted ebooks into regular Adobe Portable Document Format (PDF) files. It then can then be read by anyone using the free Adobe Acrobat PDF viewer.

The availability of the program caused Barnes and Noble to stop selling some eBooks at its online store. They resumed sales once Adobe was able to release an enhanced eBook Reader encoder forcing consumers to purchase the digital books before reading them. Adobe demanded that ElcomSoft's \$100 program it be taken off the market since the Russian program violates U.S. copyright law.

However, there are no laws against such software in Russia - or any other country for that matter - similar to the DMCA. Many security experts agree that weak computer programs and/or hardware do not deserve protection. The Electronic Frontier Foundation is in the process of filing a lawsuit trying to declare the DMCA unconstitutional on free speech grounds.

The FBI has been secretly attending the Defcon convention in recent years and last month arrested the Russian programmer who gave away copies of ElcomSoft's security-defeating program. ElcomSoft's Dmitry Sklyarov was arrested in his hotel room after his presentation on the poor security of Adobe's ebook reader software as he was preparing to return to Moscow.

Sklyarov was arraigned in federal court in Las Vegas and ordered jailed without bond. He was indicted on charges of trafficking in copyrighted software. The court has now transferred the case to a federal court in San Francisco. He faces up to five years in prison and fines of up to \$500,000 if convicted.

In a surprising turnaround, Adobe Systems has now called for the release of Dmitry Sklyarov. Adobe said it had decided the prosecution was not the best way to enforce the Digital Millennium Copyright Act. Copyright law experts had said this case could set a precedent on the constitutionality of the digital copyright law.

GRUNDIG SHORTWAVE

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*"Outstanding Performance...
Unbeatable Audio Quality...
Unbeatable Price..."*

Lawrence Magne, Editor in Chief, *Passport to World Band Radio*.

The LCD Big! Bold! Brightly Illuminated 6" by 3 1/2".

Liquid Crystal Display shows all important data: Frequency, Meter band, Memory position, Time, LSB/USB, Synchronous Detector and more.

The Signal Strength Meter Elegant in its traditional Analog design, like the gauges in the world's finest sports cars. Large, Well Lit. Easy to read.

The Frequency Coverage Longwave, AM and shortwave: continuous 100-30,000 KHz. FM: 87-108 MHz VHF Aircraft Band: 118-137 MHz.

The Tuning Controls

- For the traditionalist: a smooth, precise tuning knob, produces no audio muting during use. Ultra fine-tuning of 50Hz on LSB/USB, 100Hz in SW, AM and Aircraft Band and 20 KHz in FM.
- For Fixed-step Tuning: Big, responsive Up/Down tuning buttons.
- For direct frequency entry: a responsive, intuitive numeric keypad.

The Operational Controls Knobs where you want them; Buttons where they make sense.

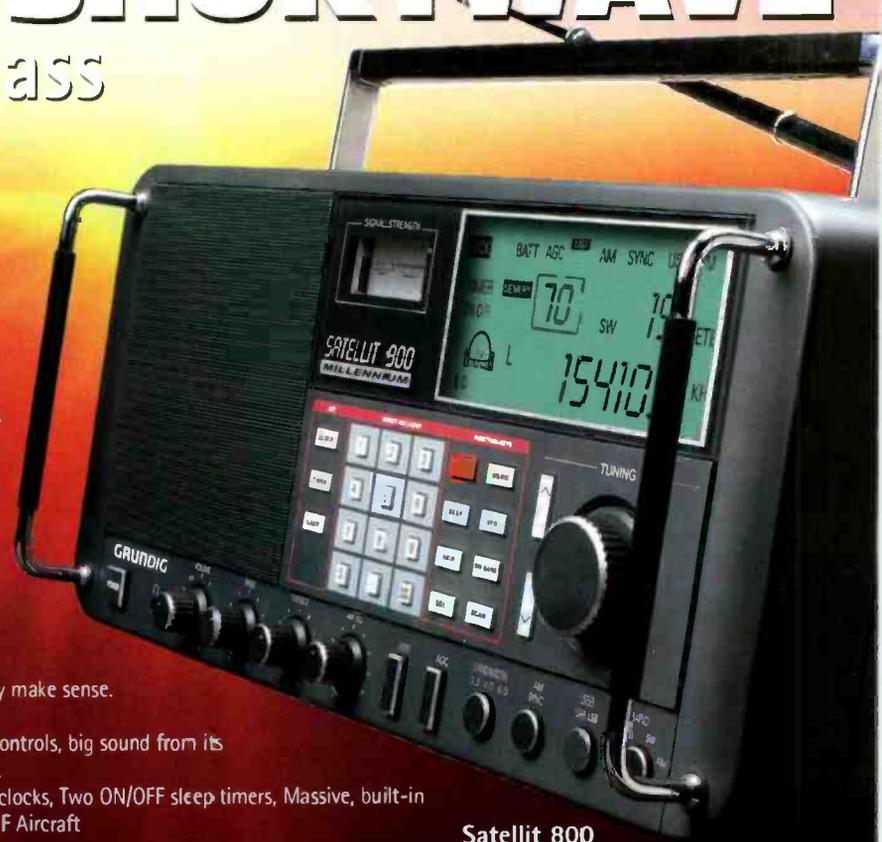
The best combination of traditional and high-tech controls.

The Sound Legendary Grundig Audio Fidelity with separate bass and treble controls, big sound from its powerful speaker and FM-stereo with the included high quality headphones.

The Many Features 70 user-programmable memories, Two 24 hour format clocks, Two ON/OFF sleep timers, Massive, built-in telescopic antenna, Connectors for external antennas - SW, AM, FM and VHF Aircraft Band, Line-out, headphone and external speaker jacks.

Size: 23.5" L x 9" H x 8" W

Weight: 14.50 lbs.



Satellit 800



Yacht Boy 300PE AM/FM/SW Radio



Yacht Boy 400PE AM/FM/SW Radio

Power and Performance with Affordability

Designed for the traveller, the titanium look digital AM/FM/SW radio provides incredible power and performance for an incredibly low price! Packed with features, including 3 AA batteries, AC adapter, earphones, supplementary Antenna and carrying case!

State-of-the-art features include:

Digital tuning with 24 user-programmable memory presets, 13 SW Bands (2.30-7.80 MHz; 9.10-26.10 MHz), Illuminated multi-function LCD display screen, AM/FM stereo via earphones, Clock, alarm and 10 to 90 minute sleep timer, Digital tuning display, Direct frequency entry, DX/local selector Titanium look finish, External antenna jack, Dynamic microphone, Earphone jack, Telescopic antenna.

Size: 5.75" L x 3.5" H x 1.25" W Weight: 9.92 oz.

Most powerful and compact portable

The Big Breakthrough! Power, performance, and design have reached new heights! The Grundig 400 Professional Edition with its sleek titanium look is packed with features like no other compact radio in the world. **Pinpoint Accuracy!** The Grundig 400PE does it all: pulls in AM, FM, FM-Stereo, every shortwave band (even aviation and ship-to-shore)-all with lock-on digital precision. **Ultimate Features!** Auto tuning! The Grundig 400PE has auto tuning on shortwave that stops at every signal and lets you listen. With the exceptional sensitivity of the 400PE, you can use the auto tune to catch even the weakest of signals. Incredible timing features! The Grundig 400PE can send you to sleep listening to your favorite music. You can set the alarm to wake up to music or the morning traffic report, then switch to BBC shortwave for the world news. The choice is yours! **Powerful Memory!** Described as a smart radio with 40 memory positions, the Grundig 400PE remembers your favorites-even if you don't!

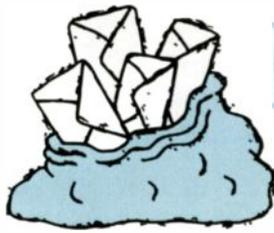
Size: 7.75" L x 4.5" H x 1.5" W

Weight: 1 lb. 5 oz.

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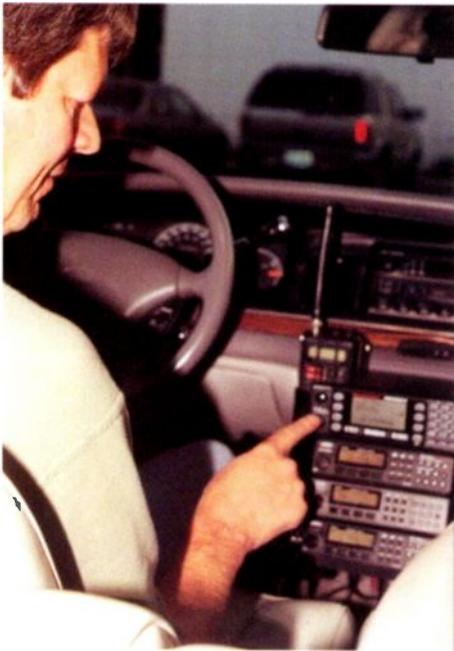
LETTERS TO THE EDITOR

St Louis Photographer is "all ears for the news"

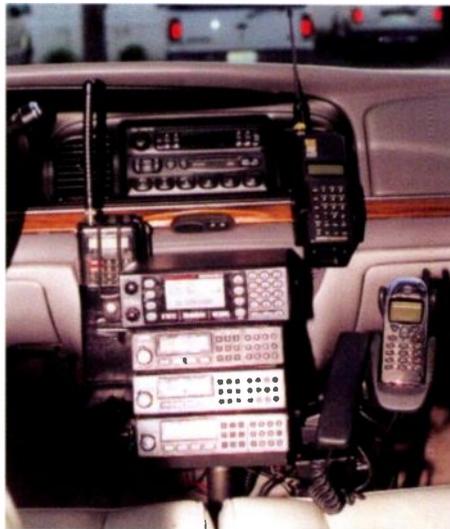
As a long time reader and subscriber to Monitoring Times, I'm appreciative of the continued excellence of your articles and presentation.

I'm security officer of this TV station, and thought that your scanner readers might enjoy the enclosed pictures and 'byline.'

- Joe Weidhaas, St Louis, MO



KTVI-Fox-2 News photographer Bob Hughes has the ultimate news chasing machine. His station-owned 1996 Crown Victoria has been converted to a mobile "assignment desk." Bob has put together an array of his favorite listening devices. The customized rack group includes a BC 780XLT Trunk Tracker, (2) BC 760XLTs, and a BC 590XLT. When on the run, Bob grabs



his BC 235XLT Tracker mobile, or his BC 200XLT. Each receiver is banked to a particular agency and programmed for cross-talk between participating agencies. Receiving over 1300 signals is accomplished with numerous calibrated dipole antennas, each tuned to cover the various frequency spreads, which makes this Crown Vic the ultimate "Spot News Machine."

Correctamundo...

Some corrections and notes from recent issues:

SWG - Local times for the frequency section of the shortwave guide were overlooked in the August and September issues, which listed UTC times only. This was not intentional: The headers are now corrected in this October issue. (Thanks to George Darcy, Gary Daugherty, and others.)

What's New - August: Midland's world's smallest FRS radio is Model number F-12, not F-10. (Thanks, Mark E. Salmon)

ACARS Decoding feature - *Caveat*: The online registration button for the WACARS

program (<http://www.geocities.com/CapeCanaveral/Cockpit/9870/acars.html>) directs you to a pornographic site. Our reporter said otherwise the program works nicely. Fortunately, registration is not required for this program to work. In fact, it gains you nothing. (Thanks, Rev. Bruce L. Footracer)

Easy Access Radio - In the July and August issues, the receiving range of the Icom IC-706MkII G was quoted as 30kHz-1999.999 MHz. That should have been 199.99 MHz!

(Thanks, Kevin Carey)

Queries and Comments

"The July Utility World on page 32 men-

tions the British Navy in Faslane, England. That's about as true as saying the Fort Bragg is in Tennessee! Sorry, but Faslane is in Scotland...and that's the one with whisky, haggis, and heather - not the one in NC." (See page 32 for Hugh's abject apology!)

"Shortwave Guide listings for major broadcasters such as VOA are all under the base country like USA despite the multiplicity of relays. Smaller organizations like RTE on the other hand are listed under relay points such as UK, Ascension Island, Canada, and Singapore rather than Eire. Can other relay points not be shown for accuracy? (RTE was so listed because it only added one line! You're right, we should probably be consistent. To add relay sites to listings like VOA and BBC would add one to two pages to the entire section; you can find the relay sites listed in *Passport to World Band Radio* or *World Radio TV Handbook*.)

"Washington Whispers (Sealand) in July edition was, in its own words, a good story, spoiled by some inaccuracies. Radio Caroline, for example, was always ship based, never on a tower." (Fred Maia says it's 'one version' of the story. I seem to recall reading a similar story; maybe it's part of Sealand's own PR to increase the intrigue!)

"Global Forum on page 41 ends with the phrase 'making lemonade out of lemons.' That must be a bit of Americana, but what does it mean? Is it related to 'Mony a mekle maks a muckle?'" (No, that's probably like "Too many cooks spoil the broth," though I can't find a translation! Whereas John Figliozzi is trying to make the best of a bad situation.)

"Thanks for the magazine, which arrives promptly around the last day of each month." (I hope you don't mean the end of the month on the cover! If so, maybe it's time to consider MT Express. You'll get it before print subscribers do! - rb)

- G.W. Traynor, Lanarkshire, Scotland

Motorist Beware

"I enjoyed Dan Veeneman's 'Travel Tips' in the July *Tracking the Trunks*. I would, however, like to make one comment in reference to his article. Traveler beware: in some states it is illegal to operate a scanner in your automobile.

"I live in Louisiana now but my home state is originally in New York State, so I visit there every summer. For five months prior to my June visit I researched *Police Call* to compile a listing of frequencies in the cities where I would be and in the places

in between. After the lists were completed, one day I logged on the internet and found out – guess what – it is illegal to operate a scanner in your car in New York State.

“Oh well, at least my niece and I had fun scanning the various bands outside of her home in Alfred (*Mommie, Mommie, there's a fire...!*)

– Bill Seamans, Pineville, LA

“Thank you for the multiple mentions of Scanner laws in the August issue. Both in the *Communications* section and in Mr. Veeneman's article on APCO-25.

– Mark Bajek, Westland, MI

As you see, we're trying to improve in our sensitivity to this issue. You can easily check out the status of listening laws in your state at the <http://www.monitoringtimes.html> website in the reprint of the “Listening Laws” publication by Frank Terranella. Although the information is in need of some updating, most of it is still correct. Readers are invited to submit any changes to the information in this publication to post for the benefit of other readers. In those states in which an FCC amateur radio license exempts a hobbyist from the restriction (such as New York), it is wise to carry a copy of the law in the car, because local police are often unaware of the exception. – rh.

MT Worth Every Penny

“I suppose there are some who have legitimate reasons for not subscribing to *MT*, but I must say, those must be pretty tough issues to be really justified. For an old late-depression era guy, I'm chagrined at the cost of most everything these days – but if you compare the cost of subscription against the pure entertainment value then it shakes out as a pretty good investment. I certainly couldn't go to the movies once a month for the price of the annual subscription – far from it!

“I suspect that there is just a lack of appreciation for all the good things that one finds in *MT* – there is a lot I don't really need right now – but the general level of information for the casual listener/enthusiast is pretty high. I guess if anything I could say that I wish there was more space for at least some of the features – a lot of information has to be left out to meet the allocated space. You might also think about providing some more advanced information for your longer term fans/subscribers.

“And the range and type of content is good for anyone attached to the ‘radio’ avocation, whether a traditional amateur operator, or a short wave listener. I find more interest in *MT* than in the whole of *QST* – which has become too slick, too inbred, and too commercial for my tastes, say nothing about the political bad taste.

“You folks at *MT* need to press on. Keep thinking ahead, and beware the ‘com-

mercial traps’ (hard to do with your costs, etc.), but if you keep the magazine *enthusiast oriented* rather than *commercial oriented* then I think you will find continued interest and support. Good luck, and regards to the ‘crew.’”

– Vic Culver, W4VIC/AFA2KS

“June is another great issue full of excellent and valuable information. The Power Strip Liberator from Cyberguys is a blessing (*Computers & Radio* column). Just ordered 24. Now my surge bars can be used properly. (*Watch for a tip in a future issue on how to make your own - rh*)

“I would hope Fred Maia, W5Y1, ar-

ticle (*Ham Operator Runs Unlicensed Militia Station*) would be read by everyone. We can receive ‘garbage’ around the Washington, DC, area from these patriots who crank up for ten to fifteen minutes after the hour. They are very ‘bad boys!’ Hopefully, they too will be caught by the FCC and FBI.”

– Wilson Hulley, Chevy Chase, MD

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to **Letters to the Editor**, PO Box 98, Brasstown, NC 28902, or email mteditor@grove-ent.com. Letters may be edited for length and clarity. Happy monitoring!

– Rachel Baughn, KE4OPD, editor

BEYOND Family Radio!

Stay in touch with your family and friends! The new PRYME Radio Products *PR-460: SportConnect™* and *PR-460: ClearConnect™* transceivers use frequencies in the **General Mobile Radio Service (GMRS)** to provide long range personal communications. Unlike half-watt FRS radios these new two-way radios provide a **full FOUR WATTS** output power.

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Range may vary due to obstructions, weather, low battery, or other factors. Access to repeaters may require a fee.

* NOTE: The prices shown above are estimated street prices. Actual dealer prices may vary.

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Good Scanner News

In Minnesota, police pulled over a motorist driving the wrong way down a one-way street. When officers realized the documents in the car did not match his Michigan license plate, the driver jumped into the car and fled. The ensuing chase covered four counties, involved several sheriff's departments and the Minnesota Highway Patrol. At times speeds reached 110 miles per hour, but often police had to back off the chase for fear of endangering other motorists.

Otter Tail County Sheriff's Deputy Scott Koennicke said the scanner listeners helped apprehend Roland Leeson by calling in his location to police as he passed their homes. Roland Leeson said he is a British citizen and was residing in Florida. The car was stolen in Florida. "It's neat how we helped the citizens by slowing down with the chase and they helped us find the guy," Koennicke said.

IMBE, VSELP, EDACS ... help!

The government has been addressing the issue of enabling communication between dissimilar radio systems, tackling the problem from several different approaches. One approach has been through making shared spectrum allocations, another in helping to establish common standards such as APCO 25, etc. The National Institute of Justice (NIJ) is looking for ways to achieve interoperability through technology.

One example of a technical solution evaluated by NIJ is the ACU-1000 Modular Interconnect System, manufactured by JPS Communications. The ACU-1000 is a communications switch that allows dissimilar radio systems – even those operating on different bands – to be combined at the audio baseband by using the received audio from one radio system as the source audio for one or more transmitters of differing technologies. It requires a portable or mobile unit from each system to be integrated into the unit by an interface module.

NIJ noted that the ACU-1000 met the manufacturer's electrical performance specifications, did not impair the audio quality of the voice communications (beyond the impairments already encountered due to the radios themselves), and was easy to configure and operate. When fielded, it met the functional requirement of allowing officers from one agency using their own agency's radio system to directly communicate with officers of another agency using a radio system operating on a different frequency band.

However, the agency warned that there are many options that may need to be "fine-tuned" to a given situation and/or equipment complement. These situations typically have workarounds, but they take time. Careful planning and operational exercises involving potential users are strongly recommended *before* deploying an ACU-1000 or TRP-1000 (a transportable model) in an emergency situation.

Oh Rats

Aero hobbyists addicted to listening in to the antics on airline company frequencies (espe-

cially the baggage handlers or "ramp rats"), may have to go elsewhere for their entertainment. ARINC has announced that deployment of its Wireless Dispatch Service has begun at major airports throughout North America. It was scheduled to be available at the first airport, Newark International, by September 2001.

The new service is based on Motorola's iDEN technology and ARINC's AviNet wireless Dispatch Service, in which one's "phone" can operate as a radio, a pager, or a digital phone. It will eventually replace the analog-based Trunked Radio Service. The service will support ramp and company operations including terminal buildings and cargo facilities.

The new service provides airlines and airports with a flexible form of instant communication that affords six times as much traffic as analog. ARINC customers will have the ability to share data between central flight operations, the aircrew, and the ground crew regardless of physical location or whether in the air or on the ground.

Star Wars Come Down to Earth

The digital-audio radio companies, XM Satellite Radio and Sirius Satellite Radio, want to use terrestrial repeaters to fill in gaps where satellites can't reach, such as between tall buildings.

The National Association of Broadcasters asked the government to deny the requests, saying the repeaters are an admission that satellite technology is not up to the task of providing seamless, mobile coverage as originally promised.

NAB has generally based its opposition to satellite-delivered audio on its mandate to protect local broadcasters. Therefore, NAB asked the FCC to ensure that terrestrial repeaters were used to retransmit only the complete signal from the primary station, and that no locally originated programming be allowed. Said an NAB spokesman, "If XM and Sirius want to provide traditional over-the-air radio service, they should apply for over-the-air licenses like everyone else. Otherwise, they are making a mockery of FCC rules and regulations."

The XM spokesman said that the FCC "has always acknowledged and understood that the terrestrial repeater system is an integral and fundamental part of DARS."

More Heat than Light

XM and Sirius are also having their battles with a light bulb company. A microwave-powered light bulb developed ten years ago is now in production by Fusion Lighting Inc, of Rockville, Md. Even though these ultra-bright, compact bulbs cost about \$2000 apiece, they will burn as long as there is a power source. In an attempt to resolve squabbles about whether the Fusion lights will interfere with satellite radio signals, the FCC arranged a test with engineers from both sides present.

Unfortunately, the test ended any hope of peaceful settlement: the suspected potential of r.f. interference turns out to be very real. Satellite companies fear that paying subscribers could lose the signal within a mile of a highway lit with

microwave bulbs, and they may be right. However, Fusion says in essence, "we were here first," and maintains any reduction in power emissions would put them out of business and suits are flying back and forth and the FCC has not decided whether to restrict emissions from Fusion bulbs.

The Coast Guard and Bluetooth technologies are also concerned about the microwave bulbs. The Coast Guard asked the FCC to require labels to warn that microwave-powered bulbs on boats and docks might disrupt radio signals.

Coming Full Circle ...

According to the *Wall Street Journal* story,



October 6-7: Seal Beach, CA

Radio Fest 2001, So Calif Area DXers (SCADS) and Orange Co Learning Disabilities Assoc.; Location: F&M Bank Community Room, 12535 Seal Beach Blvd. Contact Bill Fisher Sr, 6398 Pheasant Drive, Buena Park, CA 90620; 714-522-6434, billfishermow@netzero.net; <http://www.ocnow.com/community/groups/radiocommunications>

October 19-21, Concord, CA

PACIFICON 2001 at the Sheraton Hotel. Exhibitors 9 a.m. Sat-Sun. Exhibits, talks, license exams both days. Information <http://www.pacificon.org>. Email for tickets at tickets@pacificon.org. PACIFICON, P.O. Box 272613, Concord, CA 94527-2613. Phone: 925-932-6125.

October 20: Special Event radio station

The "U.S. Coast Guard Auxiliary" commemorates their "62nd Anniversary" with Special Event radio stations located at several U.S. Coast Guard Bases. Time: 1400 Z - 2200 Z; Freq: General portion of 40, 20, 15, 10 meters SSB & CW; Calls: K1G, K2G, K3G, K5G, K9G. Special Commemorative QSL will be issued.

October 21: Queens, NY

Hall of Science Amateur Radio Club Homfest at NY Hall of Science parking lot, Flushing Meadow Corona Park (47-01 111th St), 9a.m.; talk-in 444.200, PL 136.5, 146.52 simplex, Adm \$5 donation. Free parking, vendors, refreshments. VE exams 10a.m. Information <http://www.qsl.net/hosarc> or call Stephen Greenbaum WB2KDG (night only) 718-898-5599, wb2kdg@bigfoot.com. VE info only JMenna6568@aol.com

October 21: Sellersville, PA

RH Hill ARC homfest at Sellersville Fire House, Rt 152; talk-in 145.31. VE session 10am to 1pm, bring documents. Admission \$5. Hotline: Linda Erdman KA3TJZ (215) 679-5764, 2220 Hill Road, Perkiomenville, PA 18074. <http://www.rfhill.ampr.org>

Club News:

There have been a number of updates to the information on the Club page. Surf to <http://www.grove-ent.com/mtclubs.html> to view, or send an SASE to Club Circuit, 7540 Hwy 64 West, Brassstown, NC 28902 if you're not "connected."

the repeaters or amplifiers that Sirius has been erecting on building tops, towers and tunnels (so far without FCC approval) are viewed as a potential threat by wireless communication companies who are gearing up for an expected boom in wireless Internet traffic. Sirius pooh-poohs the concern...

Here in the mountains around Brasstown, the only way we can receive a National Public Radio station is by unmanned relays from a station in Asheville. However, a little-known FCC rule makes such low-power unmanned stations vulnerable to take-over by a newly built, full-power station. The evangelistic American Family Radio network has utilized such regulations to its advantage – accumulating as many as 181 stations in 31 states.

This spread of religious broadcasting has been compounded by other Christian broadcasters who caught on to the technique and want to expand their own territory, or at least to protect their local turf. American Family Radio, realizing that their own translators could be vulnerable, has increased the number of full-power, staffed stations with a portion of local news. A standard station may claim the frequency used by an unmanned rebroadcast outlet, whose owners may find their signal bumped with no notification from the FCC.

It has taken NPR and the FCC a while to respond to the challenge. With the current backlog of competing applications for noncommercial radio licenses, it has changed its criteria to favor stations that are based in the communities they will serve. American Family Radio is fighting this ruling in the federal appeals court, saying the ruling is unconstitutional because “if NPR is competing...NPR will *always* win.”

Last year the FCC ruled that religious exhortation on television did not qualify as educational programming. The outcry that AFR helped to organize finally forced the FCC to withdraw the ruling. It's too late for communities like St. Charles, LA, and Grants Pass, OR, who have already lost their NPR reception, but for Western North Carolina and the 178 communities with “available” licenses that American Family Radio wants, the issue is still up for grabs.

At the end of August, New York City fire officials conceded that they had jumped too quickly into untested waters. They plan to reprogram the 4,000 new, hand-held digital radios so they will operate using analog technology. The digital radios, which were bought at a cost of about \$14 million from Motorola, were abandoned in March when a distress call from a firefighter trapped in a burning house was not heard by some of his colleagues.

When put into service, the new radios, even in analog mode, are more powerful and durable than the ten-year-old radios they are replacing and will also operate on the UHF frequency, mak-

ing it possible to communicate with other city agencies.

Fire Commissioner Thomas Von Essen has called for an evaluation of whether digital transmission is best-suited for all firefighting situations. Fire officials have disputed the extent of the complaints, insisting the majority come from a lack of familiarity with digital half-second delays and sound distortions which resemble an echo. However, they have acknowledged the problem of simultaneous transmissions, which may have caused the March episode. One suggested solution is to install an override button so that a firefighter with a distress call would be heard.

Capt. Peter Gorman, president of the Uniformed Fire Officers Association, said, “I am very suspicious about this,” he said. “There was not one uniformed member of the department who knew anything about these radios before they were introduced last March. And since then we have not been able to get a word of feedback about what they have done to fix this.”

Washington D.C. got their new \$5.3 million system from Motorola in January. Firefighters report the “dead zones” are so bad they resort to using their own cellular phones during emergencies. Or, they may switch to Channel 16, a backup analog channel which communicates like a walkie-talkie to nearby squad members. That adds its own danger, however, since using that channel deactivates the emergency locator device.

Motorola's own test report specified four dozen locations, including major landmarks, in which the radios go dead or become unintelligible.

Chief Ronnie Few said the D.C. Fire and Emergency Medical Services Department needs 19 antennae but has only four. He is working to identify where additional antennae are required to fill in dead spots. Meanwhile, when a call comes from a known problem spot, he sends an extra truck to act as a communications relay. He also plans to push for legislation requiring contractors to install booster antennae on all new buildings.

A Motorola spokesman said the system is what the city ordered; the new antennae are not “fixes” but “enhancements.”

Bob Grove recently wondered what the REAL story is about how the Slinky toy came to be – so he contacted the manufacturer. Here's the scoop:

“The actual story is, back in 1944 Richard James was a naval engineer working at a ship building yard in Philadelphia. He was working with spring torsion experiments while trying to stabilize instruments on ships. One of the springs fell off his desk and started walking down a pile of books and other things that were stacked up. He took the spring home and his wife Betty named the toy.”

– Ray Dallavecchia, III, *Special Markets Sales Manager*

Okay, so the Slinky is another military by-product; but who was the first to use it as an antenna?!

Someone recently asked the WUN group (World Utility Net), what is the French version of the English “The quick brown fox...” test tape which utilizes every letter of the alphabet? Replies were forthcoming from Ralf Radermacher and from JMM:

“*Voyez le brick géant que j'examine près du grand wharf.*” (See the giant brick which I'm examining near the big wharf.), or.

“*Portez ce whisky au vieux juge blond qui fume.*” (Bring that whisky to the old blond smoking judge!)

“*Communications*” is compiled by editor Rachel Baughn from clippings and news sent in by our readers by mail and by Email. Thanks go to this month's reporters: Anonymous, Albany, NY; Kevin Carey, Bloomfield, NY; Dennis Cichanski, Arvilla, ND; Sterling Marcher, La Mirada, CA; J.P. Moodie, Portland, OR; Doug Robertson, Oxnard, CA; R. A. Sklar, Seattle, WA; and Robert Thomas, Bridgeport, CT. Via Email: Corwin, Robert Felton, John Figliozzi, Wayne Glenn, Alan Henney, Maryanne Kehoe, John Mayson, Ken Reitz, and Larry Van Horn.

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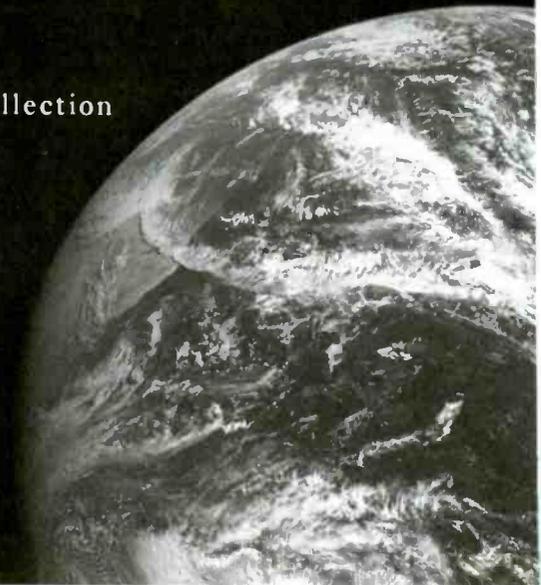
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"Since 1971"

QSLing the World

by Gayle Van Horn
 QSLs from Larry Van Horn's Personal Collection



Since broadcasters in Belize, Haiti, New Caledonia, and Tahiti left the airwaves, shortwave DXers and QSL collectors have lamented about how they were going to get these exotic countries verified. In some extreme cases radio listeners have turned to medium wave and FM broadcasting to put a new country or two in their logbooks. But despite the loss of some very good DX off the shortwave broadcast bands in recent years, for country chasers there is a better way to hear and verify these countries right now – via the amateur radio bands.

Yes, those friendly, fun loving, talkative ham radio operators might be just the ticket you need to get those exotic countries verified on shortwave frequencies. In fact, the last weekends of October and November each year present the listener with two golden opportunities to log and verify the likes of Jamaica, Jersey, Scotland and more on the ham bands, and you don't even need an amateur radio license to participate.

During the weekends of October 27-28 (Voice) and November 24-25, 2001 (Morse code) for 48 straight hours amateur radio operators from around the world will compete in the annual fall classic – the *CQ Worldwide DX Contest*. This contest is a favorite among hams the world over, and it's open to shortwave listeners to monitor as well.

What is "contesting"?

Quite simply, "contesting" is where amateur radio operators try to work as many stations as they can from as many different political entities (zones, prefixes, states and/or countries) as they can during a specific time frame. Contesting, to hams, is a showcase to display their talent and learned skills, whether the operator is a serious contender or a casual participant. The *CQ Worldwide DX Contest*, is the "granddaddy" of contests, equivalent to the World Cup, Super Bowl and Daytona 500 wrapped up into one weekend.

Amateur Radio contesting is so diverse that it holds an appeal for almost every operator from the beginning Technician class contestant, to the oldest Extra Class licensee. As a shortwave listener, you are not permitted to transmit without benefit of an amateur radio license. As a result, many listeners soon realize they too wish to compete as an operator, and obtain their license. This interest has grown since the advent of the "no code" Technician license.

Okay...Where are they?

To begin your October/November contesting odyssey, you will need to have a list of operating frequencies/bands to monitor for all the action. Amateur Radio operators are allocated bands throughout the shortwave radio spectrum, depending on their respective license class. Obviously, the U.S. Extra class operator will be permitted a larger range of frequencies within which he can transmit than the lower class General licensee. Here is a summary of where to look for contesters during the *CQ Worldwide*. These are U.S. amateur allocations.

TREASURE CAY, BAHAMA ISLAND

C6AGS

CONFIRMING QSO WITH		DAY	MONTH	YEAR
N5FPW		29	Oct	00
UTC	MOU	RSI	2-WAY	QSL
1435	212	59	SSB	Tnx

GARY STILWELL
 7632 Woodland Ln.
 Fair Oaks, CA 95628

ABACO ISLAND
 IOTA: NA-80

Morse Code (CW)	Voice (SSB)
160 meters 1800-2000 kHz	Both modes available throughout entire range
80 meters 3500-4000 kHz	3500-3750 kHz 3 7 5 0 - 4000 kHz
40 meters 7000-7300 kHz	7000-7150 kHz 7 1 5 0 - 7300 kHz
20 meters 14000-14350 kHz	14000-14150 kHz 1 4 1 5 0 - 14350 kHz
15 meters 21000-21450 kHz	21000-21200 kHz 2 1 2 0 0 - 21450 kHz
10 meters 28000-29700 kHz	28000-28300 kHz 2 8 3 0 0 - 29700 kHz

Armed with the ham frequency plans, your most important commodity during the contest should be your logbook. Although no longer an FCC requirement for hams, many DXers and ham operators realize what a necessity the log book is. In addition to tracking QSL submissions and contacts, your station logs provide information on conditions, frequencies and times. Keeping an accurate log is absolutely essential for every shortwave listener or ham, especially during contesting.

Ready to contest? Pick a band to tune across and listen for a station calling "CQ, CQ, CQ Contest" (they will usually repeat it two or three

CQ-33	ALGERIA	ITU - 37
7X4AN		
BOUKHAR MOHAMED N° 263 ZELBOUN 13121 TLEMCEM - ALGERIE		LOC. IM94GS 10-X # 33 610
Confirming QSO with:		Day Month Year
N5FPW/41QRP		22 Nov 99
UTC	NRW	RSI
1458	28	57
2-Way		QSL
SSB CW		TNX



times), followed by their call signs, most likely spoken phonetically. As a listener, you will be able to note their call sign, signal report and CQ Zone, and sometimes even their name and location. The operator will then pause and wait for a response from another operator that exchanges similar information. Occasionally operators will sometimes advise stations of their QSLing preference – either direct, manager, or through a QSL Bureau (more on that in a moment).

Now what?

OK, now they are in your logbook, now what? QSLing ham operators is an art unto itself, and far easier than most shortwave listeners realize. Unlike what is required to confirm a shortwave station, a reception report is not used in amateur radio, nor is a set time of monitoring. A contact between stations may last less than a minute, but that certainly qualifies as enough information to log the station and get their QSL card.

Radio amateurs regularly exchange QSL cards to acknowledge receipt of their contact. Verification cards are usually postcard size, somewhat similar to those sent out by shortwave or AM radio stations. QSL card designs may be a simple call sign logo card, or colorful photographs of the station, the operator, or scenery from the area where the station is located.

But some things are constant among these treasured pieces of paper. Cards will contain the basic information of call, location, time, date, frequency, signal report, and mode of transmission. In ham radio sending a QSL is a courteous way to complete a radio contact between two operators or a listener. In addition to being written proof of a contact, QSL cards are often used to prove eligibility when hams or SWLs apply for any of the thousands of operating certificates that are available through amateur organizations from around the world.

Creative QSL cards aren't exclusive to hams or broadcast stations. Many shortwave listen-

ers design their own shortwave listener cards to exchange as their personal QSL card, with similar verification information as the hams use. Souvenir post cards, professionally-produced or computer-designed cards may be used, and most amateur operators will gladly exchange their card with radio listeners.

The direct approach

There are several methods of exchanging QSL cards. The first and the quickest method is the direct route. If you prefer this approach, many amateur operators are listed on the QRZ.com website <http://www.qrz.com> proclaimed as the *Ham Radio Super Site*. If you want to send a QSL direct to the DX station, this should be your first stop on the web. Once you enter the ham's call sign at the website, you'll retrieve information that may include the operator's name, physical address, QSLing information, email address (if available) and sometimes a photo of their QSL card. The QRZ.com search page also will accept partial call signs just in case you didn't quite catch the entire call while the station was on the air.

Direct QSLing, although considerably faster than other methods, tends to become expensive if you have several cards to mail that require return postage, especially if they are foreign contacts. Fortunately for DXers and hams, a more efficient method has been devised for QSLing through the station QSL manager.

QSL Managers

QSL managers act as middlemen for a number of foreign ham radio operators. Hams and DX listeners send their QSLs to the DX station's manager. Sometimes you get lucky and the manager is located in the same country as you are located and you can use domestic postage rates instead of more expensive overseas rates to send your card.

Again, by searching the DX station's call sign at QRZ.com, you can search over 68,000 calls to inquire if that rare station you logged verifies through a QSL Manager. If you discover your operator does not verify through a manager, you will have to opt for the direct approach or via the "buro" (more on that below).

When the DX station's QSL manager receives a card, he checks the logs from that station, and if they agree, the manager fills out and sends the return card to the DXer. If you desire a direct response from a QSL manager, you must supply a self-addressed-envelope and adequate funds to pay for return postage. If you find a QSL manager that handles more than one station, it is advisable to send a separate return envelope for each card.

QSL managers also handle cards from operators in rare DX locations. Delays can arise when requesting the manager method; however, it tends to be quicker and more popular than the QSL bureau method.

"QSL Via Buro"

Sometimes locating a DX station's direct address or a QSL Manager may not be possible. To aid in getting the card through to the station, a QSL Bureau system has been devised by many

U.S. and worldwide amateur organizations. Also, as postage costs keep rising, QSLing via these bureaus (or buro in ham shorthand) is the cheaper way to collect an impressive ham QSL collection. Depending on the bureau or service, it is possible there will be some cost involved, mainly membership in the organization. Although typically slower, the use of a QSL bureau will often result in a greater chance of verifying foreign ham radio operators.

One of the best parts of ARRL (American Radio Relay League) membership is the opportunity to use the League's Outgoing QSL Service. Considering the potential savings on postage as an individual, QSLing via the bureau is equal to many times the price of your annual dues.

To use this service, you need to include a copy of your membership card with \$4 for a half-pound of postage – equivalent to seventy-five QSL cards. A package of ten cards or less in a single shipment costs only \$1. You can pay by check or money order and be sure to write your callsign (if applicable) on the check. Sending the League currency ("green stamps") is not recommended, nor are postage stamps or IRCs, as they cannot be forwarded to foreign QSL bureaus.

Pre-sort your DX QSLs alphabetically by parent callsign prefix (AP, C6, CE, DL, ES, F, G...and so on). When sorting countries with multiple prefixes, keep that country's prefixes grouped together alphabetically and do *not* separate countries by envelopes, rubber bands, paper clips or *Post It* notes. Include only your cards, fee, and proof of membership in the package and mail to: ARRL Outgoing QSL Service, 225 Main St., Newington, CT 06111 USA

Your cards will be sorted by the Outgoing Service staff, and usually are mailed overseas within a week of arrival at the ARRL headquarters. QSL cards are shipped to worldwide QSL bureaus, which are typically maintained by the National Amateur Radio Society in each country. This service should not be used to exchange QSL cards within the 48 contiguous states. Those will need to go using the direct method.

The worldwide QSL bureau systems handle most of the amateur cards sent today, but it is the slowest method. Getting that coveted DX card via this method may require several months to a year or more, but you will save money by QSLing the countries through the bureau.

The ARRL Outgoing QSL Service serves 260 countries as defined by their DXCC country list. In some cases, there is no incoming bureau in a particular country and cards therefore cannot be forwarded via the bureau system. In these cases direct or via a QSL manager is your only option. At presstime the following coun-

FERNANDO DE NORONHA ISLAND

PTØF

COMPOSITE QSO WITH		DAY	MONTH	YEAR
CALL	MODE	26	3	2000
1304	2R	59	SSB	TXK

JAMES HOFFMAN, NSFA
4824 Winnett Rd.
Burlington, TX 76028 USA

GIBRALTAR ZB2X

QSL Addr: JORMA SALORANTA, Karhutie 39, 00800 Helsinki, FINLAND

CONFIRMING CALL WITH	DATE DAY MONTH YEAR	UTC	HRZ	RST	MODE 2-WAY
N5FPW	28 09 2000	0001	1.8	599	QWQSSB

PSE QSL TNX QSL

tries cannot be forwarded by the League's Outgoing Service.

A5	Bhutan
A6	United Arab Emirates
D2	Angola
J5	Guinea-Bissau
KH0	Mariana Island
KH1	Baker and Howland Island
KH4	Midway Island
KH5	Palmyra and Jarvis Island
KH7K	Kure Island
KH8	American Samoa
KH9	Wake Island
KPI	Navassa Island
KP5	Desecheo Island
P5	North Korea
S7	Seychelles
SU	Egypt
T2	Tuvalu
T3	Kiribati
T5	Somalia
T8	Palau
TJ	Cameroon
TL	Central Africa
TN	Congo
TT	Chad
TY	Benin
V6	Micronesia
VP2M	Montserrat
XU	Cambodia
XW	Laos
XZ (1Z)	Myanmar (Burma)
YA	Afghanistan
ZD9	Tristan da Cunha
ZK1	North & South Cook Islands
3C0	Pagalu Island
3C	Equatorial Guinea
3W, XV	Vietnam
3X	Guinea
5A	Libya
5R	Madagascar
5T	Mauritania
5U	Niger
70, 4W	Yemen
7Q	Malawi
8Q	Maldives
9N	Nepal
9U	Burundi
9X	Rwanda

You also need to be aware that some national societies restrict the forwarding of QSL cards to anyone other than members of that country's national Amateur Radio Society. Those countries include: France, Germany, Japan, Monaco, Morocco, Portugal and Poland. Additional information on the League's Outgoing QSL service can be found at <http://www.arrl.org>.

The Return Trip – Incoming QSLing

Within the United States, the ARRL Incoming QSL bureau is comprised of numerous call-area bureaus that act as central clearing houses for cards arriving from foreign countries. Staff volunteers receive and forward the cards to "incoming" bureaus throughout the United States. The staff of these incoming bureaus sort the incoming cards by the first letter of the call sign prefix. The service is free and ARRL membership is not required.

Canadian amateurs can find out more information about their bureaus at <http://www.rac.ca/qsl.htm>. In the United States all incoming QSL Bureaus have email addresses, and many bureaus have active web pages to aid the DXer in learning more about how to use the service.

Ready to collect your QSLs?

Send a 5 x 7-1/2 or 6 x 9 inch self-addressed envelope, or money credit where applicable, to the incoming bureau serving your call sign district. Print clearly your name and call sign if you have one in the upper left corner of the envelope and place your mailing address on the front on the envelope. One suggested method is to affix a first class stamp and clip extra postage to the envelope. If you receive one ounce of cards, they can be mailed in a single package.

You may also purchase envelopes and postage credits, from various incoming bureaus in addition to the normal SASE handling. Once the prepayment of funds is received at the bureau they will provide the proper envelope and postage. To learn more about this method send your inquiry with an SASE to your area bureau. A list of incoming bureau addresses appear in this article.

Ultimately, good cooperation between the DXers and his or her bureau is most important to ensure you receive your cards. The bureau system is an excellent tool for the DXer and the ham, staffed by volunteers who provide a valuable service. By following the rules of Do's and Don'ts below, you, too, should receive your verifications without a problem.

The Do's

Do keep self-addressed 5 x 7-1/2 or 6 x 9 inch envelopes or money credit on file at your bureau, with your call in the upper left corner, and affix at least one unit of first-class postage.

Do send the bureau enough postage to cover SASEs on file and enough to take care of possible postage rate increases.

Do respond quickly to any bureau request for SASEs, stamps or money. Unclaimed card backlogs are the bureau's largest problem.

Do notify the bureau of your new call sign as you upgrade you amateur license. Please send SASEs with your new call in addition to SASEs with your old call.

Do include an SASE with any information request to the bureau.

Do notify the Bureau of a change of address.

The Don'ts

Don't send domestic US-to-US cards to the various call-area bureaus.

Don't expect DX cards to arrive for several months after the contact. Overseas delivery is very slow. Many cards coming from overseas are over a year old.

Don't send your outgoing DX cards to your call-area bureau.

Don't send SASEs to your "portable" bureau. For example, N5FPW/4 sends SASEs to the W4 bureau, not the W5 bureau.

Don't send SASEs or money credits to the ARRL Outgoing QSL Service.

Don't send SASEs large than 6 x 9 inches. SASEs larger than 6 x 9 inches require additional postage surcharges.

Incoming ARRL QSL Bureau Addresses

Amateur operators should send SASEs to their respective call areas, usually corresponding with their call letter districts as indicated by their call letters. Shortwave listeners can send their SASEs to: Mike Witkowski, WDX9JFT, 4206 Nebel St., Stevens Point, WI 54481.

The following addresses will assist both the ham and shortwave listener alike.

First Call Area: W1 QSL Bureau, P.O. Box 7388, Millford, MA 01757-7388

Second Call Area: ARRL 2nd Dist. QSL Bureau, NJDXA, P.O. Box 599, Morris Plains, NJ 07950

Third Call Area: Pennsylvania DX Association, P.O. Box 100, York Haven, PA 17370-0100

Fourth Call Area (All single-letter prefixes K4, N4, W4): Mecklenburg ARC, P.O. Box DX, Charlotte, NC 28220

Fourth Call Area (All two-letter prefixes AA4, KB4, NC4, WD4, etc.): Sterling Park ARC, Call Box 599, Sterling, VA 20167

Fifth Call Area: W5 Incoming QSL Bureau, Magnolia DX Assoc., P.O. Box 999, Wiggins, MS 39577-0999

Sixth Call Area: ARRL Sixth (6th) District DX, QSL Bureau, P.O. Box 900069, San Diego, CA 92190-0069

Seventh Call Area: Willamette Valley DX Inc, P.O. Box 555, Portland, OR 97207

Eighth Call Area: 8th Area QSL Bureau, P.O. Box 182165, Columbus, OH 182165

Ninth Call Area: Northern Illinois DX Assoc., W9 Incoming QSL Bureau, P.O. Box 4798, Glenview, IL 60025-0273

Tenth Call Area: QSL Bureau, P.O. Box



RAROTONGA (IOTA:OK 013)
COOK ISLANDS

ZK1JD

CONFIRMING QSO

DATE	UTC	STATION	RST	FREQ	MODE
28 Nov 2000	00 01	N5FPW	51	28351	SSB
Rlg - 1001738 Pwr 1000 Ant YAGI					
Rmks 733 QSL Pse <input type="checkbox"/> Tru <input type="checkbox"/>					
JW DITCHBURN PO BOX 401 RAROTONGA COOK ISLANDS					

4798, Overland Park, KS 66204

Puerto Rico: Puerto Rico QSL Bureau, P.O. Box 9021061, San Juan, PR 00902-1061
US Virgin Islands: Virgin Islands ARC, GPO 11360, Charlotte, Amalie, Virgin Islands 00801

Hawaiian Islands: Wayne Jones, NH6K, P.O. Box 860778, Wahiawa, HI 96786

Alaska: Alaska QSL Bureau, P.O. Box 520343, Big Lake, AK 99652

Guam: Guam QSL Bureau, Marianas A.R.C., P.O. Box 445, Agana, Guam 96932

QSL Cards for Canada hams may be sent to:

RAC Incoming QSL Bureau, Box 51, St. John, NB E2L 3X1

Also QSL cards for Canadian hams may be sent directly to the individual bureaus:

VE1, VE0: Brit Fader Memorial QSL Bureau, Box 8895, Halifax, NS B3K 5M5

VE2: Jacques Dube, VE2QK, 875 St. Severe St., Trois-Rivieres, QC G9A 4G4

VE3: The Ontario Trilliums, Box 157, Downsview, ON M3M 3A3

VE4: Adam Romanchuk, VE5FX, 26 Morrison St., Winnipeg, MB R2V 3B4

VE5: Bjarne Madsen, VE5FX, Box 2860, Tisdale, SK S0E 1T0

VE6: VE6 Incoming QSL Bureau, Box 1515, Gibbons, AB T0A 1N0

VE7: Dennis Livesey, VE7DK, 8309 112th St., Delta, BC V4C 4W7

VE8: Rolf Ziemann, VE8RZ, 2 Taylor Rd., Yellowknife, NWT X1A 2K9

VE9, YV2: VE9, YV2 QSL Bureau, Box 12-255, 1633 Mountain Rd., Moncton, NB E1G 1A5

VO1, VO2: Rick Burke, VO1SA, Box 23099, St. John's, NF A1B 4J9

VY1: Hugh Henderson, VY1HH, P.O. 33062, Whitehorse, YT Y1A 5Y5

QSL and Packaging Tips for Outgoing Cards

Consider first, who is to receive your card. As mentioned before, whether to package your outgoing cards to a QSL Manager or send them direct is the first decision. Here some additional considerations:

DX stations receive thousands of verification cards, most notably during contests. If you really want that QSL card, especially the rare ones, it is essential that you package your outgoing cards accordingly.

Are you considered "rare" DX? Probably not if you are stateside station; however, if you expect a reply you should at least include a self-addressed-stamped envelope (SASE) to ensure your reply.

Ensure you entered the correct time and date on the QSL. The exact date and time in UTC (not local time) must be entered on your card to avoid a QSL Manager writing "NIL" (Not in Log), on your card. What a waste if that catch was a "rare one."

When designing your card, why not consider putting your call sign, name and such, on the

same side of your QSL card with the contact information? The manager will not have to flip back to front, and it may decrease the chance of a manager getting the wrong call sign. If you prefer to have your QSL cards professionally designed, several QSL card designers and printers can produce everything from simple and inexpensive cards to decorative, multicolored cards with custom photos and text. Consult the QRZ.com website for their extensive listing of sources.

Using pre-glued envelopes for your SASE's, known as "Peel and Seal," is a great advantage over regular envelopes. The manager simply pulls the strip off the backing and presses it to seal. This makes his job one step easier, a plus for both of us!

Including a small sheet of wax paper on the inside of a regular envelope will prevent the envelope from self-adhering during transit to the DX station or manager. This is a super idea when mailing to tropical areas or any area where moisture is likely.

Many QSL managers have noted the lack of return addresses on SASE's. Since the manager deals with many such envelopes, it is unlikely they will insert their own address as a "return address" on the envelope. Therefore, many suggest the DXer put the QSL manager's address in the top left corner of the SASE. This tip may just avoid a trip to the postal dead letter department for lack of delivery to you!

QSL Report contributors will attest to the growing popularity of using mint postage stamps on self-addressed-envelopes to stations. Using this method through a manager or direct mail remains a successful strategy in amateur radio. By affixing the stamps to the SASE, you make the manager's job easier and your card will possibly be sent out as soon as it is processed. Be sure to affix sufficient postage to cover all postage expenses. Foreign stamps, airmail and nesting envelopes may be purchased through: DX Stamp Service, c/o Bill Plum, 12 Glenn Road, Flemington, NJ 08822-3322 USA. Ph: (908) 788-1020 Fax: (908) 782-2612.

The direction of the fold of the SASE is equally important so that it will fit into your outgoing envelope. When you insert the folded SASE, do not allow the fold to be at the top of the envelope. By not inserting your SASE properly, your envelope could be sliced in half as the QSL manager opens his mail.

You've read about it many times. Postal theft is an increasing problem. Writing "ham radio contest" on an envelope could spell disaster, especially if you've enclosed currency. If your mail will travel to countries with less than honest clerks, you will have a better chance of its arrival by not putting your call sign on the outside of the envelope. It's also a good idea to put your call on the inside flap of the SASE, in case the manager gets your envelope mixed up with another envelope.

Another great idea is to address your envelope only with the name (minus the amateur callsign) or to "Mr. and Mrs." from yourself, and use a "Mr. and Mrs." for your return name. This makes it appear more personal instead of a QSL request. Security-lined envelopes with a pattern printed inside will also secure the con-

tents of the envelope. It is also helpful to wrap a piece of opaque paper or aluminum foil around your QSL card and enclosures.

Letters have also been stolen to rip off the airmail stamps. Why not use the services of the post office postal meter strip? This is a great idea for direct mail to South America or Africa.

Do you secure the back of your envelopes with a sealing tape? Not a great idea. This is a dead give-away that there is probably something of value (like currency) inside!

The only time you should opt for sending your mail via registered or certified mail, is if it is the only way to ensure that the envelope is handled correctly through your country's postal service. But, using either method, if it is not needed, is time-consuming for the manager, who must go to the post office to sign for the letter. Who wants a process that will delay your receiving a verification?

There is an excellent chance your QSL manager is a stamp collector. Why not include a few commemorative or domestic stamps that are less common in your county within your envelope? Shortwave QSL collectors have used this incentive for extra "goodies" for many years.

Speaking of "goodies," sometimes it's the extra touch that will reward your efforts with an exotic QSL card. In New Orleans, they call it "l'aginaire," which means a little something extra for free. For DXers and hams, these can be items added to your mailing, in addition to an SASE and your QSL card, to hopefully entice your recipient. As previously mentioned, mint stamps are popular, especially plate blocks of new or older stamps.

And who doesn't like to brag about their state or city? I keep a supply of souvenir postcards from the local area and highly recommend them. Pocket calendars are very big in South America along with a personal note (in Spanish is a nice touch) and your personal business card. While you're bragging, show off your shack with you at the dials. It is a great way to put a name with a face!

So there you are, QSLing for the ham and shortwave listener. But are you ready for the big contest? As a DXer, if you're not familiar with the process of hams transmitting their calls, find a ham radio net and practice writing the call letters. Amateur operators routinely gather on the air to conduct a brief roll call, then pass traffic or conversation on a variety of topics. Nets can last from a few minutes to several hours, depending on the net control operator, type of net or propagation conditions. One such net that can be heard nightly around 0000 UTC on 7233.5 LSB is the 3905 Century Club <http://www.qsl.net/3905cen/>. It is a good place to practice copying ham callsigns. You can get a large list of amateur radio nets from John Norfolk's *Net To You!* listings. You can find it at <http://www.angelfire.com/ok/worldofradio/net2you.html>

So now, armed with this guide, I hope you will have successful weekends chasing DX, and QSLing them during the upcoming *CQ World-wide DX Contests*. Be sure to let me know of your QSL successes. When the cards begin rolling in, please share them with *MT's QSL Report!*

Ham Licensing in Canada

By John David Corby, VA3KOT

I remember the night very well. It was a warm summer evening with a clear, dark blue, starry sky. It was the summer of 1965 and I was bicycling through the darkness to attend my first amateur radio club meeting. A friend of mine had an older brother who was a licensed ham. I had been allowed to feel the controls of his "19 set" and I was hooked. At the club meeting, an HF set was fired up and I listened in on a transatlantic QSO for the first time. That night I made myself a promise that I too would become a ham.

The enthusiasm of youth is a powerful emotion that can inspire ambitions lasting a lifetime. That is probably fortunate, because I kept that promise to myself a full thirty-six years later, in a new millenium. High school graduation, college years, an early plunge into marriage, then children, put the promise on hold. It was only when my teenaged daughter announced her intention to join the amateur radio group of her local Air Cadet squadron and get her license, that I finally sprang into action.

After all those years as a shortwave listener, scanner owner, and satellite monitoring sleuth, I brushed the cobwebs off that 1965 promise and took the plunge. So, in March 2001, I joined the Peel Amateur Radio Club and took the test. Three weeks later I was awarded a certificate of proficiency in amateur radio by Industry Canada. Even though that certificate is freshly hung on the shack wall, I feel that I have been a part of the ham community most of my life.

Canada's Radio Heritage

Canada has a rich radio heritage. Perhaps by virtue of its geography alone, the eastern-most point in Canada – St Johns in Newfoundland – was chosen by Guglielmo Marconi as the North American site for the first transatlantic radio transmission in 1901. Today, in the Cabot Tower atop Signal Hill, overlooking St Johns Harbor and the Atlantic Ocean, is a ham station operated by the local club. When I visited the

station a couple of years ago, the operator was busy talking with a European station on HF. He paused to share his pride in operating from such a historic site.

The amateur radio service in Canada dates back to 1914 when Parliament issued regulations prescribing operating and proficiency standards for Canadian amateur radio operators. Today, the number of licensed hams in Canada is approaching 50,000.

Licensing in Canada

Canada has joined the rest of the world in making the task of getting that first amateur radio "ticket" a lot easier. The Canadian government licenses amateur radio operators through a department called "Industry Canada." Industry Canada (Radiocommunications and Broadcasting Regulatory Branch) is responsible for managing the radio spectrum in this country and for issuing licenses for the operation of radio equipment.

The amateur radio service provides for three classes of licenses in Canada:

1. **Basic** - restricted to operation in all bands above 30 MHz. Basic certificate holders must limit their output power to 250 watts and are not allowed to build their own transmitting equipment.
2. **Morse Code** at 5 w.p.m. - allowed to operate in the HF bands below 30 MHz at up to 250W output power.
3. **Advanced** - allowed to operate in all bands allocated to the amateur radio

service at up to 1000 watts. Allowed to build their own transmitting equipment and to set up and operate repeater stations.

The Basic Test

Canadians venturing into the hobby for the first time are required to pass a 100 question, multiple choice examination for the Basic class qualification. The pass mark is 60%. Questions are drawn from eight categories:

1. Regulations and policies
2. Operating and procedures
3. Station assembly, practice and safety
4. Circuit components
5. Basic electronics and theory
6. Feedlines and antenna systems
7. Radio wave propagation
8. Interference and suppression

The test usually takes less than an hour to complete (although de-

pending on individual aptitude, it may involve weeks of study – and maybe years of procrastination) and opens the door to the world of amateur radio. My club runs classes and conducts testing at no charge, as a service to the amateur radio community, but my biggest surprise was not having to pay any kind of fee to the government. Amateur radio licenses do not expire in Canada; they last for the lifetime of the holder, and they are free!

Learning the Code

Upgrading the Basic license to gain privileges on the HF bands involves passing a Morse Code test. The test to qualify for access to Morse Code or phone (voice) use of the HF bands involves sending and receiving Morse Code at a speed of at least 5 w.p.m. for three consecutive



The Peel ARES team at work

minutes. Each character omitted, or incorrectly sent or received, is counted as one error. A pass mark of one hundred percent is required and is awarded to candidates who record five errors or less, on both the sending and receiving tests.

The debate over the relevance of Morse Code in the third millennium rages in Canada, just as it does in other parts of the world. In an age of high speed Internet who needs an archaic code that is both hard to learn, and slow to convey information? My answer is "me." I live in a rural area that has no high speed Internet and frequent power cuts. It is easy for me to visualize emergency conditions that restrict power and strip away the conveniences of 21st Century communications. On/off signalling may be slow, and it may even be archaic, but if a natural or man-made disaster took available technology back to the Stone Age, Morse Code will still be available. Morse code can be sent using sunlight and a mirror, or even smoke signals, if necessary.

The Advanced Qualification

The examination for the Advanced qualification comprises a 50 question, multiple choice test. Once again, the pass mark is 60%. The questions are drawn from a question bank (as they are for the Basic examination) involving the following topics:

1. Advanced theory
2. Advanced components and circuits
3. Measurements

4. Power supplies
5. Transmitters, modulation and processing
6. Receivers
7. Feedlines – matching and antenna systems

The Advanced qualification involves a much deeper knowledge of theory, and is essential for clubs setting up and operating their own repeaters. Just as in the United States, Canadian clubs operate a vast network of repeaters, most of which are open for use by any licensed amateur.

Bandplans in Canada

Even though the United States and Canada share many common factors related to amateur radio, there are some differences that it is important to understand. In addition to the different classes of licenses granted in each country, there are also differences in a couple of the bandplans. Although these differences are small, it is possible to find oneself in violation of band restrictions if the differences are not learned and observed.

In Canada, amateur radio operators have exclusive use of the 220-222 MHz band, but in the United States, these frequencies are allocated to fixed and mobile services. The United States and Canada share a very long border, and most of the Canadian population lives within a couple of hundred kilometers of the border. This means

that Canadians operating on their own side of the border have to be very careful not to cause interference to primary American users of the same frequencies.

Canada and the United States entered into an agreement on the use of 220-222 MHz in 1999. Canadian use of these frequencies is subject to restrictions under that agreement. The restrictions vary depending on which of three geographic zones a Canadian ham is operating from.

There is also a difference in the frequencies assigned to the popular 70cm band. In the United States, this band extends from 420 - 450 MHz. In Canada, the band lower limit is 430 MHz. Americans operating near the Canadian border must observe restrictions to prevent interference to primary Canadian users of the 420-430 MHz range.

Radio Amateurs of Canada (RAC)

Americans have the ARRL (American Radio Relay League), the British have the RSGB (Radio Society of Great Britain), and Canada has the RAC (Radio Amateurs of Canada). Often pronounced simply as "RACK," it is the national body supporting amateur radio operators in Canada. RAC is Canada's voice on the IARU (International Amateur Radio Union). It is also the self-governing body that administers licensing qualifications and testing on behalf of Industry Canada.

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Prior to 1993 there were two amateur radio organizations in Canada; the Canadian Radio Relay League and the Canadian Amateur Radio Federation. In that year the two organizations merged to create a single cohesive body that would be able to represent Canadian hams in all ten provinces and three territories from the Atlantic coast, to the Pacific coast, to the Arctic coast.

Canadian Callsigns

Canadian amateurs can be identified as to their home province or territory by their callsign prefix. Currently, eighteen prefixes are in use in Canada:

VA1, VA2, VA3, VA4, VA5, VA6, VE1, VE4, VE5, VE6, VE7, VE8, VE9, VO1, VO2, VY0, VY1, VY2

All regular Canadian prefixes begin with the letter "V" followed by either "A", "E", "O" or "Y" and a single numeric character. The prefix identifies the geographic province or territory as shown in Table 1.

Table 1: Canadian Callsign Prefixes

VO1 - Newfoundland
 VO2 - Labrador
 VY2 - Prince Edward Island
 VA1, VE1 - Nova Scotia
 VE9 - New Brunswick
 VA2, VE2 - Quebec
 VA3, VE3 - Ontario
 VA4, VE4 - Manitoba
 VA5, VE5 - Saskatchewan
 VA6, VE6 - Alberta
 VA7, VE7 - British Columbia
 VY1 - Yukon Territory
 VE8 - North West Territories
 VY0 - Nunavut

Callsign suffixes may be either two or three alpha characters and are assigned from a pool of available character combinations. Radio Amateurs of Canada publishes available callsigns on its website, and hams can either select their choice of whatever is available, or allow Industry Canada to assign one. "Vanity" callsigns are not officially available, but hams may select an available character combination that may have some special significance to themselves. For example, some may be lucky enough to find an available callsign with their own initials. My own callsign (VA3KOT) contains the first initials of my wife and two children.

USA and Overseas Hams Operating in Canada

The spirit of amateur radio is not divided by international borders. Canada and the United States share a common border stretching for thousands of miles, but our community of spirit flows over that border far more easily than we can. Canada welcomes hundreds of thousands of Americans into our country every year, and judging by the callsigns that I frequently hear on repeaters, many of our visitors are licensed

American hams. Reciprocal agreements between Canada and the United States allow hams from either country to operate reasonably freely while visiting the other side of the border.

There are rules governing operating privileges for American hams visiting Canada. Since our licensing systems are different, the privileges available when operating on a particular band in Canada are matched to specific classes of American licenses. For example, Americans without CW qualifications in the USA, are permitted to operate with the same privileges as a Canadian amateur with "Basic" and "Advanced" qualifications. Americans with Morse Code qualifications of at least 5 w.p.m. are allowed to operate with the same privileges as Canadians possessing Basic, 5 w.p.m. and Advanced qualifications. Regulations are subject to amendment from time to time, so it is always wise to check the latest information available at either the RAC or ARRL websites before traveling.

Visitors from other countries may require a "CEPT" or "IARP" permit to operate in Canada. CEPT licenses are most likely to be required for European hams, and IARP (International Amateur Radio Permit) licenses will usually be required for visiting hams from countries in the Americas.

Ham Activities in Canada

Hams in Canada share the same activities enjoyed by amateur radio enthusiasts all over the world. There are many clubs all across the country that support participation in the hobby through study classes, examinations and special interest groups. A lot of clubs operate their own repeater stations, and some participate in linked repeater systems with cross-border communications to the United States.



Canadian Hamfests are always crowded events

Although none can rival the internationally famous Dayton event, there are many "hamfests" and swap meets throughout the spring, summer and fall months. These crowded events are always a good opportunity to shop for a new rig, antenna, or bits and pieces for that next homebrew project. Hamfests sometimes also provide an opportunity for new hams to qualify for that first Basic license, or to upgrade a ticket to CW or Advanced class.

An essential element of the amateur radio service is to provide public service communications during times of emergency. Canadian hams participate in ARES (Amateur Radio Emergency Service) and have a good track record during tornadoes, blizzards and ice-storms. The "Canwarn"

service is run in conjunction with Environment Canada to provide communications support during extreme weather conditions. Participating hams are trained by Environment Canada (the government department responsible for weather forecasting) to recognize warning signs, and to communicate reports in a precise and consistent manner.

The annual ARRL Field Day is observed in June on both sides of the border. Canadian clubs vie for contest awards alongside US hams in a continent-wide, 24-hour long jam-boree of radio fun.

Other locally organized activities include "fox-hunting" in which the "fox" (a club member with a transmitter in an unknown location) is tracked down by other club members with direction finding equipment.

Challenges to the hobby in Canada

Some sources report a decline in interest in amateur radio in Canada. The Internet has eroded the thrill of international communications. I receive e-mails from remote parts of the globe every day and I can monitor what is happening in other countries through a plethora of websites. I can well remember monitoring Radio Prague on a homemade shortwave set during the invasion of Czechoslovakia in 1968, and the thrill that I felt about it at the time. It just wouldn't feel the same today.

Today's Family Radio Service provides a very inexpensive, available alternative to rag-chewing on the local 2-meter repeater for some. Cellular telephones permit easy, inexpensive and convenient voice communication all around the world.

However, there is one element of the radio hobby that will always preserve it in the minds of hams in Canada and elsewhere, and that is a passionate interest in the medium itself. The desire to experiment, and to understand what works and what doesn't work – and why. Amateur Radio will always survive, even if it takes thirty-six years for some of us to get off the sofa and get involved!

73 to all de VA3KOT.

Acknowledgement: my thanks go to Joe Valente, VE3VDK, and the Peel Amateur Radio Club for the use of their pictures in this article.

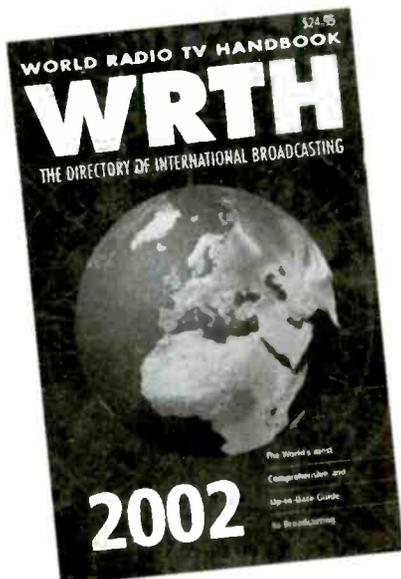
Table 2. Sources of further information:

Industry Canada
 Radiocommunications and
 Broadcasting Regulatory Branch
 300 Slater Street
 Ottawa, Ontario
 K1A 0C8
<http://strategis.ic.gc.ca>

Radio Amateurs of Canada (RAC)
 720 Belfast Road, Suite 217
 Ottawa Ontario
 K1G 0Z5
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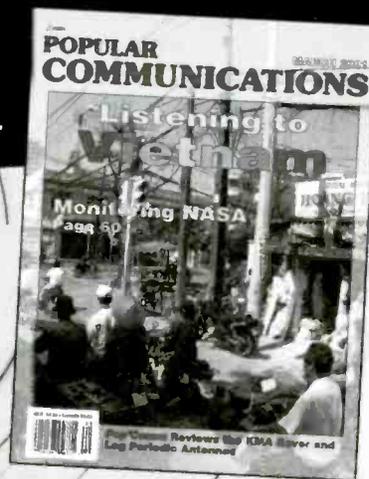
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The History and Future of Radio

By Dr. John F. Catalano

Today, in the year 2001, most of us think of a desktop receiver as a few microchips, a display, some control knobs and a loudspeaker. Others, who are computer-based, just think of a computer-controlled receiver as a black-box with a cable connecting it to a computer. And yet owners of wide-band handheld receivers, such as the R2 or VR-500, think of it as portable, cigarette-pack size and battery operated. In all cases the radio receivers of today are simple to operate but complex in the technology they utilize.

This was not always the case. As we will see in this two-part feature on the past, present and future of radio, early radio wave reception was just the opposite of today's situation. The early receivers were complex to operate but simple in the technology it employed. Let's go back to the roots of radio and the people who shaped its future.

The First Spark

At the end of the 19th century, when Heinrich Hertz sent a radio signal across empty space, he utilized the then revolutionary spark gap technology.

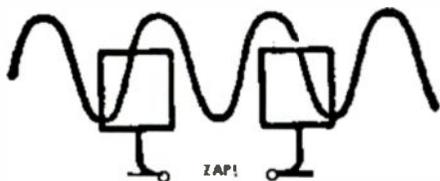


Figure 1 – Hertz Spark Gap Receiver – Pre-1900

The transmitter consisted of a telegraph key, a spark gap, and tuning coils. The tuning coils were connected to a long, horizontal wire, which acted as the transmitting antenna. A source of electricity is connected to a telegraph key, which in turn is connected to the spark gap. The spark gap was nothing more than two conductors spaced close enough together so that the supplied electricity would ionize the air between the conductors. This resulted in a spark being generated between the conductors. The spark gap turned on and off at a low audio rate. In

other words, it buzzed. This, in turn, causes the transmitter's tuning coils to generate a radio wave having a range of frequencies.

Hertz used a similar spark gap arrangement as the receiver. The spark gap receiver was "tuned" to the frequency(s) of the transmitter by adjusting LC networks consisting of coils and capacitors. Coarse tuning was obtained by adjusting the spacing of the spark gap conductors. The "tuning" approach was very empirical and required patience and a measure of luck. If tuned correctly, a small spark was generated at the receiver by the transmitted spark.

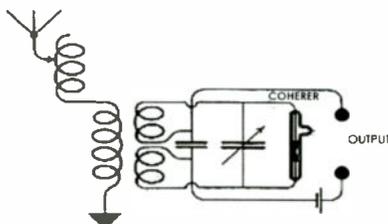


Figure 2 – Radio – wire coils, capacitor, coherer and headphone circa 1900

Ships began to carry spark gap transmitters and receivers, the importance of which gained widespread acceptance after the *Titanic* sank.

DXing with the Spark Gap

When reception over longer distances was attempted, a more sensitive indicator, or detector, was needed. Here the inventors of the day modified a device that was used to protect electrical devices, such as telegraph lines, from lightning.

The long distance, high sensitivity detector device was called the coherer. It consisted of a glass tube loosely filled with metal filings. A wire was sealed into each end of the glass tube so the wire ends were in contact with the metal filings. When the filings are lying loosely in the tube, the coherer shows a high resistance to the flow of electric current. When connected to the tuning coils, and in the presence of a radio signal, the filings will rearrange themselves to form a low resistance path. This low resistance condition will continue after the radio signal goes away and as long as the glass tube is not physically disturbed.

If the coherer is tapped with a small object, the metal filings will be rearranged back into their "off," or high resistance condition. So, the early receivers used a sensitive relay in series with the coherer to boost the current high enough to operate a telegraph sounder.

The coherer and the sounder were arranged together so that whenever the sounder "clicked," it would reset the coherer. In this way, the person at the receiver would hear buzzes of long and short duration, corresponding to the message being sent at the transmitter. Even with this simple setup, messages could be sent over long distances without wires and over water; also, where it was difficult or impossible to place a telegraph wire.

In those days, around 1900, a radio was a few coils of wire, a detector and a pair of headphones. See Figure 2.

Experimenters wanted to send voice over long distances. The spark gap system could only be "on" or "off" and therefore was unsuited for audio (voice) signals.

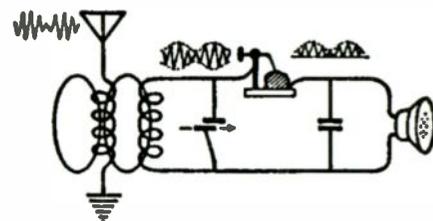


Figure 3 – Crystal Diode Detector-based Radio Circuit circa 1907

Around 1906 a high-powered a-c generator (alternator) was developed using a high-enough frequency to be used as a voice transmitter. These were the earliest broadcast transmitters. But the coherer was an unsatisfactory detector for receiving audio because it, too, was strictly an "on" or "off" device.

The "Detector" Search

In an attempt to find a suitable detector for audio signals, many different types of materials were placed in the circuit between the tuning coils and the telephone receiver (or headphones). Those that worked had the property of rectify-

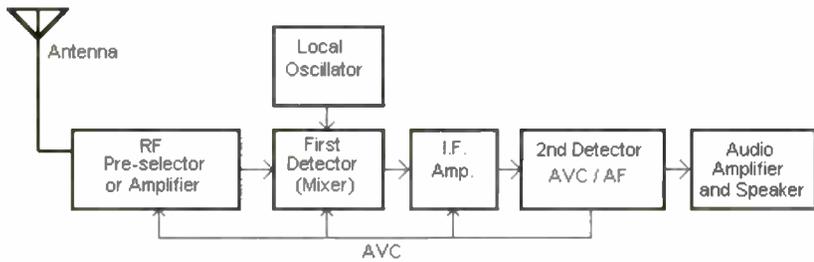


Figure 4 – Armstrong's Superheterodyne circa 1918

cation; that is, electric current passed through the material in one polarity or direction but was blocked (or partially blocked) in the opposite direction. Some detectors were crystals like galena, silicon, carborundum and germanium.

Fessenden even invented an electrolytic detector using a jar filled with an acid. A platinum wire was mechanically adjusted to barely touch the surface of the liquid.

But none of the inventions provided a reliable, easy-to-use voice detector, and the search continued.

The Industrial Drone's Brilliance

Now, before all this interest in radio had occurred, Thomas Edison was hard at work perfecting his incandescent electric light bulb. One factor that limited bulb life was the blackening of the inside of the glass bulb, which occurred gradually over the life of the bulb. In an attempt to reduce or eliminate the blackening, Edison placed a metal plate inside the bulb along with the filament. He ran a wire from the plate through the glass of the bulb. This allowed him to apply a voltage between the filament and the metal plate.

Unfortunately, the experiment didn't reduce bulb blackening. However, it did result in the discovery of the Edison effect: current flowed when the plate was positive and the filament was negative, and current would not flow when the plate was negative and the filament was positive.

Although he had inadvertently invented the vacuum tube rectifier, Edison could find no practical use for it at the time. This was to be the breakthrough detector that radio experimenters were trying to develop.

If At First You Don't Succeed ...

Marconi was a charismatic, intelligent entrepreneur who is well remembered by the public as the "father" of radio. But Marconi's success in radio occurred only after he had a string of business failures using capital raised from his Italian father's family connections. His other business results were so abysmal that he was forced to travel to England and enlist the financial backing of his English mother's family. Have you ever wondered why the Italian Marconi started a radio business in England? Now you know. He had creative people working for him, such as Sir Ambrose Fleming, who invented products on his behalf.

Around 1905 Marconi and company were also looking for the best possible detector for their radios. Sir Ambrose Fleming, who then

worked for Marconi, dusted off the Edison effect, which Marconi had purchased earlier from Edison "lamp," and discovered that it made a good radio frequency detector! It was then patented as the Fleming valve consisting of a cathode (filament) and a plate. This device was later to be known as a diode detector, or two-electrode vacuum tube, and gave birth to the vacuum tube (valve) technology and industry.

Vacuum tube based receivers were to become commonplace in all radio applications for the next 55 years! The new vacuum tube technology not only enabled a new, more sensitive detector, it also provided the Holy Grail of electronics – amplification.

Vacuum Man

Lee DeForest, amidst some controversy with Fleming, developed the triode or three-electrode vacuum tube with a cathode (filament), grid and plate. The grid is mounted between the cathode and the plate. The triode vacuum tube had one important characteristic that no previous device had exhibited: it made weak audio or radio frequency signals stronger. This 1907 invention may have been the single, most important event in shaping the history of radio.

Now with stages of vacuum tubes in amplifying, detection and oscillating circuits, the modern radio was beginning to take shape.

The Hero of Modern Radio

On September 22, 1912, encouraged by his work on the triode at Columbia University, Armstrong started a series of experiments, carried out in his attic. From this came the vacuum-tube oscillator, which was the first reliable and versatile generator of continuous waves. This principle resulted in the world's first radio capable of receiving weak radio waves from hundreds or thousands of miles away.

Due to the limited frequency capabilities of the early vacuum tubes, Armstrong devised a circuit which used a technique known as "mixing" to reduce the frequency requirements of the amplifying elements of a radio receiver. It was long known in the physics community that when two electromagnetic waves of different frequencies interact they could combine to produce a new wave which is either the sum or the difference of the two initial frequencies. Armstrong cleverly used this principle. He reasoned that by having an oscillator section in a receiver close to that of the desired radio station frequency, the radio station signal could interact with the receiver's "local" oscillator. Figure 4 is the block diagram of a superheterodyne receiver.

The Super Invention

The resulting "mixed" signal would have a frequency equal to the difference of the local oscillator and the radio signal frequency. Since the frequencies of the local oscillator (LO) and the radio station were close, the resulting mix signal, or intermediate frequency (IF), would contain all the modulation of the original signal, BUT be a much, much lower frequency. This lower frequency easily allowed vacuum tubes to provide amplification.

If the initial frequency was very high, relative to the maximum tube operating frequency, multiple IF stages could be used to reduce the resulting signal to a manageable frequency. These stages are sometimes referred to as conversion stages. So if a receiver is designed as a dual conversion radio, it has two IFs with their corresponding local oscillators. Typical intermediate frequencies for the superheterodyne receivers from the 1950s until recently are 455 kHz and 10.7 MHz.

Early in 1918, Armstrong built the first superheterodyne radio. It had eight tubes. Just prior to entering the military, Armstrong delivered a detailed paper on the heterodyne principle. While in London, the question arose regarding reception on shortwave, given the fact that the tubes available then were incapable of amplifying above 1,000,000 cycles per second (hertz). After trying the heterodyne principle again, it occurred to Armstrong to mix a vacuum tube generated signal with the incoming radio wave in the first stage of the radio, to produce a signal low enough in frequency to be easily amplified by the tubes. Thus was born a radio which was not restricted to the then-popular longer radio waves.

The superheterodyne circuit was patented by Armstrong and licensed to RCA, Radio Corporation of America. When Armstrong had a complete receiver ready to demonstrate, he went to RCA. The exclusive RCA superheterodyne hit the stores in March 1924. Armstrong retained amateur and experimental rights to all his inventions. Mostly through the efforts of radio amateurs, this insured the rapid advancement of communications technology.

Having this patent helped RCA take a competitive advance in the home radio market, which RCA profitably enjoyed for years.

A major complaint of broadcast radio lis-

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Smart R8 Control - Smart control for the Drake R8/RBA/R8B	\$25/mo/\$40/mo/\$60/mo
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Smart Lowe Control 32 - for HF-150	\$60/mo
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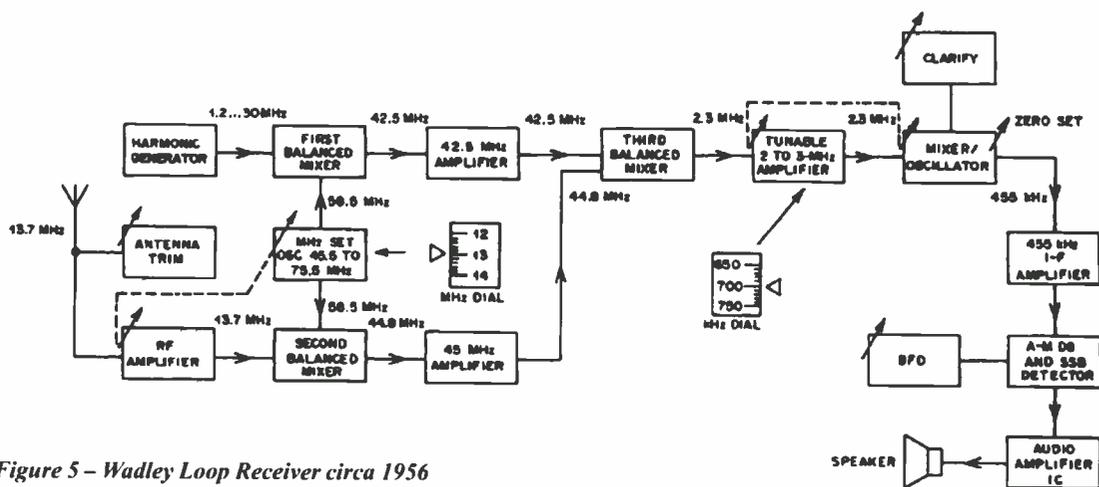


Figure 5 – Wadley Loop Receiver circa 1956

teners in those days was the presence of unwanted noises or “static.” Armstrong turned his attention to this problem. Again going against common thinking at the time, in 1933 Armstrong invented wide band frequency modulation (FM), which is still the standard for most point-to-point, two-way VHF/UHF communication.

Until the advent of high frequency microchips in the mid 1980s, Armstrong’s superheterodyne circuit was still widely used. Even solid state receivers utilized this method long after the vacuum tube technology was dead. We, and the receiver designs of today, still owe much to Edwin Armstrong.

Wadley Loop – Accurate Analog Tuning!

As a result of advances in vacuum tube technology and the intrinsic design of the superheterodyne receiver with its mixer and independent multistage concept, great advances in sensitivity and selectivity were realized.

However, the dream of every radioman was to have a receiver that they could tune to an exact frequency. Due to the temperature drift inherent in the components of the local oscillator, together with thermal aging of the tuned circuits in successive receiver stages, the analog tuning scale could not always be counted on for its accuracy.

These inaccuracies resulted in the need for the user to “tune about” the printed dial frequency in order to actually receive a station actually transmitting on the dial frequency. The goal was to design a receiver that had frequency dial marking that were always reliable. An accurate tuning system, without the need for guesswork and knob twiddling, was the goal.

Most receivers add a second “fine” tuning, bandspread knob. Although helpful for separating station, it simply added to the real tuned frequency confusion.

In the 1950s, Dr. Trevor Wadley, professor of electrical engineering at a South African university, devised a unique multiple frequency comb approach to generate the local oscillators. The Wadley loop utilized a harmonic multiplier, which generated a series of frequencies across the range of the receiver. The remainder of the receiver design still followed Armstrong’s superheterodyne (mixer) design. See Figure 5.

The Wadley Loop at Work

For illustration only, if we consider a radio designed to cover 2 to 30 MHz, the multiplier would generate a comb of discrete frequencies every 1 MHz from 2 MHz to 30 MHz. A phase lock loop is then used to “pick out” the desired coarse frequency.

A very stable, easily generated, low frequency, fine tune oscillator is then used to tune between the comb generated frequencies. For example, with an intermediate frequency of 455 kHz, the fine tune oscillator would only have to tune accurately and linearly over a 1 MHz range (from 1.455 MHz to 2.455 MHz). Restricting the range to 1 MHz, instead of the entire receiver range of 28 MHz, gave a quantum leap in analog dial tuning accuracy.

Of course, the added circuitry was state of the art at the time and added complexity and cost. This may have been what discouraged every US and European radio company that was presented with the concept. For a number of years no major radio company took the offer of patent licensing from the inventors.

The Rascal Success Story

By 1955, a relatively new radio company was trying to break into the European military market. Started on the concept of refurbishing and rebuilding leftover World War II radios, the company was bidding on a UK Royal Navy receiver contract. The company was up against some well-known names, like GEC-Marconi and Collins, and needed a unique “hook” to get the contract.

In a very gutsy move, the United Kingdom Company, Rascal, designed their proposed naval receiver around the Wadley loop and its promise of superior tuning accuracy. After some initial tense moments, the Navy chose Rascal and the Wadley loop, and the now famous RA-17 was born.

Although Rascal’s implementation of this circuit was based around vacuum tube (valve) technology, in the 1970s the Japanese company Yaesu released the solid state, consumer version of the Wadley loop, the FRG-7. Yaesu’s FRG-7 is credited with, almost single-handedly, reinvigorating the shortwave industry. The FRG-7 was extremely popular during the 1970s and 80s.

It was so popular that it was re-badged and available to every US household via the Sears catalog. Drake produced the SSR-1 receiver, and Tandy the DX-300, both using the Wadley loop circuit. However, the use of the Wadley loop was relatively short-lived, as integrated circuit complexity grew while costs dropped.

Thank You, CB Radio

Digital displays with keyboard entry are commonplace today. But how many of us realize that we owe this technology to CB (citizen band)

radio?!

In the late 1950s, CB radio really took off in the US. It had 23 channels in the 27 MHz band. Vacuum tubes were the active circuit elements with two quartz crystals, one for the transmitter and one for the receiver’s LO, were required for each channel desired.

But CB radio had a great resurgence in the early 1970s with the “moon-landing” generation. The US government (FCC) expanded the CB channels to 40. Around this time, semiconductor companies such as Motorola, TI and National were looking for a high volume product that could utilize their newly developed digital integrated circuit (IC) technology.

The concept of providing all the circuitry in a single IC to provide 40 channels with only three crystals was economically very appealing to the radio manufacturers.

Synthesized Digital Receivers

A circuit called a phase lock loop (PLL) had been used in high-end military and professional radios. It consisted of a circuit, which would compare the output of a voltage-controlled oscillator (VCO) with the desired digitally “dialed-in” frequency. The difference between the two generated an output voltage corresponding to the magnitude and sense of the difference. This was then sent to the voltage-controlled oscillator for its automatic adjustment, resulting in a match between the digitally dialed-in desired frequency and VCO output. Using this method, with careful design any range of frequencies could be simply and accurately synthesized.

Using phase lock loop techniques the synthesized CB radio was born, with National Semiconductor leading the way in the CB world with their two-chip CB synthesizer chip set.

Simultaneously, RCA, GE, Timex and Hitachi were making advances in the development of low power digital displays. Monsanto had introduced the first light emitting diode (LED) display in 1969. Although many times lower-powered and less bulky than the vacuum tube-based displays of the day, LEDs were still power hungry for battery operated equipment. The above mentioned companies looked to the new liquid crystal display (LCD) technology for the

answer. Today, LCDs are common in watches, calculators, cell phones and communications equipment.

In the 1980s, with the IC synthesizer technology now fully developed and available very inexpensively, receiver manufacturers began to use this technique to generate local oscillator signals with digital precision. This, of course, gave us our first accurately-tuned, synthesized, digital-readout receiver. Sony was one of the first to produce such a receiver in their now-famous ICF-2001. The revolutionary features of this receiver, together with its relatively low cost (around in the \$300-400 range) caused quite a stir in the professional and military communications' world. It was a glimpse into the future of what was to come.

Today, in 2001, highly accurate, synthesized, digital display receivers are commonplace. Stereos, communication receivers, cellular phones and even boomboxes utilize the technology. Today, it is truly amazing how rapidly technology evolves into everyday products.

Great Moments in Radio's History

In Part One we have seen the tremendous developments the radio underwent in its first 100 years, from 1890 to the 1990s – evolving from a scientific curiosity to mass media, feeding the world. Below is a timeline of important events in the development of radio.

RADIO TIMELINE

- 1876 Bell invents telephone
- 1883 Edison invents the Edison effect
- 1886 Hertz produced and detected electric waves
- 1894 Lodge invents Coherer with 200 mile range
- 1897 J.J.Thompson discovers electron
- 1900 Poulsen invents Poulsen Arc
- 1901 Marconi sends signal from UK to Newfoundland
- 1906 DeForest invents triode
- 1906 Catwhisker crystal detector invented
- 1906 RF Continuous-wave alternator developed
- 1912 Armstrong invents radio-frequency generator
- 1918 Armstrong invents superheterodyne
- 1924 RCA superheterodyne hit stores in March
- 1933 Armstrong invents F.M.
- 1955 Wadley Loop – Racal RA 17
- 1981 Consumer Synthesized Receiver – Sony IC-2001
- YOU ARE HERE – At the End of Part 1**
- 1995 Digital Signal Processing Receiver
- 2001 First Software Radio Chips
- 2010 ??????????????????????

Next Time - Part Deux

The advancements in digital electronics, coupled with the almost unbelievable developments in microcircuit technology, were to lead receiver design into the entirely new design concept of digital signal processing (DSP). DSP, the developments of software receiver chips, and what's next will be the topics for Part Two. Also, you won't want to miss a no-holds-barred look into the radio industry from one of the people who help shape it: Bob Grove. In a question and answer session, Bob will give his unique, first-hand perspective on the radio industry: past, present and future.

Acknowledgement

I'd like to thank Mr. H. Simmons, historian of vacuum tube technology and all aspects of radio circuitry, for his great assistance in helping write this feature. Harve has actually participated in many areas of technology to the modern integrated circuit. However, his recollection of the tube era says it all – "... the smell reaching anyone who ventured into an establishment where radios were used or repaired, was very special to me (and I am sure to others as well), because that smell of shellac and phenolic plastic invoked the very mystery and fun of radio."

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Major World Air Route Areas

This month we are going to take a look at some HF aeronautical frequencies. If you want to listen to air traffic control activity, then the Major World Air Route Area (MWARA) frequencies will do the trick. If weather is your thing, then check out the Volmet frequencies. And if you want to get inside communications, the airline company or LDOC frequencies will certainly keep you busy. Keep the mode switch in USB and good hunting.

Major World Air Route Areas

North Atlantic (NAT)

2872 2899 2962 2971 3016 3476 4675 5598 5616
5649 6622 6628 8825 8831 8864 8879 8891 8906
11279 11309 11336 13291 13306 17946

Caribbean (CAR)

2887 3455 5520 5550 6577 6586 8846 8918 11387
11396 13297 17907

South Atlantic (SAT)

2854 2935 3452 5565 6535 8861 11291 13315 13357
17955

South America (SAM)

2944 3479 4669 5526 6649 8855 10024 10096 11360
13297 17907

Europe (EUR)

3479 5661 6598 10084 13288 17961

Middle East (MID)

2944 2992 3467 3473 4669 5658 5667 6625 6631
8918 8951 10018 11375 13288 13312 17961

Africa (AFI)

2851 2878 3419 3425 3467 4657 5493 5652 5658
6559 6574 6673 8894 8903 11300 11330 13273 13288
13294 17961

Indian Ocean (INO)

3476 5634 8879 13306 17961

North Central Asia (NCA)

3004 3019 4678 5646 5664 6592 10096 13303 13315
17958

East Asia (EA)

3016 3485 3491 5655 5670 6571 8897 10042 11396
13297 13303 13309 17907

Southeast Asia (SEA)

3470 3485 5649 5655 6556 8942 10066 11936 13309
13318 17907

Central West Pacific (CWP)

2998 3455 4666 5652 5661 6532 6562 8903 10081
11384 13300 17904

Central East Pacific (CEP)

2869 3413 4657 5547 5574 6673 8843 10057 11282
13300 17904

North Pacific (NP)

2932 5628 6655 6661 10048 11330 13300 17904

South Pacific (SP)

3467 5559 5643 8867 10084 11327 13300 17904

Volmet Weather Broadcasts

Africa 2860 3404 5499 6538 8852 10057 13261
Caribbean 2950 5580 11315
Europe 2998 3413 5505 6580 8957 11378 13264
Middle East 2956 5589 8945 11393
North Atlantic 2905 3485 5592 6604 8870 10051 13270
13276
North Central Asia 3461 4663 5676 10090 13279
Pacific 2863 6679 8828 13282
South America 2881 5601 10087 13279
Southeast Asia 2965 3458 5673 6676 8849 11387 13285

Long Distance Operational Control (LDOC)/Airline Company Frequencies

3007 3010 3013 3494 3497 4654 4687 5529 5532 5535
5538 5541 5544 6637 6640 6643 6646 8921 8924 8927
8930 8933 8936 10027 10030 10033 10069 10072
10075 10078 11342 11345 11348 11351 11354 13324
13327 13330 13333 13336 13339 13342 13345 13348
13351 17916 17919 17922 17925 17928 17931 17934
17937 17940 21940 21943 21946 21949 21952 21955
21958 21961 21964 21967 21970 21973 21976 21979
21982 21985 21988 21994 21997

System Profile: Westover ARB

By Ken Windyka,
ken.windyka@the-spa.com

Westover Air Reserve Base, Chicopee, Massachusetts, is home to the 439 Airlift Wing (Air Force Reserve Command), with over fifteen C 5 aircraft assigned, and the longest runway in the Northeast (2.1 miles). It provides limited transit aircraft support, but primarily serves many Northeast Guard/Reserve/Active Duty aero units as an effective/efficient training area due to limited civilian aircraft activity. Training activities include touch/goes, ILS approaches, local pattern work, parachute drops, and helicopter lift training.

It is also designated as an emergency landing field for the Space Shuttle. Westover ARB is home as well to a variety of Army, Navy, Marine Corps Reserve units and will also be the new home for the Military Entrance Processing Station next year.

Typical high use frequencies include the following:

Air Traffic Control/Ops/Command Post/Tactical:

ATIS: 138.10/114.0

Boston Center ARTCC: 132.65/379.1

Bradley IAP Approach/Departure Control: 125.35/325.8

Westover Army National Guard Aviation Support Facility "Patriot/Minuteman Ops": 38.70, 123.05, 356.3.

Westover Base Operations (Dispatcher): 372.2

Westover (Civilian Airport "Metropolitan Airport") UNICOM: 123.0

Westover Command Post (439 AW) "Casino Royale": 252.1

Westover Metra (Wx): 342.5

Westover Parachute Drops Coordination "Bean Bag OZ": 301.4

Westover Tower (CTAF): 134.85/348.4

Westover Tower (Ground Control): 118.35/275.8

Tactical Air-to-Air Frequencies

These are typical frequencies used on a recurring basis by "visiting" aircraft/helos in training: 41.90/242.4 (UH1's/CH47's), 287.5/303.0/340.8/383.3/(C130's), 321.0/319.4 (KC135's), 139.875/319.4 (KC10's), 379.4 (C5).

Ground Support Activities:

Base Aerial Port (Fleet Service): 413.4

Base Aircraft Maintenance: 163.5875/165.0125/165.0375/165.1375

Base Aircraft "Transit Maintenance Alert": 163.1375

Base Civil Engineering/Communications: 173.5375

Base Commander's Net: 149.55R

Base Fire/Crash: 173.4125/173.4375

Base Ground Training (Misc): 173.5375, 413.3, 413.4

Base Medical 173.5625

Base Operations: 173.5375/165.1375 & 275.8(mobile)

Base Security: 165.1875/163.4875

Note: Ground Support radio systems will be placed on a trunked radio system in the future – however installation/operational date is unknown at this time.

Reference Sources:

Personal monitoring efforts on a daily basis. Grove Enterprises', Larry Van Horn *Military Frequency Directory 2001* (also state edition) <http://www.afrc.af.mil/439aw/default.htm>



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Getting Started in Scanning

It's late at night and all is quiet. As your eyes close and you drift off to sleep you hear a faint noise in the background. Over time the noise becomes more discernible and louder as it approaches your house. Suddenly you see flashing lights and hear the blare of a loud siren going down your street. You know something big is happening in your neighborhood. Where is that emergency unit headed? Was it an ambulance, a piece of fire apparatus or law enforcement officials?

If you would like to know for sure what's going on the next time you hear a siren and see flashing lights, I'd like to invite you to get started in the world of scanning.

Buying Your First Scanner

As an amateur radio operator, I had always used the expanded receive capabilities on my various 2 meter transceivers to monitor the public service bands. But, I found there were shortcomings with this method, most notably the lack of sufficient memory channels to keep up with all the action on all the bands. Second, I found that base station/mobile 2 meter rigs lack the portability offered by hand held scanners. And third, power requirements for hand held scanners are nothing compared to 2 meter HTs. I could save a lot on batteries with a hand held scanner.

Here are some of the things you should think about before buying your first scanner. Should you get a base scanner or a hand held? What frequencies are you most interested in receiving? Do the local public service entities use a trunked system or standard analog transmissions? Is the locality you're in close enough to be able to receive the signals with the small flexible antenna which comes with the scanner? What other scanning interests do you have and will the scanner you want cover potential future interests? What kind of accessories are available and what do you really need? And, finally, where should you buy your first scanner?

Shopping for Answers

Once you start looking for a scanner you'll be amazed at the number of models

and the incredible features which are offered. But, before you become overwhelmed maybe you should check out your current financial status. You can spend \$400 for a top-grade scanner, but do you really need that much scanning capability? Without committing to any one model, let's go through the checklist above and shop according to the answers you provide.

1) *Base Or Hand Held?* While base stations can be used in a vehicle (providing, of course, you live in a state which allows its citizens to use scanners in a vehicle) it's a little work to find a suitable place to secure it and yet allow you to operate it. Second, you'll have to buy and install an external antenna. And, finally, you'll have to worry about theft of the unit from your car unless you choose to remove it every time you get in and out of the car. If you think you'll be listening mostly in your car, a hand held unit with an external antenna will bring in all the action you want, be easily removed from your car and be just as easily set up for home monitoring.

2) *What's The Frequency?* Before you buy a scanner you should check out which frequencies you'd like to monitor. To do this you'll need to buy one or two of the more popular general frequency lists such as *Police Call* which are available from your local Radio Shack or Grove Enterprises for \$19.95 per region (price includes a nationwide frequency database on CD-ROM). Also available are more specialized lists such as the *Grove Military* or *Federal Frequency Directories*, but they are available



AOR's AR-5000B high performance wide-band receiver tunes from 10 kHz to 2.6 GHz. It doesn't get much more expensive than this!

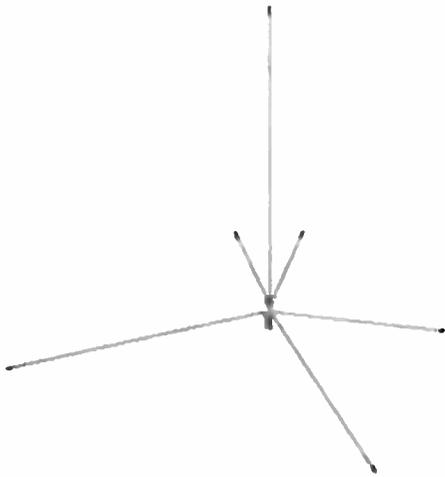


Radio Shack's Pro-79 hand held scanner tunes VHF-Lo, VHF-Hi and UHF. It doesn't get much cheaper than this! Which do you really need, which is best for your own uses and which can you afford?

only on CD ROM and you'll need a computer to use it. You can keep up to date with the latest in what's available right here in the pages of *MT*. Check out the "What's New" column in the back of this magazine and the "Scanner Equipment" column on page 84 for all the latest info on equipment and accessories. Most local Radio Shack stores keep a list of the active local frequencies which they make available to interested scanner buyers. Some provide the list only with a scanner purchase. One of the best sources for frequency lists is the Internet. A search on Google.com or other search engine may give you all the information you can use.

3) *Trunked Or Not?* This is the one factor which will determine just what you'll need in a scanner. Trunked systems use a technology similar to cell phone hardware in which the signals hop around on different frequencies from different transmit locations. The upshot is that if your locality uses this system you'll need a scanner which has technology to follow the action. Standard scanners won't work for those services. In my area the local sheriff's department just recently switched from VHF-Lo to VHF-Hi so there's little chance of this locality going to a trunk system soon. A traditional scanner works great for me. Find out what's being used in your area. Expect to pay a little extra for a trunk-tracking scanner.

4) *Can You Hear It?* One of the most frustrating things about scanner listening is not being able to receive the signals you're looking for. Depending on terrain and location, your reception of public service action could be very poor with the factory "rubber duck" antenna. You'll need an external antenna. The cheapest is from Radio



Radio Shack omnidirectional ground plane antenna covers 108 MHz to 1.3 GHz and costs just \$20.

Shack which covers most of the scanning spectrum and costs just \$20. It can be easily mounted on your existing outside TV antenna or, if you live in an area where outside antennas are restricted, you can mount it in your attic. If you don't have an attic you can mount it near the ceiling inside a closet. To receive distant cities you'll need a beam antenna, on a mast, mounted outside as high as you can put it. Range is a function of antenna height at VHF/UHF frequencies. To monitor different cities around your location you'll need to add a rotor to aim the beam in the proper direction.

5) *What Are You Listening To?* Scanners cover an amazing amount of RF spectrum. The highest priced radios are full coverage models going from long wave to frequencies in the gigahertz range. Of course, you pay for what you get, and if you want it all you'll have to pay for it all. Expect prices over \$2,000 for the best full-featured scanners. But, do you really need to hear all those frequencies or need all those features? For instance, most of us have little use for all-mode receivers featuring SSB and CW capabilities. Still, if you have plans that include weather satellites or other "out of this world" listening you may need a receiver that can go in frequency and mode where you want to go.

6) *Let's Accessorize!* There are a couple of things you should consider getting when you first buy your scanner, not the least of which is an external power supply to give your batteries a rest when you're listening indoors. And, that brings up another issue. Should you buy regular batteries or rechargeable? If so, what sort of charger will you need? I'd recommend waiting a while to answer those questions. I'm still using the AA batteries I bought when I got my hand held scanner. It turns out that I use it almost exclusively indoors and powered from a "wall wart."

In a car, you might consider a cigarette lighter power supply. It really helps to conserve on the amount of batteries you'll have to buy. In the mobile environment you may want to add a lapel speaker. I find that with the scanner attached to an external antenna, I can position a lapel speaker where I can hear it best. That way the scanner can just lie in the center console. A signal preamp might be called for if you get consistently poor reception. But, before getting a preamp consider getting an external antenna. Often enough signal gain can be had with an external antenna at half the price of a good signal preamp.

7) *Where Can I Get My First Scanner?* The first thing you need to do is a little comparison shopping. Once you've determined which scanner should be your first, get prices and develop a chart showing where and at what price the unit is found. Check out the prices at Grove Enterprises, Communications Electronics, Inc., Radioworld, AOR, ICOM, and all the other advertisers in *MT*. Check out your local Radio Shack and do some searches on the web.

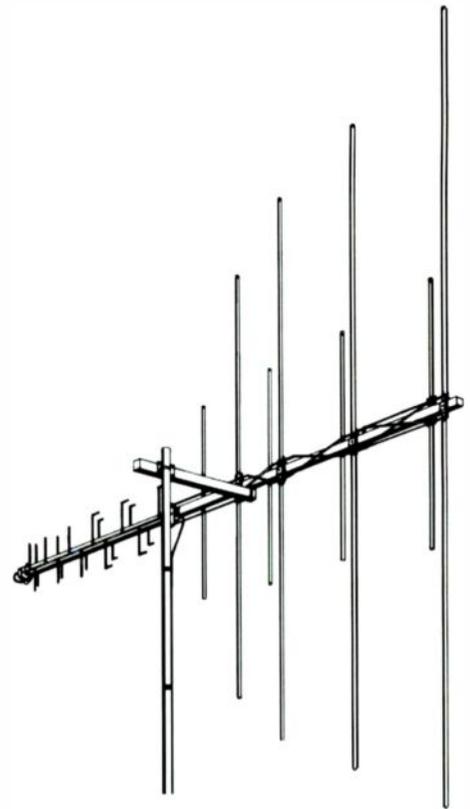
Go directly to the manufacturers' web sites, they often have specials on returned or refurbished merchandise which includes a warranty. Check out other liquidation catalogs such as Damark and Heartland America, which not only have warranties, but make available extended warranties. Keep your eyes peeled for the occasional Radio Shack flyer which often has scanner models at big discounts.

Unless you're in a big hurry you should be able to find what you want at less than the retail price. Don't forget Bob's Bargain Bin found on the Grove Enterprises' site!

One big caveat; if you are new to the hobby and aren't technically inclined, beware of bargain priced radios. They normally are sold with no after-purchase technical support. Saving a buck or two is irrelevant if you can't operate the radio to its fullest extent. Tech support can be especially important if you have purchased a trunk tracking scanner. Grove provides great trunk tracker support, for example, but only to customers who bought their radio from Grove.

8) *What about used scanners?* Flea markets and hamfests are places to get used scanners, but you'll have to be careful. Most items sold there have no warranty, and you may not even be able to tell if the unit actually works. Further, it could work well for a few days or weeks before you discover just why the owner wanted to get rid of it. Usually there's no recourse on such a purchase and you're stuck with it.

Buying from a friend is a good idea. Many folks are eager to sell their earlier "beginner" purchases in order to help finance their advanced activities. You may also have good luck on eBay.com, but again it's "buyer beware."



Grove Scanner Beam highly directional scanner antenna covers 30-50 MHz, 180-174 MHz, 225-512 MHz and 806-906 MHz can be used with a TV rotor and costs \$75.

SOURCES

Where To Buy Used Scanner Equipment

Amateur Electronic Supply - 800-558-0411

<http://www.aesham.com>

Bob's Bargain Bin - 800-438-8155

<http://www.grove-ent.com>

Burghardt Amateur Center - 800-927-4261

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 - * Digital C-LNB 2D deg NF + scalar nng. \$49 + \$10SH
 - * Superjack 1B* actuator for 5.3ft, Hq18, \$59 + \$20SH
 - * Integre IT910s hdv stb \$899 + \$25SH
- Email: support@smalltear.com or fax 888-731-1834



◆ More on Polishing Plastic

We recently discussed measures to remove scratches from plastic bezels and other soft surfaces; reader Jim Konen has the professional solution:

Body shops and auto sections of department stores like Wal-Mart offer Simichrome Polish and Metall, pink compounds specifically designed for such soft materials. Jim alternatively suggests any fine automotive polishing compound like 3M swirl remover.

If the scratches are deep, try wet sanding with 400 grit followed by 600 grit, and finally the auto polish to return the display to new condition.

Jim cautions readers, however, to remove the cabinet from the radio first to avoid getting compound or water into the innards!

Reader Dick Kruse agrees with Jim regarding the effectiveness of Simichrome, and suggests DuPont No. 7 auto polish as well.

Ed Przyzycki of Lemont, Illinois suggests Meuiars Mirror Glaze #10 or #17, designed for removing hairline scratches from clear plastic windows, visors, CDs, and even eyeglasses. Thanks to all who offered their assistance.

◆ More on the R390 receiver...

Previously, we discussed the difficulty in finding appropriate headphones and speakers for the popular surplus Collins R390/A receiver because of its high output impedance. Reader Howard Ragan, K7ATU, prompted me that Fair Radio Sales (419-227-6573, 1016 E Eureka St, Lima, OH 45804, <http://www.fairradio.com>) often carries matching speakers like the LS454 and LS177, and the HS-33 headsets. Thanks, Howard.

Q. *The instructions for my BC780XLT say to always plug the power cord into the scanner before plugging the AC adapter into an outlet; the same instructions apply if using the 12-volt cord. Is there any good reason for doing this? (Jim Knight, Soddy Daisy, TN)*

A. If the power cord is "hot" and left dangling, it could touch a metallic surface, short out, and possibly cause a fire – or at least damage the power supply.

Q. *Does stranded wire have the same current-carrying capacity*

as solid wire of the same gauge? (Mark Burns, Terre Haute, IN)

A. Good question, Mark. I'm sure many of our readers recognize your name from previous excellent questions. And thanks for including the SASE for a personal response!

The singular advantage of stranded wire is, of course, flexibility. As to whether stranded wire and cable can carry as much current as solid, the answer is, "yes and no!" It depends upon the gauge of the fibers that are bundled together to make up the main cable, and the way that gauge is measured.

Bundling wire fibers together leaves some air space, but the finer the wire, the more copper in the bundle. The finer the wire in the strand, the more copper in the bundle. With just a few strands of large wire, current ratings are lower than solid, but with a large number of very fine wires, the total copper is actually greater than solid for a given gauge, and the current-carrying capacity is greater than a single solid wire of that same gauge.

To select the greatest current-carrying capacity in stranded wire or cable, choose one with very fine strands.

Q. *When buying a shortwave receiver, what is meant by "phase noise" and "synthesizer noise?" How can you tell if it is excessive without measuring it without instruments? (Gabe, Glen Ellyn, IL)*

A. Phase noise is often caused by components in the oscillator circuit, such as filters and capacitors, which alter the basic waveform of the oscillator signal. Synthesizer noise is a feed-through of seemingly random noise produced in the frequency synthesizer circuit which processes the basic oscillator frequency to generate the virtually infinite combinations necessary as you tune through the spectrum. There are other noises produced by the oscillator circuit as well, including spurious signals ("spurs"). The net result is the same – noise interference to desired signals.

The easiest listening test is first without, then with, an antenna connected. Without an antenna, the receiver may be heard producing a variety of noises as you tune it through its ranges, usually broadband but occasionally frequency-specific. These can be heard through the speaker as well as seen as an upward deflection of the S meter. Receivers with many of these, especially if strong, are inferior to those that have fewer

and smaller noise products. Write down the frequencies of the more prominent ones.

Now, with the antenna connected, listen to signals within the ranges that revealed significant noise before the antenna was connected. Compare the receiver with one of known performance. If the noise causes significant interference to weak signals, avoid the receiver.

Q. *Can the computer-hosted receivers with spectrum displays like the ICOM and WinRADIO units be used to find pulsed signals like those transmitted by wildlife telemetry beacons? (Tom Earnest, San Angelo, TX)*

A. Not reliably. The spectrum is digitally posted to the screen pixel by pixel, and this slows down the process. Typically, the baseline is painted at no more than 50 pixels per second, so if the pulsed transmission has a duration of 100 milliseconds (1/10 second) and a repetition rate of one second, whatever span is being sampled should be swept at 10 times per second to be sure of hitting the pulse frequency as it occurs.

That may be fine for a very narrow span of frequencies, but if we have to sweep a wide band, this slows down the graphics considerably. For example, if the spectrum is being painted at 50 pixels per second, and you suspect that the signal is between 169 and 174 MHz, then to look for a signal every 12.5 kHz would take about 9 seconds. It's highly unlikely that the instantaneous pulse will coincidentally occur just as you sweep by that frequency.

For such on/off transmissions, you need a faster trace like a CRT or one of the newer LCD graphics modules. Favorite choices include the AVCOM PSA65C and PSA37D spectrum analyzers, or a communications receiver like the ICOM R8500 or AOR AR5000 Plus and a spectrum display unit (SDU) like the AVCOM SDM42A (CRT model) or SDM42B (new, fast-trace LCD model).

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, or e-mail to bgrove@grove-ent.com. (Please include your name and address.) The current Ask Bob is now online at our website: www.grove-ent.com

Getting Started

Bright Ideas

Gary Webbenhurst

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As I write this month's column, I have just returned from SEAPAC, a ham radio convention held in Seaside, Oregon. The terms ham swap and hamfest mean similar events. For upcoming events in your area, check <http://www.arrl.org/hamfests.html>. You do not need to be a ham to attend. I thought I would pass along some of the tips I use for a successful experience.

69

Go with a friend. They can convince you to not buy some worthless junk you think you need. They can also patrol another area of the grounds, and call you on the radio if they spot a bargain. If you are not a ham, you can use FRS.

Whenever I go to these events, I reset the memory on my Scout® frequency finder. When I get home, I take a look at what the Scout captured. There are usually about 150-300 different frequencies. Besides the ham and FRS channels, I usually find the local police and/or security, food vendors etc. I have even found a couple of 140 MHz military frequencies. Mmmmmmm...

70

Ham swaps or hamfests are often outdoors and consist mainly of people selling out of the back of their truck or van. Bottom line, the really good bargains go very fast. Be there when it opens. This means 0' Dark-thirty.

71

Bring along a full sized backpack. I often acquire many small items and need a safe and convenient way to carry them. Example, I

bought a dozen coiled DC cigarette cords with fuses for \$3.99. The fuses cost that much!

72

Most of the radio and computer gear is used. If it's brand new, why are they selling it for pennies on the dollar? This is definitely Buyer Beware.

73

If it's a scanner or transceiver, ask to try it. You can always tune handhelds to the NWS weather broadcast. Program in a local repeater and check the audio with a friend. Carry along a small 9-volt battery with a 1/8 inch female connector. This will allow you to insert it in the side of most scanners for brief power to check the display. I always carry two, one for each polarity as Uniden and Radio Shack have different polarities.

74

After I have made the rounds once, I go back for a quick review. If there is an indoor market, I go there next. From the manufacturer's reps, I pick up any needed literature and sometimes giveaways like caps or log books. They have even been known to give away coupons for a few dollars off a particular radio. The commercial retail vendors are usually indoors. It is easy to compare prices. Again, the really good buys will go fast as dealers can only bring so much inventory in their truck.

75

I was amazed at how the prices for radios continue to drop. A friend bought an Icom W32A dual bander for \$244 (no tax in Oregon). An Alinco DJ-V5 went for \$205 and a Yaesu FT1500 (now Vertex Standard) for \$149. I remember paying in the range of \$500 for radios that had 20 channels and limited features back in the early '90s. These same companies are manufacturing transceivers these days and the prices are under \$200 in most cases. You really need to visit their websites and see what the dealers are charging. You might want to wait a few months for the new digital scanners. The re-farming of the VHF spectrum will cut spacing to 7.5 kHz.

76

At SEAPAC, I also picked up an Alinco Power supply with 30 amps for \$150. This is compact and loaded with many features including backlit display. It has a front cigarette type receptacle and quick connect terminals on the front. On the back is a 30-amp set of terminals. I leave a standard ham radio mobile "T" connector cord on these. Thus, I can hook up virtually anything that needs power in a matter of nano-seconds. I really like it! Add a deep cycle battery and your power needs are complete.

77

I also found a cheap Uniden scanner 248CLT. I quickly noticed a real oddity. The wall wart was for 110 AC to 10 AC volts. Yes, that is AC. Glad I noticed that and labeled the transformer in a bright red label. The antenna-input jack was for a Motorola plug. I simply took off the case, drilled a new hole for a 259 female, and did a little rewiring. While inside, I made another hole to take a BNC connector. Total flexibility. The display is brightly backlit in a soft green. Best of all, the display letters are about an inch high. I can read it even without my glasses. I hate to admit it, but this replaces another radio at my bedside. I turned on its side so I can read the frequency while in bed. Yeah, I know, I should get a life, or is that a wife?

78

Whenever I travel, I stop at the local Radio Shack. I get the free one page scanner list and look for any bargains. I found a really nice computer-type power manager with surge protection for \$20. When I returned home, I took six of my rapid chargers and attached them to the device. I could now turn on one at a time rather than all six chargers when I really needed just one.

Listen for the goblins on Halloween! See you next month.



Hamfest at Seaside Oregon: "I'll take one of everything."

The Mail and the Media

In this edition of *Scanning Report*, we'll look into the *Scanning Report* mailbox, including notes addressed to Rich Barnett that have been forwarded to me since I took over the column. For our monthly hobbyist spotlight, I'm happy to feature one of my first contributors. We'll also revisit some older subjects and then explore some new 900 MHz allocations.

◆ The Mail and other stuff

From Kenneth Pearson in New Jersey:

150.2000	Air National Guard
453.3250	New Jersey Transit
463.2000	Atlantic City Trump Marina
463.4250	Atlantic City Harrah's Casino
463.5000	Atlantic City Sands Casino
464.0750	Atlantic City Hilton Casino
464.3500	Atlantic City Claridge Casino
464.6250	Atlantic City Caesar's Casino
500.9875	Department of Youth and Family Services

From Anonymous Traveler, Singapore,
Changi International Airport (Motorola Type 2)

856.0625	857.6875	858.8125
856.1875	857.8125	859.3125
856.5625	857.9375	859.5625
856.8125	858.0625	859.8125
856.9375	858.1875	859.8125
857.0625	858.3125	860.3125
857.1875	858.5625	860.5625
857.5625		

Selected Talkgroups:

32	Police
464	Parking Enforcement
528	Police Dispatch
752	Airport Police
5408	Airport Fire

Jan Fine, last month's spotlight hobbyist, just moved into his new house and finally started monitoring **South Florida MilCom**. He happily reports these hits on the day he installed his antenna:

138.025	Homestead ARS interplane
138.125	Homestead ARS interplane
139.800	Homestead ARS interplane
141.000	unidentified (formerly Homestead AFB / Naval Sec. Group Activity)
141.100	unidentified interplane
141.700	Homestead ARS interplane
234.500	Navy Air Combat Manuevering (ACM) comms

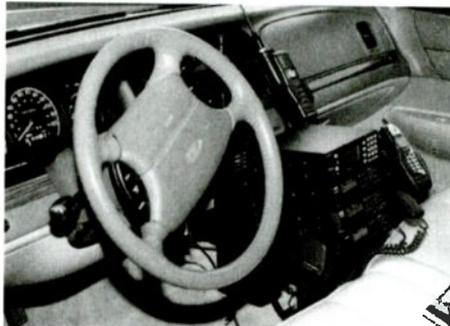
237.800	unidentified ACM
238.900	Aerial Refueling route AR-620 comms
264.200	unidentified
270.600	Tarpon Range ACM (Florida Keys area)
292.200	Avon Park Range Control (South-Central Florida area)
295.700	Homestead ARS tower
295.900	unidentified
307.100	Miami Center remote at Pahokee, Florida
317.700	Homestead ARS Ground Controlled Approach (GCA)
323.000	Miami Center remote at Miami, Florida
338.000	Key West Naval Air Station Base Operations
380.300	Miami Center discrete

Jan, according to my map, you're getting a near-perfect omni-directional antenna pattern. The Avon Park range is about 130 miles northwest of you, and NAS Key West / Tarpon range complex is about 130 miles southwest of you!

◆ Bank Number One: Media

Since we've been discussing wireless microphone channels in recent columns, I've received some new wireless mic frequencies and some questions about TV, AM/FM broadcast radio, and newspaper channels.

Loren Fields, Co-Editor of the *Official Maine Frequency Guide*, supplied me with a list of Audio Technica and Telex wireless mic channels that I'll add to the Sony and Sennheiser listings previously published. I'll get the complete list up on the *MT* webpage soon.



KTVI Fax-2 news photographer (See p.6)

As for the news media channels, these are either exciting or boring, depending upon the news market and the way in which a station uses their radio assets. News media outlets often have communications dealing with administration, story

assignments and engineering. Small stations may combine these functions on one or two radio channels, while large stations may segregate each function on several independent radio systems:

Administrative and station management communications are often conducted by cellular telephone, on business radio bands or on a special talkgroup of a station's trunked radio system.

Story assignment communications are conducted on FCC-designated news media channels or on special talkgroups. Assignment Editors or production staff members will dispatch news crews to story locations and monitor the progress of large stories. Listen for reporters and trucks being sent to such locations before each daily local news program.

Engineering communications are also hosted by news media channels or special talkgroups. These channels are used to provide cueing and TV audio feedback to reporters (the "talent"). Also heard are microwave-alignment communications between "live" trucks and their receiver sites. Listen for microwave alignment communications about an hour before each local news program and talent cueing during each program. For example, when a news anchor (on TV) switches to a "live" reporter at the scene of a story, listen in for cues and special instructions being given to the reporter on these channels.

Additional channels may be implemented by local chapters of the Society of Broadcast Engineers (SBE) to coordinate common wireless microphone and microwave channels between stations, especially when many stations are operating trucks from a "live" reporting location. Although the stations are competitors, engineering staff members work together to eliminate radio interference between trucks. Check the SBE webpage link at the end of this column to see what may be operating in your area.

The stations don't just operate their own radios...they listen in to other stations and agencies with scanners or specially-obtained municipal radios...and they fully realize that they themselves are also being monitored. Due to this dependence and interaction with radios, news outlets have a Chief Engineer and engineering staff familiar with professional VHF, UHF, 800 MHz and microwave systems.

Staff members are often Amateur Radio operators, Emergency Management volunteers and radio hobbyists. They are excellent resources for bandplan information, station tours, engineering curriculum internships and related news media questions.

Check the attached table of frequencies for activity throughout the day, and especially before the evening and late-night local news programs...then call your local station to set up a tour...it's a fascinating profession!

Common News Media Channels

(Check the *Police Call* series of books or CD for a more complete explanation of FCC bandplans pertaining to news media communications)

All frequencies are MHz, FM mode:

25.87	450.0500	455.0500
25.91	450.0875	455.0875
25.95	450.1125	455.1125
25.99	450.1375	455.1375
26.03	450.1500	455.1500
26.07	450.1625	455.1625
26.09	450.1875	455.1875
26.11	450.2125	455.2125
26.13	450.2375	455.2375
26.15	450.2500	455.2500
26.17	450.2625	455.2625
26.19	450.2875	455.2875
26.21	450.3125	455.3125
26.23	450.3375	455.3375
26.25	450.3500	455.3500
26.27	450.3625	455.3625
26.29	450.3875	455.3875
26.31	450.4125	455.4125
26.33	450.4375	455.4375
26.35	450.4500	455.4500
26.37	450.4625	455.4625
26.39	450.4875	455.4875
26.41	450.5125	455.5125
26.43	450.5375	455.5375
26.45	450.5500	455.5500
26.47	450.5625	455.5625
	450.5875	455.5875
	450.6125	455.6125
161.64	450.6500	455.6500
161.67	450.7000	455.7000
161.7	450.7500	455.7500
161.73	450.8000	455.8000
161.76	450.8500	455.8500
166.25	450.9000	455.9000
170.15	450.9250	455.9250

equipment remains functional and ready to be pressed into service if needed.

Current equipment includes a Uniden Bearcat BC780XLT, BC895XLT, Radio Shack RS 2004, RS Pro 26 and ICOM IC-R2. Ken manages his many scanning interests and large frequency list by using the "divide and conquer" method: He has a dedicated scanner for MilCom and nearby Westover ARB, another for the Massachusetts State Police Smart Zone trunked system, and a third unit for "general scanning of police, fire, utilities, transportation, aero, federal law enforcement, private security forces, etc. I'm always interested the system of response to incidents or just general operations."

Ken continues, "I never go to accident, crime, or potential crime scenes that I monitor on the scanner and actively discourage others from doing this. However, I do call in news tips to the two local TV stations on accidents and completed crimes...and many of the tips end up being the top story. What I like about this is that I get to see video of what happened, and get the reporter's interpretation as opposed to what I've monitored."

"However, I do some on-scene scanning at military airshows, open houses, military and civilian airports," plus "high hill top monitoring and other public safety related, community events." Ken's mobile scanning is usually conducted "in stealth mode" with only a stock antenna on his portable scanners or the 780XLT. He uses a trunk-mount antenna on occasion.

His wishlist includes a frequency counter. "I would really like to get a frequency counter because one can walk around and scoop frequencies *anywhere!*" Ken, for this I highly recommend the OptoElectronics Scout. "Don't leave home without it," to steal an old marketing phrase.

Interestingly, Ken also uses stock antennas at home. "I would like to somehow come up with a portable, external antenna arrangement that I could put up and take down quickly. However, I've seen most area police/fire departments go to repeater systems so the external antenna isn't as important as in the past."

Ken's present position as an Analyst and Administrator in the heating/air conditioning/ventilation/refrigeration service industry includes handling his company's telephones, cell phones, pagers, data lines, and low-power radios.

"It's amazing what folks think the operating area coverage should be, versus the reality of coverage. I always have to bring them back into reality...and give them the cost associated with buying them a satellite phone or something (which will never happen!). We aren't launching missiles or rescuing people, so our comm needs are not at a critical life or death stage...being out of range of any system...is just the way it is sometimes."

Ken recommends a complete home library for research and monitoring diversity. His bookshelf includes...

Police Call, Volume 1

Grove's Military Frequency Directory on CD

Grove's Federal Government Frequency Directory on CD

Official Scanner Guide of Londonderry, New Hampshire (Robert Colburn, editor/owner) and related guides for Connecticut (Keith Victor, co-editor), Massachusetts (William Dunn, Jr.

co-editor), New Hampshire (Scott Rice, co-editor), and Maine (Loren Fields, co-editor) *ScannerMaster* Corp. (Richard Barnett, owner/editor) publications for Massachusetts and surrounding states

Ken's most frightening monitoring experience concerned a tornado approaching a rural Michigan Air Force Base. He was monitoring the Commander's Net and heard the increasing sense of urgency as the storm system approached. Evacuations were imminent, and Ken was himself preparing to head for the cellar. The storm diverted within a few miles of the base and heartbeats soon returned to normal.

"One of my funniest monitoring experiences involved two police units going to a discrete frequency" to discuss a just-occurred crime. Picture this: "Woman stopped at traffic light...male jumps into passenger side of vehicle to attempt a car-jacking...large German Shepard in back seat...guy jumps out, bleeding...woman calls it in...and police are on the lookout." Talk about "taking a bite out of crime!"

◆ On-Scene Commander: New Channels

What? Another low-power channel to add to my list? Actually, several more. As most experienced hobbyists know, the low power and itinerant channels are used in a variety of interesting ways, including the often-published fast food restaurant drive-thru intercoms. Here are some new ones to check out, as stated by the FCC August 2, 2001:

Private Land Mobile Radio Services - 900 MHz Band Itinerant Use Channels

The Wireless Telecommunications Bureau (Bureau) confirms that the following Private Land Mobile Radio (PLMR) Services channels in the 896-901/935-940 MHz bands (900 MHz band) are designated for operations at unspecified locations for varying periods of time (itinerant use).

900 MHz - Industrial/Land Transportation (I/LT) Category

Channel No. 398 - 900.9750 / 939.9750 MHz
Channel No. 399 - 900.9875 / 939.9875 MHz

900 MHz - Business Category

Channel No. 131 - 897.6375 / 936.6375 MHz
Channel No. 133 - 897.6625 / 936.6625 MHz

◆ On the Keyboard

It's time for your fall and winter monitoring ideas, frequency lists and "cool" stories. I'd also like to see some football stadium freqs and Thanksgiving Day activity information. In Miami, for example, a big news media event is an annual meal for the homeless, catered by local celebrities. What happens in your town?

Links of Interest from this column:

Society of Broadcast Engineers (SBE):

<http://www.sbe.org>

Ken Windyka's list server:

ScanWesternMass@yahoo.com

FCC 900 MHz information:

http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-01-1847A1.pdf

◆ Who's Listening? Ken Windyka

"My spouse tells me that I'm just plain nosy...but when the power goes out or something else happens, she as well as my neighbors always want to know what's happening." And so goes the life of Ken Windyka, a frequent *MT* contributor and owner/moderator of the Scan Western Massachusetts mailing list.

Ken had a 20-plus year military career, "part of which involved emergency planning, operations, training, and 'no notice' evaluations. It was very interesting...monitoring from various places I was stationed at."

"California probably offered the longest monitoring distance because of high, hill top repeaters," Ken recalled. "Baltimore, Anchorage, and even eastern Massachusetts (Bedford area) offered some real interesting scanning because of the diverse radio system users...both government and non-government."

Ken started in scanning in 1975 while stationed in Michigan. His first scanner, still operational, was a Bearcat 101. In fact, Ken has never disposed of any scanning equipment. Although some items are now in storage, all of his

Onward to Ontario

This month Scanning Canada begins its epic journey across the "Great White North" in my home province of Ontario. Ontario sits on the northern shore of Lake Ontario and faces New York State to the south. Ontario and New York meet at each end of the lake. At the western end lies Niagara Falls, while at the eastern end, the St Lawrence River carries the water flowing from the Great Lakes to the Atlantic Ocean. The capital of Ontario is Toronto, Canada's largest city, and that is where Scanning Canada is going to begin.

Visitors from the United States and overseas often arrive in Canada via Toronto's Lester B. Pearson International Airport. Pearson Airport is a major international gateway with full ILS (Instrument Landing Systems) supporting four operational runways. Pearson ATC (Air Traffic Control) controls all activities on the field, and the approaches to the airport. Pearson ATC also supports arrivals and departures for many smaller airports in the vicinity. Toronto Center controllers cover the whole southern Ontario region. Figure 1 shows part of Pearson airport's ATC antenna farm.

Pearson airport is a very busy international gateway and a fascinating target for scanner owners. I have heard many instructions to inbound aircraft to abort landings because controllers have squeezed aircraft movements too close together. It is common to see one aircraft touching down at one end of the runway, while another is just getting its wheels off the ground at the other end.

Controllers have aborted landings due to coyotes straying onto the runways in the middle of the day. Pearson airport also has a

Table 1: ATC frequencies in use at Pearson Airport

(all frequencies in MHz, AM)

CLNC DEL (Clearance Delivery):	121.3
Terminal 1 & 2 ramp:	122.075
Terminal 3 ramp:	122.875
Ground:	121.650, 121.900
Tower - Runway 24R/06L:	118.35
Tower - Runway 23/05:	118.700
Arrivals:	125.400, 121.475
Departures:	128.800, 127.575
Pod Control Center (De-icing area):	131.175
ICEMAN (De-icing operations):	131.375
ATIS (Automatic Terminal Information Service):	112.15, 120.825
NOTAM (Notice To Airman):	133.1
VFR (Visual Flight Rules) advisory:	119.3, 133.4
Toronto Center:	124.925, 125.775, 127.000, 132.475, 132.8, 134.575, 134.925

herd of deer living within its perimeter, and they, too, sometimes pose a threat to aircraft movements.

Control of aircraft movements flows from one controller to another. As each controller hands off to the next, the new frequency is announced to the pilot. Using the list provided in Table 1, monitoring enthusiasts can quickly program ATC frequencies sequentially into scanner memory locations. You will then be able to quickly follow outbound aircraft from the gate, across the apron, onto the runway, through take-off, departure control, and final exit from the area when Toronto Center hands off the flight to an adjacent region.

Ground-based VHF receivers will usually not be able to hear ATC from adjacent control centers. Inbound flights will follow the reverse of the departure sequence.

Scanning VHF Airport Beacons

I personally find monitoring the ILS beacons to be almost as fascinating as the ATC. Toronto uses a combination of DME (Distance Measuring Equipment), "localizers," and VOR (VHF Omnidirectional Ranging) to provide aircraft with the data required to make a perfect final ap-

proach and landing. Signals are transmitted using Morse Code to identify each beacon. It was mostly because of my own interest in monitoring airport navigation systems that I learned Morse Code, even before becoming a ham. Fortunately, airport beacons transmit their code very slowly, and use a modulated AM VHF signal, so the signals can be received on any scanner which covers the VHF airband.

The two VORs can be heard through 360 degrees and transmit the airport identification code ("YYZ" - Toronto, "YTP" - Pearson). Each localizer and DME channel also has an identification code. Localizer signals are transmitted by the arrays of beam antennas placed at the end of each runway. Localizers transmit a narrow beam of radio signals to guide aircraft on their final approach, so they can only be heard within a few degrees of the runway centerline. Table 2 lists the frequencies in use at Pearson air-

Table 2: ILS/DME frequencies in use at Pearson airport

(all in MHz, AM):

Runway 06L	IJS (.. — ..)	109.100
Runway 24R	INV (.. - ...)	109.300
Runway 05	ITX (.. - ..)	109.700
Runway 33R	ILE (.. - ..)	110.300
Runway 15L	IRW (.. - ..)	110.500
Runway 15R	ILP (.. - ..)	110.950
Runway 33L	ITO (.. - —)	110.950
Runway 23	IYZ (.. - — —)	111.500
VOR	YYZ (- — - — —)	112.150
VOR	YTP (- — - — —)	116.550

There are many other frequencies in use at Pearson airport. Each airline has its own assigned frequencies for terminal operations. The RCMP (Royal Canadian Mounted Police) provides policing at the airport. The OPP (Ontario Provincial Police) also maintains a clandestine presence at the airport (believed to be associated with anti-drug smuggling operations). Perhaps we will explore this aspect of airport operations further in a future column.

Scanning Canada readers are invited, as always, to send in monitoring reports from all points north of the border. You can reach me at johndavidcorby@yahoo.com. Until next month, 73 and have fun scanning Canada!



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823,9875MHz., 849,0125-868,9875 MHz., 894,0125-1300,000 MHz.

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ICOM PCR1000 computer communications receiver.....	\$379.95
ICOM R10 handheld wideband communications receiver.....	\$279.95
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Understanding Weather Bulletin Headers

You get your weather forecast from the friendly local meteorologist, usually a happy person on TV with a computer-driven map. Every wonder where the cheerful local people get *their* information?

Well, they get it from the same place everyone else does. It comes via thousands of terse, highly compressed, weather reports, as collected and made public by weather offices worldwide. These "products," as meteorologists like to call them, are distributed to millions of users every day. While shortwave radio is used for delivery even less than it was five years ago, there are still hours of radio teletype (RTTY) and Morse code (CW) weather out there for us to copy.

◆ Why coded weather?

Weather codes started for two reasons. First, of course, was brevity. This is a good idea now, but it was absolutely essential when 75 words per minute was a pretty decent data rate. By acting as pointers into voluminous lookup tables, a few well-chosen alphanumeric characters in a document heading can decode into several lines of information.

Second, though, is clarity. Thousands of international conferences have worked over every linguistic and cultural nuance, creating a universal code understood by all members, while still allowing the survival of some carefully documented national practices. Even so, it's easy for beginners to confuse weather codes with the encrypted groups used in "numbers" broadcasts aimed presumably at spies.

The difference, of course, is that weather codes aren't secret. They are completely explained and standardized in a huge stack of numbered handbooks available to anyone from the World Meteorological Organization (WMO) in Geneva. Of course, these are not cheap, and WMO takes only Swiss francs. It might be simpler just to read the rest of this column, where we dissect those cryptic headings at the tops of transmitted weather bulletins.

◆ Weather Product Headers

Hundreds of international agreements have recently created a tight, highly structured heading syntax that will ultimately be used at the beginning of most weather products worldwide. One short line of code gives full information on what the bulletin is about, what type of data it contains, where it was taken, and, if it is a forecast, when and where it will be valid.

Let's jump right into it by taking the first lines from a US Air Force weather transmission copied right off the air:

```
ZCZC
SAUS80 KWBC 011200 RRC
METAR
KDAL 011150Z 0000KT SKC 14/11
A3010 RMK 10170 20133=
[more lines of data]
NNNN
```

The first line, ZCZC, is a standardized start signal. Line two is the real information we're after. The first group is always four letters, then an optional 2-digit number. Generally, the letters break down to the product type (SA is Surface Observations), and its valid location (US is the United States).

The meaning of the number, when there is one, can vary from country to country, though it usually pertains to the altitude level for the data. In this particular case, it seems to refer to the data's have been taken at the surface.

The next group is a four-letter international weather station identifier. In our example, KWBC is the National Weather Service central operation center in Maryland.

At airports, weather stations usually share the four-letter identifiers issued by the International Civil Aviation Organization (ICAO), but these are a subset of the larger list maintained by the WMO. While weather IDs look like radio callsigns, they are not. In several countries, they include letters not internationally authorized for radio use.

The next character group gives the valid date and time of the product, in the form ddhmm. This is day of month, hour, minute. It is always Coordinated Universal Time (UTC).

Finally, the line ends with an optional, three-letter group for extra attributes. In our example, "RRC" stands for "retarded," plus a serial letter. It indicates delayed data. In this same manner, "CCx" means "Corrected," and "AAx" is "Amended."

The rest of the bulletin is outside the scope of this column. Briefly, the next line is an optional code designator, where METAR means the hourly Aviation Routine Observations used by pilots. KDAL, in our example, is Dallas, TX. Other codes we encounter include AAXX or SYNOP (synoptic land observations), and BBXX or SHIP (volunteer ship reports). Fi-



a Korean commemorative stamp.

nally, NNNN is a standard stop code.

A great deal more information on decoding weather bulletins is at this column's web site, <http://www.ominous-valve.com/uteworld.html>.

◆ Faslane is in Scotland

Apologies to Day Watson and any other Scots who caught me trying to move Faslane to England in the July column. Of course, this UK naval base is still in Scotland, northwest of Glasgow, and right where it has always been. Sorry I was such a *blether skite*.

Table 1: Common WMO Data Types

AB	Weather summaries	FZ	Marine forecasts
AC	Convective outlooks	SA	Surface observations
AS	Surface analyses	SD	Radar observations
AU	Upper level analyses	SH	Synoptic ship reports
AX	Tropical discussions	SM	Synoptic observations
FA	Area forecasts	SP	Special reports
FB	Aviation forecasts	SS	Ship reports
FP	Public forecasts	UR	Air reconnaissance data
FS	Surface forecasts	WT	Tropical advisories
FT	Terminal forecasts	WU	Severe storm warnings
FU	Upper level forecasts		

Table 2: Frequently Seen IDs

CWAO	Canada	Canadian Met. Centre
CWEG	Canada	Alberta Weather Centre
CYZZ	Canada	Toronto Weather Centre
KAWN	USAF	Aviation Weather Network, Offutt AFB, NE
KGWC	USAF	Global Weather Center, Offutt AFB, NE
KKCI	NWS	Aviation Weather Center, Kansas City, MO
KMKC	NWS	SIGMET Center, Kansas City, MO
KNGU	US Navy	Navy Weather Center, Norfolk, VA
KNHC	NOAA	National Hurricane Center, FL
KWBC	NWS	Central Operations, MD
KWNC	NWS	Climate Prediction Center
KWNO	NWS	Aviation Weather Center, Kansas City, MO
KWNS	NWS	Storm Prediction Center
MMGL	Mexico	Guadalajara
MMMD	Mexico	Merida
MMMXX	Mexico	Mexico City
MMMZ	Mexico	Mazatlan
PANC	NWS	Anchorage, AK
PHFO	NWS	Central Pacific Hurricane Center, HI
PHNL	NWS	Honolulu, HI
TJSJ	NWS	Puerto Rico
TJNR	US Navy	Roosevelt Roads Naval Station, PR

NWS = National Weather Service

SIGMET = Significant aviation weather warning

Abbreviations used in this column

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARIA	Advanced Range Instrumentation Aircraft
ARQ	Automatic Repeat Request teleprinting system
CAMSPAC	Communication Area Master Station, Pacific
CIA	US Central Intelligence Agency
CW	Morse code telegraphy ("Continuous Wave")
E3	British M16/SIS "Lincolnshire Poacher"
EAM	Emergency Action Message
FAX	Radio Facsimile
FEC	Forward Error Correction teleprinting system
FEMA	Federal Emergency Management Agency
FSK	Frequency-Shift Keying
HFDL	High-Frequency Data Link, a serial radio modem
M10	Unidentified CW numbers, ends 000
M16	8BY, French intelligence, CW numbers
M22	4XZ, Israeli navy, CW numbers
M29	VDE, Unknown CW numbers station
MARS	Military Affiliate Radio System
MFA	Ministry of Foreign Affairs
MXC	Russian single-letter markers in clusters
NASA	National Aeronautics and Space Administration
NAWS	Notice to Allied War Ships
Pactor	Packet Teleprinting Over Radio
PSK	Phase-Shift Keying
RSA	Republic of South Africa
RTTY	Radio Teletype
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	SITOR, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States
V2	Cuban "Atencion!" numbers
V13	New Star numbers, Taiwan
XPH	High Pitched Polytone, Russian numbers

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

- 426.0 KPH-Special event at the restored Point Reyes, CA coastal maritime station, with commemorative CW messages at 0740. Also copied simulkeying on 4247, 6477.5, 8642, 12808.5, 17016.5, and 22477.5. (Hugh Stegman-CA)
- 518.0 ZSC-Capetown Radio, RSA, with Navarea VII warnings, at 1725. (Bob Hall-RSA)
- 1649.0 VK-Canadian Forces, Camp Black Bear/ Velika Kladusa, CW nondirectional beacon at 2003. (Ary Boender-Netherlands)
- 2362.0 LQFI-Unknown station with CW marker calling group/station EXG4, then 5-letter code groups, and back to the marker, at 2130. (Boender-Netherlands)
- 4017.0 Cuban Spanish female AM voice with 5-number groups (V2) at 0303. (Tom Severt-KS)
- 4028.0 Cuban Spanish female AM voice with 5-number groups (V2) at 0504. (Severt-KS)
- 4110.0 BRL-Unknown, possibly Romanian government, calling PNMB2 in ALE, daily at 2058. (Boender-Netherlands)
- 5153.9 "S"-Russian navy, Arkhangelsk, with a CW marker "cluster beacon" (MXC), at 2127. Also using 7038.9 and 10871.9. (Boender-Netherlands)
- 5154.0 "C"-Russian navy, Moscow, with a CW marker "cluster beacon" (MXC), at 1850. (Day Watson-UK) "C" marker, CW, at 2127. Also using 7039, 8495, 10872, and 16332. (Boender-Netherlands) Also see John Maky's logging below. It's a busy month for the channel markers. -Hugh
- 5159.0 4XZ-Israeli navy (M22), with CW messages, then back to marker, at 1904. (Watson-UK)
- 5422.0 Unid-"Lincolnshire Poacher" (E3), female "numbers" voice, Cyprus, with callup "45954," at 1321. (Boender-Netherlands)
- 5650.0 VDE-Unknown CW "numbers" station (M29), with markers at 0600. (Boender-Netherlands)
- 5680.0 Unid-Icebreaker Outeniqua, RSA, in rescue of scientists from Marion Island in extreme South Atlantic, at 1730. (Bob Hall-RSA)
- 5811.0 Freedom Star-NASA Booster Recovery Vessel, along with BRV Liberty Star, both working the Booster Recovery Director via Cape Radio, Cape Canaveral, FL, in preparation for a space shuttle launch, for hours before and after the logging time of 1400. (Allan Stern-FL)
- 6020.0 MVNHF424-US Army Corps of Engineers, sounding in ALE at 0624. (Severt-KS)
- 6416.0 WLO-Mobile Radio, AL, with weather and traffic list in SITOR-B, at 0500. (Severt-KS)
- 6485.0 Unid-"Lincolnshire Poacher" (E3), female "numbers" voice with callup "45954," at 1900. (Boender-Netherlands)
- 6900.0 Unid-"Lincolnshire Poacher" (E3), female "numbers" voice with callup "78492," at 2000. (Boender-Netherlands)
- 6945.0 Unid-CW numbers station (M10), ending with group count and "000," at 2112. (Boender-Netherlands)
- 6959.0 "Lincolnshire Poacher" (E3), British intelligence, probably Cyprus, in a female "numbers" voice with callup "67243," also using 9251, at 2200. (Boender-Netherlands)
- 7534.0 Unid-Unknown station working another in CW duplex, changed frequency to 12195, then to 10450, where it sent an RTTY message in 5-letter code groups. All this started at 1118. (Severt-KS)
- 7710.0 VFF-Canadian Coast Guard, Iqaluit, with FAX ice charts at 0539. (Watson-UK)
- 8007.0 Base5-Turkish military, sounding in ALE, at 0120. Zulubas, ALE sound at 1901, Base0 at 1924, Base6 at 1941, Base1 at 2019, Base9 at 2039, Base4 at 2142, and Base8 at 2334. (Watson-UK)
- 8010.0 GAL-Romanian government, Galati, calling ALX in ALE at 0037, then calling SLA and SXI at 0137. (Boender-Netherlands)
- 8148.0 SNN299-Polish MFA, Warsaw, with markers in frequency-shifted Morse, at 1631. (Watson-UK)
- 8300.0 New Star Radio Station-Weird female voice with 4-number group AM "numbers" in Standard Chinese (V13), at 1300. (Severt-KS)
- 8464.0 "Lincolnshire Poacher" (E3), with callup 45954, at 1900. (Boender-Netherlands)
- 8638.0 VNG-Australian standard time station, in AM at 1152. (Severt-KS)
- 8906.0 New York Radio, working Air 1789 and KLM 789 for air traffic control, at 0246. Unknown aircraft asking Santa Maria for the spelling of waypoint LADOX, at 0504. (Brent Davenport-CO)
- 8965.0 Goliath Delta-Unknown US military, using call B69 on an ALE-initiated patch via ADW (Andrews AFB), at 1526. (Larry Van Horn-NC)
- 8983.0 CAMSPAC Point Reyes-US Coast Guard, working Coast Guard 1716, a C-130, at 0200. (Ron Perron-MD)
- 8992.0 Deep Cut-US military aircraft, in a patch to "1851" via Andrews, where the female operator quickly passed the following code messages: "The head is purple," "The rooster is in the hen," and "The monkey has lost his banana," all at 0011. (Jeff Haverlah-TX)
- 9007.0 Unid-2 or 3 males chewing the rag in either Italian or Portuguese, definitely not this frequency's new US Air Force Global station, at 0507. (Davenport-CO)
- 9016.0 Ore Mine-US military, raising Jewel Box and entering the net, at 1635. (Haverlah-TX)
- 9057.0 Sentry 10-US Air Force E-3, telling "Current Ops" that the aircraft is returning to base with landing gear problems, at 1433. (Severt-KS)
- 9439.6 Unid operator, probably Russian, practicing code on the air, with a strong signal, and right next to a very popular broad-

- casting band. The op was apparently learning how to send with a semi-automatic telegraph key, thus creating many hours of drill letters, "dit" streams, and general noise, all in FSK Morse at 0533. (Stegman-CA) Unid-same guy, still banging away, in FSK Morse at 1415. (Sevart-KS) [August saw a big return of these old, Soviet-bloc, FSK, Morse code stations, perhaps for training. -Hugh]
- 10046.0 4XZ-Israeli navy (M22), with 5-letter groups in CW, at 0300. (Sevart-KS)
- 10204.0 Race Car-US military, with a 28-character EAM, simulcast on 11244, at 1510. (Haverlah-TX)
- 10583.0 US CIA "Counting Station" (E5), with numbers in standard USB, not the normal reduced-carrier mode, parallel on 11580, on several Tuesdays and Saturdays at 2100. (John Maky-AR)
- 10610.9 Moscow Meteo, with a blurry FAX synoptic weather chart, at 0835. (Watson-UK)
- 10865.0 140-Chinese diplomatic station, working 162 in ALE, then data modem and voice, at 1317. (Watson-UK)
- 10872.0 "CHH"-Abnormal Russian channel marker on "C" single-letter frequencies, also using 16332, at 0235. (Maky-AR)
- 10945.0 CFH-Canadian Forces, Halifax, NS, with NAWS callup marker in RTTY, at 1945. (Sevart-KS)
- 10991.7 RFFVAY-French Forces, possibly Sarajevo, with 2-channel multiplex ARQ at 0908. (Watson-UK)
- 11033.7 ICCH-Eastern European, possibly Belgrade, with RTTY news for "HPCD," at 0933. (Watson-UK)
- 11034.7 Unid-Probable Egyptian diplomatic station, with SITOR-A in the Arabic language and teleprinting alphabet, at 1637. (Watson-UK)
- 11104.0 N140SC-US L-1011 Pegasus rocket launch aircraft, working several US Air Force ARIA instrument planes on the Eastern Test Range, at 1940. (Stern-FL)
- 11175.0 Reach 922T-US Air Force, making arrival arrangements with Andrews AFB in patches through Thule Global, at 0438. (Davenport-CO)
- 11175.0 Navy LF 292-US Navy P-3C, in a patch via Puerto Rico to the duty office at Keflavik, Iceland, at 0004. Navy CW 180, a C-130, making arrival arrangements in a patch via Andrews to North Island Naval Air Station, Coronado, CA, at 0059. Raid 68-US Air Force tanker, in a patch to Nordic Control regarding refueling operation, at 0118. Reach 914-USAF Air Mobility Command C-17 transport, in a patch to AMC Rhein Main, at 0145. Omni 01-Possible US Navy P-3, returning to base in El Salvador, patching Blue Star (US Navy, Roosevelt Roads, PR) via Andrews, at 2303. (Perron-MD)
- 11217.0 Dixie 32-Probably Alabama Air National Guard, passing authenticators with Dixie Control at 2011. (Sevart-KS)
- 11232.0 Trenton Military-Canadian Forces, Trenton, working Elite 431 at 2356 and unknown aircraft CF-JGX at 2358. (Perron-MD)
- 11244.0 Rockaway-US military, with a 21-character EAM, simulcast on 8992, at 1555. (Haverlah-TX)
- 11384.0 007-Aeronautical Radio, Inc., Shannon, Ireland, working flight KH8382 with a position check in the new HF DL digital mode, at 1030. (Watson-UK)
- 11430.0 HMF55-Korean Central News Agency, Pyongyang, North Korea, with typically weird RTTY news, at 1041. (Watson-UK)
- 11465.0 Unid-Russian intelligence "English Man" (E6), with a very long AM message in 5-figure groups, starting at 2110. (Boender-Netherlands)
- 11494.0 Hypnotize-US military, with a 28-character EAM at 1628. Andrews, with same EAM, simulcast on 8992 and 11244, at 1631. (Haverlah-TX)
- 11545.0 "Lincolnshire Poacher" (E3), with messages beginning hourly from 1400 clear to 2200. (Boender-Netherlands)
- 12216.0 WGY 918-FEMA, CO, with a time stamped message for WGY 916, TX, at 1900. WGY 918, passing a similar message to WGY9410, an unknown emergency operations center, at 1912. (Sevart-KS)
- 12562.5 UIMQ-Russian vessel Armenak Babaew, with traffic in 3rd-shift Cyrillic RTTY, at 0754. Similar traffic heard on 12564.5 and 12568. (Watson-UK)
- 12603.0 "Lincolnshire Poacher" (E3), messages at 1500 and 1700. (Boender-Netherlands)
- 13375.0 "Lincolnshire Poacher" (E3), messages at 1500, 1700, and 1800. (Boender-Netherlands)
- 13438.0 Unid-Polytone Station, Russia (XPH), with a null-message broadcast in AM and the usual tone format, at 2010. (Boender-Netherlands)
- 13467.0 SNN299-Polish MFA, Warsaw, with markers in FSK Morse, at 1048. (Watson-UK) [Another old Soviet-bloc station? -Hugh]
- 13910.0 Unid-Russian intelligence "English Man" (E6), with a very long AM message in 5-figure groups, starting at 2010. (Boender-Netherlands)
- 13956.5 Unid-Probably Tunisian diplomatic, with SITOR-B traffic in French at 1906. (Watson-UK)
- 13956.7 BDE-Possible Tunisian MFA, with FEC test markers and coded messages at 1640. (Hall-RSA)
- 14373.4 Unid-Private station in a corporate net, with Spanish-language messages in 200-baud Pactor, at 1545. (Hall-RSA)
- 14487.0 "Lincolnshire Poacher" (E3), with message 03070, also on 15682 and 16084, at 1200. (Boender-Netherlands)
- 14639.0 Unid-Polish embassy, Baghdad, Iraq, working SNN299, who was using 15682, in Polish ARQ at 1330. (Watson-UK)
- 14846.0 Unid-Polytone Station, Russia (XPH), with a null-message in AM tones, at 2000. (Boender-Netherlands)
- 14931.0 8BY-French intelligence (M16), with CW markers and 3-figure "numbers," at 0455, and the same message at 0556. (Sevart-KS)
- 15016.0 US Air Force, with several ground stations broadcasting a 50-character EAM, at 1750. (Haverlah-TX)
- 16017.7 Unid-Probable Egyptian diplomatic station, with Arabic SITOR-A, at 0828. (Watson-UK)
- 16084.0 Unid-"Lincolnshire Poacher" (E3), female "numbers" voice with 5-figure groups in English, at 1321. (Sevart-KS)
- 16412.7 Unid-Bank financial traffic from Kinshasa, Zaire, in slow Pactor at 1540. (Hall-RSA)
- 16830.5 SVU6-Olympia Radio, Greece, with SITOR-B ship press bulletins, at 1306. (Watson-UK)
- 16976.0 PWZ33-Brazilian Navy, Rio de Janeiro, with RTTY navigational warnings and weather in English and Portuguese, at 1604. (Watson-UK)
- 18041.0 HGX21-Hungarian MFA, Budapest, with long coded ARQ message at 1525. (Hall-RSA)
- 18064.0 SNN299-Polish MFA, Warsaw, with markers in FSK Morse, at 1500. (Watson-UK)
- 19945.0 MAE-ALE call of Algerian MFA, Algiers, working BKO (Bamako embassy, Mali), in ALE at 1032. (Watson-UK)
- 20010.0 S78-Swedish embassy, Tunis, working S00 (Stockholm) with ALE-initiated serial data exchange, at 1425. (Watson-UK)
- 20031.7 Unid-Probably Pakistan MFA, Islamabad, with encrypted SITOR-A traffic, at 0918. (Watson-UK)
- 20602.0 KUW-British military, Kuwait, sounding in ALE at 1541. ASI-British military, Ascension, sounding at 1606. (Hall-RSA)
- 20633.7 RFVI-French Forces, Le Port, with ARQ traffic for Paris, at 1620. (Watson-UK)
- 20942.0 S97-Swedish Embassy, Abidjan, with ALE callup, then serial PSK data exchanges with S00, MFA Stockholm, at 1248. (Watson-UK)
- 21973.7 TAD-Turkish MFA, Ankara, with FEC news in Turkish at 1230. (Hall-RSA)
- 23337.0 HAW-US Air Force, Ascension Island, sounding in ALE at 1054, then working PLA, Lajes, in ALE at 1105, and ADW, Andrews AFB, in ALE at 1109. (Hall-RSA)
- 23526.0 S73-Swedish Embassy, Abidjan, Ivory Coast, sounding in ALE at 1316. (Hall-RSA)
- 27870.0 HAW-US Air Force, Ascension Island, sounding in ALE at 0951. (Hall-RSA)

Utility Monitoring Central on the Move

This month we return to the continuing growth of ALE and our ongoing research to uncover the operators behind some of these networks. We also profile the FEC-A digital system.

Due to a recent house move and change of ISP, the Utility Monitoring Central website has been moved to a new location: <http://www.chace-ortiz.org/umc>. Please update your links and any bookmarks. Visitors to the old site will be redirected automatically to the new location, and you shouldn't notice any difference in service. One advantage of the move is that we can now monitor who visits the site much more closely, in addition to having a few tools that tell us where the visitor resides. We can already see that the Swedish Military and Russian FAPSI are frequent visitors to UMC.

More ALE Network Updates US Civil Defense Network?

An interesting but as yet unknown network appears to operate annually across a wide variety of frequencies using plague-related identifiers (and callsigns when using USB voice communications). Any information on this network would be much appreciated.

Identifiers:

EBOLA, PLAGUE, RESTON, B01, B02, B03, B04, B06, B07, B11, B12, D03, E05, E11

Frequencies:

2280.0, 5778.5, 5818.5, 5848.5, 6908.5, 8048.5, 9121.0, 9121.5, 10818.0, 11445.0, 11576 kHz USB

UN Peacekeepers in East Timor?

Some chance catches from listener Igor Buhtiyarov in Siberian Russia indicated a series of locations from where UN observers are based in East Timor. The giveaway is thought to be the identifier UNHQMOG (UN Headquarters Military Observer Group).

Identifiers:

AINARO, AILEU, BAUCAU, DILI, ERMERA, HQUNMOG, LIQUICA, LOSPALOS, MALIANA, MONATUTO, SECURITY, VIQUEQUE

Frequencies:

9029, 9034, 11211, 11212 kHz USB

Myanmarese or Philippine Network?

This network was first thought to originate in Myanmar due to the distinctive identifier YGN for Yangon (Rangoon), that country's capital. However, on uncovering more identifiers for this network, they could indicate either Myanmarese or Philippine locations. For example, MAN could be Mandalay or Manila. The operators of this network use English when sending short AMD messages or via USB voice. Note that 20500 kHz is another case of a shared channel, as MFA Bucharest and its embassies can also be heard there.

Identifiers:

APK, BZB, KKT, LPD, MAG, MAN, MER, MGY, PAY, QFI, YNG, YGN

Frequencies:

6494, 20500 kHz USB

Romanian Internal Network

Listener Leif Dehio spotted a connection between the identifiers of this network and various Romanian towns over a certain size of population. The ALE traffic triggers the Harris AVS-type voice scrambler and MIL-188-110A 2400bd and 39 tone modems. The best guess is that this is therefore an MOI (ministry of information) or military network of some sort: The suffixes B1, B11, B2 or B4 are often added to the identifier, but its purpose is unknown.

ALX	Alexandria
BIS	Bistrita
BU1..4	Bucharest
BOT	Botosani
BRL	Brailia
CON	Constanta
CRA	Craiova
DRO	Drobeta-Turnu Severin
GAL	Galati
PLS	Ploiesti
PNM	Piatra Neamt
RES	Resita
SLA	Slatina
SUC	Suceava
TAR	Targoviste
TIM	Timisoara
TMU	Targu Mures
VAS	Vaslui

Frequencies:

4410, 6770, 6945, 8010, 8190 and 10375 kHz USB

Some Odd Unidentified Ones...

MOSCRIP

A network in which the station MOSCRIP tests the link to BAHAMAS, VIEQUES or PINI once an hour has been heard on 10760, 10932 and 15730 kHz USB.

ARGON

This network, first reported on 5523 kHz in the June 2001 issue of *MT*, appears to sport a second channel on 9105 kHz using the same odd mixture of identifiers:

123	H2A
ARGON	H3
ARGON1	H4
F6	H5U
H2	T

Phone Patch Network Update

The phone patch network on 10142, 10706 and 16278 kHz noted in the July 2001 issue of *MT* appears to be carrying Colombian, and not Mexican phone traffic as initially thought.

Don't forget to check the ALE network updates and identifier database at Utility Monitoring Central (see Resources).

System Profile: FEC-A

Originating from the laboratories of the German electronics giant Siemens, this system has been used in the past by the German Government Press Service and the German Diplomatic Service. Later, it was adopted by MFA Paris and French Military Attaches (P6Z, RFGW etc), the Serbian Diplomatic Service (DFZG) and MFA Ankara (TAD). Today only Paris and Ankara are regularly heard with FEC-A. The original system was named FEC-100; a later variant was FEC-100A (shortened to the more familiar FEC-A).

The system typically runs with 96bd or 192bd (144bd and 288bd are heard rarely) and uses the ITA2-P alphabet. As its name suggests, FEC-A produces robust copy through the use of a fairly simple (short) interleave Forward Error Correction scheme whereby the same parts of a message are repeated a number of times later during the transmission. If one element of the message is missed due to interference, the receiver can simply wait for the next occurrence(s). Normally this interleave is a standard 72, although a number of organizations have modified their equipment to use a different interleave value. Although not as reliable as ROU-FEC, FEC-A does well under heavy interference or weak signal conditions.

A fast baud rate of 384bd (actually two channels of 192x2) has been found in use by MFA Paris on rare occasions.

Unfortunately (and you probably know what's coming next) there are signs that FEC-A will soon disappear. MFA Paris is clearly testing the Thompson CSF Series 2000 high-speed modem on a number of its regular FEC-A links. However, both Ankara and Paris can still be heard on a daily basis with FEC-A transmissions. Enjoy it while it lasts!

Resources

Utility Monitoring Central: <http://www.chace-ortiz.org/umc/>
FEC-A Clip: <http://rover.vistecprivat.de/~signals/WAV/FEC-A.HTML>

Mike's one year daughter, Nami, at the controls of Utility Monitoring Central.



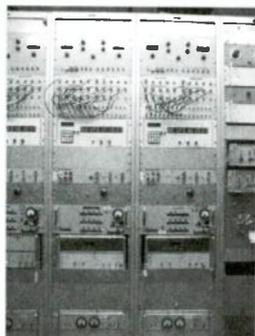
Glenn Hauser

P.O. Box 1684-MT, Enid, OK 73702

wghauser@yahoo.com

www.angelfire.com/ok/worldofradio

TOP 10 WWV PROMOTIONAL IDEAS



10. Buy the rights to "bee-doop" from old Mutual network.
9. New Station ID: "WWV, Fort Collins-DENVER!"
8. New Slogan "Give us 22 minutes—we'll give YOU 22 minutes!"
7. Hire "Perfect Paul" away from NWS to do side-splitting morning show.
6. Have music director expand playlist to include "Theme from 60 Minutes".
5. Do station promo poking fun at Canadians on CHU.
4. Drive time slogan: "Propagation and Solar Weather Together on the :18's".
3. LIVE Solar Flare Remote from surface of the Sun!
2. Hire low paid female sidekick for announcer who laughs hysterically every time he gives the time.

And the #1 Promotional Idea for WWV:

1. "9th Caller wins an Atomic Clock!"

(Thanks to Brock Whaley for finding this on the radioready website)

ALGERIA Radio Algiers International, sporadic English hour at 1600 was audible Aug 9 at 1640 on 15160, not on the other frequency mentioned, 11715 (Mike Borracough, Letchworth, UK, DX Listening Digest)

AUSTRALIA Christian Voice very strong at 0400 on 21550 and 21680, creating mixing products on 21810 and in the hamband at 21420 (Jem Cullen, Australia, ARDXC)

AUSTRIA Over the last few years, extreme budget cuts have been made and this year the whole funding will again be cut in half (!). No broadcasting service for abroad can survive with a budget of only ATS 45 million, so this practically means THE END for Radio Austria International. Services that have already been dismissed are voice services in German, Spanish, Arabic and Esperanto. All listeners should show their solidarity with ROI NOW. Let's give our VOTE FOR RADIO AUSTRIA INTERNATIONAL. Just fill in an easy web-form and send it to ROI, or download the PDF-file, print it and send it to ROI. Can be found at: <http://www.ratzer.at> Thanks a lot for your support - every vote counts! (Christoph Ratzer, OE2CRM, Salzburg, A-DX via Wolfgang Büschel, Wolf Harranth) Statement from the head of R. Austria International about its future: http://roi.orf.at/english/orfgesetz/en_intendant.html (gh)

BELGIUM On 15795 LSB, 2230-2310 UT 10 Aug, R. Borderhunter conducted an extremely low power DX test. Frans dropped the power in increments over a 40 minute period, from 25 watts at 2230 down to the absolute minimum he could transmit: could not hear every word, but did copy "100 milliwatts" after 2300, very weak in Nashville, TN. I have a tape recording of this as proof. RX: Drake SW8 with MFJ amplified preselector, which gives 10 dB signal boost. ANT: 30 meter sloper, with 3 ground radials 15 meters each. Thanks to R. Borderhunter for providing this opportunity at very low power DXing and to pirate operators in general for enhancing our hobby! (David Hodgson, TN, DX Listening Digest)

BOLIVIA 3343.6 station, *2230 with radio drama; I have many hours of recordings, but only at one time did they say, R. Ayopaya Onda Corta. Ayopaya isn't very far but there are social problems with the farmers closing the roads. They won't let me get there (Rogildo Fontenelle A., Cochabamba, Bolivia, Cumbre DX) R. Ayopaya is the station of the "Centro Cultural Ayopayamanta" in Independencia (Ayopaya/Bolivia). It also works in development, environmental protection and education. You can contact the Centro Cultural Ayopayamanta by Casilla 2433, Cochabamba, Bolivia; Tel-Fax 00591 42 44909; or Parque Fidel Anze No 5, Cochabamba, Bolivia (Steffi und Thomas Henrich, Germany, who sponsor a Catholic MW station in Ayopaya, via Henrik Klemetz, DX Listening Digest) R. Ayopaya, 3344.3 runs 500 watts at 0900-1230 and 2230-0130. Director: Sr. Jorge Aquino. Postal: Casilla 2433 Cochabamba - Bolivia. It's almost 100% in Quechua.

R. Impacto Cristiano, La Paz, 6883.5, 500 watts at 0900-0200. Director: Sr. Rene Vano. Tel. 005912481947 (in October another number will be added). Has no postal address as there is no postal delivery service in the area where it is installed in Villa Nueva Potosí church. And the station is unlicensed (Rogildo Fontenelle Aragão, Cochabamba, Bolivia, Radioescutas)

I stopped by R Trópico, Trinidad, Beni, 16 July on vacation while they were changing

frequencies from the old 4552 +/- to their newly assigned 6035 kHz. Owner Eduardo Avila-Alberdi said they finally received their frequency allocation from the government; had been operating under temporary permit since 1979! Most of their audience has trouble finding portable SW radios that cover 60m. Expect to see more Bolivians trying to move into 49m. Colombia is also on 6035 and engineer indicated they might move a few kHz. I found them on 6027 that evening, but they may move around a bit before settling down. Schedule is 1000-1300, 1600-1830, and 2230-0100 UT. Rated for 3 kW, but they run at half power. They are interested in reports; send to the in WRTH and mention any messages heard - that will get their attention and give them ammunition for advertising. Pictures are on my web site at <http://www.comportco.com/~wfair/Photos/index.html> and follow the links under "Radio Stations". (Walt Fair, Cumbre DX) R. Trópico heard on new 6036.8 at 2357 with ID announcing 6035 (Rogildo F. Aragão, Cochabamba, radioescutas)

On 6054.4, R. Juan XXIII, San Ignacio de Velasco, 2145-2155 only in a typical July greyline-sunset opening. Lowlander playing their typical flute sounding quite different from the Andean variety (Henrik Klemetz, Sweden, DX Listening Digest) Also at 1055, first thought to be Radio Mauro Núñez, Villa Serrano which is listed on 6065 but according to a press release from the Bolivian State Authority SITTEL, has been assigned to 6055, after paying 4200 bolivianos for it. Another frequency sold for 5025 Bs., 6005 to be used by R. Patujú (Björn Malm, Ecuador, SW Bulletin)

Radio Santa Cruz, 6135, date and time friendly Spanish letter with station stamp, in 6 months, v/s Yolanda Marco Escobar, Secretaria de Dirección, for English report and IRC. She tells me that although their target audience is Bolivian, they are always happy to hear from listeners abroad. Radio Santa Cruz's anniversary is Oct. 25. 10 kW into a dipole. Return postage was Bs.5 Address: Casillas 672 or 3213, Santa Cruz, Bolivia. E Mail: irfacruz@roble.scz.entelnet.bo Fax: (519-3) 532257 (Joe Talbot, Alberta, Cumbre DX)

BRAZIL R. São Carlos, São Carlos, SP, told me a year ago they planned to reactivate 2420 kHz, and now they have, on the air 24 hours, but after 0300 only music with no announcements. Address: Rádio São Carlos, Caixa Postal 115, 13560-970 São Carlos SP (Samuel Cassio, Conexión Digital)

What's going on with R. Cultura, São Paulo? I can't get it on 6170 here in SP state (Eduardo Pazera) Heard them announce that due to electricity rationing the FM program would be simulcast on SW only at 5-6 and 20-24 local time (Claudir Ghiggi) Not heard on 9615 or 17815 either (Adriano Becker) R. Cultura has two big problems: only one technician who knows how to push certain buttons, and no maintenance team. 17815 is off the air

because it needs new tubes. It looked like a battlefield when I visited recently: pieces everywhere and nothing working. They put higher priority on maintaining 9615 relaying the AM program than on 6170 with the FM (Denis Zogbi, all Radioescutas via @ividade DX) R. Cultura on 6170 at 0840, strong in Portuguese talk (Ion Cattermole, New Zealand, Cumbre DX) That fits into the 5-6 am local hour (gh)

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2x freq = 2nd harmonic; A-01=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated

BULGARIA R. Varna is on 9955 Sundays 2100-0300, good reception (Madimir Kovalenko, Tomsk, Russia, Signal via World DX Club Contact)

CANADA On 8 Aug at I noted RCI on 15034 kHz // 15170 after 0030 when Trenton Military left the frequency (Bill Wilkins, MO, DX Listening Digest) Geez, RCI interfering with Trenton, which surely needs the frequency later, ought to get someone's attention (gh) One of many spurious mixing products I have complained to RCI about, this one between 15305 and 15170 (David Hodgson, TN)

CHECHNYA [non] Separatists were reported operating a SW Radio Station of Free and Independent Ichkeria - Caucasus near the Georgian village of Duisi in the Pankissi Gorge, of great concern to Russia, which pressured Georgia to close it down (RIA Novosti via Sergei Sosedkin)

The disputed Chechen clandestine is certainly the one on 7350/7143, audible at times in Germany after 1830 (Kai Ludwig, DX Listening Digest) Radio Kavkaz from 1605 on 7143.05 in Russian and Chechen (3-4 min information blocks about current situation). News in Russian noted at 1605, 1633, 1700. News in Chechen at 1630 only. Elsewhen, monotonous HQ singing. Full ID in Russian at 1629: "Natsionalnoye Radio Svobodnoy Nezavisimoy Itchkerii. - "Kavkaz". (Vladimir Titarev, Kremenchuk, Ukraine via Ludwig, DX Listening Digest)

Georgian National Communications Control Commission official Temur Dzagnidze told Caucasus Press on 8 August that his agency has been unable to trace the Chechen radio station that Russian officials claim is broadcasting to Chechnya from the Georgian village of Duisi. Dzagnidze said either that radio station does not exist, or its signal is so weak that only local radio engineers in eastern Georgia could trace it (RFE/RL Media Matters)

CHINA 6060, Sichuan PBS, program for young people included 1000 ID in Chinese, and English as "Voice of Golden Bridge," announcing 5900, but not audible there (Alan Davies, Thailand, Cumbre DX)

Heilongjiang People's Radio Station. ID: "Heilongjiang Renmin Guangbo Diantai". Address: 181 Zhongshan Lu, Harbin, Heilongjiang 150001. Tel: +86 (0)451 262 7454. Fax: +86 (0)451 289 3539. E-mail: am621@sina.com Web Site: <http://www.am621.com.cn> SW schedule: 2100-1300 on 4840 in Mandarin.

Gansu People's Radio Station, Lanzhou, in Mandarin: "Gansu Renmin Guangbo Diantai" Address: 226 Donggang Xilu, Lanzhou, Gansu 730000. Tel: +86 (0) 931 84111054. Fax: +86 (0) 931 8825834. 2200-1600 on 4865.

Guizhou People's Radio Station, Guiyang. "Guizhou Renmin Guangbo Diantai". Languages: Mandarin. Address: 259 Qingyun Lu, Guiyang, Guizhou 550002. Tel: +86 851 582 2495. Fax: +86 851 586 9983 Web Site: <http://www.gz169.com/diantai> 2150-1710 on 3260, 7275.

Inner Mongolia People's Radio Station - Mongolian Service, Hohhot. Address: 19 Xinhua Dajie, Hohhot, Inner Mongolia 010058. Tel: +86 (0)471 696 2288. Fax: +86 (0)471 696 1082. 2150-0115 and 0800-1605 on 4525, 4785, 6195; 0115-0800 on 7210, 7270, 9750.

Inner Mongolia People's Radio Station - Mandarin service. ID: "Neimenggu renmin guangbo dantai". Address: 19 Xinhua Dajie, Hohhot, Inner Mongolia 010058. Tel: +86 (0)471 696 2288. Fax: +86 (0)471 696 1082. 2200-0115, 0900-1605 on 4000, 4620, 6045; 0115-0900 7105, 7165, 9520 (© BBC Monitoring)

Latest schedules of various services of China National Radio, including regional and minority, along with audio links, and in some cases, program schedules can be found at Nagoya DXers Circle: <http://www2.starcat.ne.jp/~ndxc/cn/cnr.htm> (gh, DXLD)

CUBA RHC was to debut web broadcasts Aug 13 (Jean-Michel Aubier, <http://perso.wanadoo.fr/jm.aubier>) All RHC programming in Spanish and other languages will be broadcast on these sites at their usual hours: <http://www.infocom.etecsa.cu> and <http://www.cubasi.cu> (Ruben Guillermo Margenet, Argentina) We got an embedded player at first, but nothing on it (gh)

[non] Ninoska Perez Castellon made a surprise announcement of her resignation as director of the Cuban American National Foundation. Her voice had been heard for a sesquidecade on SW via La Voz de la Fundacion on WHRI 7315. One of the reasons for her resignation was the decision to cancel this broadcast. She continues to be heard on WQBA 1140 Miami, Ninoska a la Una (Oscar via D. Lawton, Conexión Digital)

CZECH REPUBLIC R Prague is giving a 20 page booklet to all its listeners to commemorate its 65th anniversary, detailing the history of Czech R (Swopan Chakraborty, Kolkata, India, DX Listening Digest) In response to many listeners' fears over the future of Radio Prague on shortwave, director Miroslav Kupica spoke on Mailbox to assure that Radio Prague is not thinking of stopping SW, its main medium for international broadcasting, with the internet, satellite and cable as complimentary systems. Around 1/3 of the station's budget is spent on transmission costs (Jonathan Murphy, Ireland, World DX Club Contact)

EGYPT Cairo is testing at least two new transmitters, heard +1900-2054° on 5900 and 9900; +0336-0358 + 6200 and 12000. Good audio quality (Mikhail Timofeyev, Russia, hcdx)

ERITREA Radio UNMEE announced two addresses for letters, English accepted. Radio UNMEE, ECA Building, P.O. Box 3001, Addis Ababa, Ethiopia; or Radio UNMEE, P.O. Box 5805, Asmara, Eritrea. Background info and schedule at <http://www.un.org/Depts/dpko/unmee/pr27.htm> (Hans Johnson, Cumbre DX) [United Nations Mission in Ethiopia and Eritrea]

ETHIOPIA [non] A Tigray exile organization in Indiana has been experimenting with half-hour broadcasts via WWCR. Tried Sunday 1630 on 15685, after the Latin Mass, but unsatisfactory. Thursday 2100 on 15685 worked better, and may be retained (right after WOR). An 0500 test on 3215 was on UT Sunday. Website is <http://www.ethiopiancommentator.com> and e-mail articles@ethiopiancommentator.com They say their purpose is to provide lessons in democracy to Ethiopia (Adam Lock, WWCR, WORLD OF RADIO) Website identified show as Dimtsi Tegarú Kab Semien America, this voice of our martyrs. The 0500 show was temporarily called Dimtsi Si-wu-at. Also there is a link to a number of audio files at: <http://www.ethiopiancommentator.com/dejenradio/index2.html> one of which, <http://www.ethiopiancommentator.com/dejenradio/dimtsitigray.ram> appears to be the broadcast heard on WWCR. There are also a large number of editorials and articles in English on the site, if you want to try to figure out where they are coming from politically (gh)

Netsanet Le Ethiopia Radio, 1700-1800 on 12110; <http://www.netsanet.com> A monitoring station direction finding system measured it at 67 degrees, ruling out Sofia, Bulgaria, and Miac, Moldova. Close to this bearing are Russian sites Kurovskaya, Samara, Serpukhov, Tula (BC-DX)

GERMANY "DW Radio DX Committee" in English by Wolfram Hess heard on last Saturday of month in the 2300-2345 to Asia on 9815 Wertachtal, 12055 Novosibirsk, 13610 Trincomalee, 21790 Petropavlovsk (Roland Schulze, Philippines, BCDX) Show gets lost in the shuffle; DW rather lax in publicizing such monthly sub-programs (gh) You've got that right. The DW Radio World DX Meetings are on the air every last Saturday of the month plus repetitions (Sundays, too) in all English programs with Mailbag Asia (Wolfram Hess, via Kai Ludwig, DX Listening Digest) For webcast schedule see <http://www.publicradiodf.com> (gh)

HUNGARY R. Budapest was rumored to be facing sharp cuts in its international broadcasting - just as the EDXC Conference was about to happen there August 24 (Luigi Cobisi, EDXC Report on HCJB DX Partyline)

INDONESIA Regionals I could hear around 1100 UT u.o.s. in the Philippines, mid-July: 2960 RRI Manggarai. v3177.6 RSPDT2 Halmahera Tongha. 3214.9 RRI Menado had problems, strong growl tone and weak audio. 3264.7 RRI Gorontalo s-off around 1312°. 3344.8 RRI Ternate. 3960.2 RRI Palu. 3976 RRI Pointonak s-on later than listed, on air varies sometime between 1100 and 1200. 4003.1 RRI Padang. 4606.4 RRI Seuri. 4753.3 RRI Makassar. 4789.1 RRI Fak-Fak. 4925 RRI Jambi. At around 0800-0900 6071.3 RRI Jayapura. 6153.3 RRI Biak, and 9552.3 RRI Makassar. 3325 RRI Palangkaraya not regularly active. 2899 RPDT2 Ngada tentative, only weak carrier on channel. 9525 VOI not regularly active at 0800, but at 1130 Japanese powerful. 9680 RRI Jakarta around 1110. And 15125 & 11760 at 0400, "Warta Berita", sport reports, telephone call-in (Roland Schulze, BCDX)

Mailbag program of V of Indonesia announced URL <http://www.rrionline.com> and said to send at least 4 IRCs to receive a QSL card (Swopan Chakraborty, India, DX Listening Digest)

IRAN Radio Shalom's program was monitored in July for about 5 days between 1900 and 1927. 7175 was always under a strong cochannel, but 9745 was in the clear. I never heard any speech, only continuous middle eastern music. Always off at 1927. Never heard any IS, NA or IDs, so this is a presumed logging (Walt Salmaniw visiting Andlau, France, DX Listening Digest)

[non] Clandestine listed as "GHI" on new 17520 at 1530-1730 is believed to be Seday-e Iran, ex-15690; jammed. Site seems to be Europe, Jülich? (Noel R. Green, UK, and Wolfgang Büschel, Germany, BC-DX)

KURDISTAN [non] Denge Mezopotamya or Voice of Mezopotamya: Per Ludo Maes at TDP, schedule is: 15230 0800-0959; 11530 1400-1600. Target is the whole of Kurdistan including regions in Turkey, Iraq and Iran (Hans Johnson, Cumbre DX)

LIBYA In one of its Arabic broadcasts, V. of Africa announced Email address: africavoice@hotmail.com (Christian Mocanu, Romania, Cumbre DX)

MYANMAR 6570, Myanmar Defense Forces Station, sked is 0130-0430, 0630-0930 & 1330-1630. The 0930-1330 break coincides with minority language service of Myanmar Radio from Yangon on 4725 (Alan Davies, Thailand, BCDX) Implying same transmitter/site? (gh)

[non] Democratic Voice of Burma, per DTK sked revised in July, shows no more usage of Norway, just Jülich at 70 degrees: 9490 2330-0030, 15405 1430-1530; 17805 1455-1530 (DTK Jülich via WWDXC, via Wolfgang Büschel)

NIGERIA Per the High Adventure website, the station in northern Nigeria is under construction. The shortwave station will initially cover Nigeria. Within a few years, they plan to have a more powerful transmitter here that will cover most of the continent (Hans Johnson, Cumbre DX)

PERU 5341.03v, Radio Nuevo Horizonte, Retamas, distrito de Parcoy, provincia de Patate, departamento de La Libertad, new station heard from mid-July around 1100, approximate schedule 1000 to 0400. Owned by the mining company "Consorcio Minero Horizonte," which several times a day has a program called *Seguridad y trabajo*, Peruvian and other LA-music mixed with enumeration of all kinds of rules and regulations how to run and handle a mine. ID: "Radio Nuevo Horizonte, desde la capital de oro, La Libertad, presentó "Seguridad y trabajo". Jingle: "La número uno en tu corazón". Announcing 5340 kHz and FM 105.5 MHz. Morning program: Amanecer campesino and evening program: Una cita con el amor. Contact the station via fax (51)1 4763497, (51)1 2253564 (Minera Aurifera Retamas). CMH can be visited at: <http://www.cmh.com.pe/toc.htm>

6249.70, R. La Voz de Andahuaylas, Andahuaylas, provincia de Andahuaylas, departamento de Apurimac at 1030 "Amanecer campesino" and ads for bullfighting handled by incredibly loud-voiced DJ - on the contrary the usual DJ is calm and collected, heard with perfect quality (Björn Malm, Quito, Ecuador, SW Bulletin)

PHILIPPINES [non] FEBC experimented one week in August with relays via Wertachtal, Germany, 1800-1830 in Tagalog on 11895, 120 degrees to Mideast (Ralf Weyl, DTK via Kai Ludwig, Ian Cattermole, Costa Constantinides, DXLD)

RUSSIA R. Gardarika conducted tests to NAM in late July, mornings on 17690, evenings on 9940. These were first tests to North America from St. Petersburg for many years! 200 kW and some curtain/rhombics at 327, 312, 308 degrees. Very tentative future schedule is: 0200-0300/0400 on 9940 (Mikhail Timofeyev, St. Petersburg, hard-core-dx)

Buryat Radio, 4795, carrying Radio Rossiya at 1220, weak but // 7320 and 11840. Stupid radar signal didn't make it any easier. Peaked about 1223 and rapid fade after that (Hans Johnson, TX, Cumbre DX)

SAUDI ARABIA Radio of the Kingdom of Saudi Arabia 2, Jeddah. Address: (technical/frequency management) PO Box 61718, Riyadh 11575; Tel: +966-1-442-5170; Fax: +966-1-404-1692. Daily in Arabic: 0300-0600, 1700-2200 9579v; 0600-

Shortwave Broadcasting

1700 11855v (© BBC Monitoring)

SUDAN 7200, SNBC Omdurman, *0150-0220. Native percussion instrument; repeated chords to c0159. Brass band NA (presumed) and announcements to 0202. Holy Qur'an recital to 0215. Heavy QRM from Yakutsk, Russia, throughout (Ray Merrall, UK, DX Window via BCDX)

SURINAME After silence for some time, R. Apintie heard again on 4991, good 0840-0900 in Dutch, ID also in English at 0900 as "Radio Apintie, the happy station" (Samuel Cássio, DX Clube do Brasil)

SWITZERLAND RTTY is getting into SRI's 9885 as a cochannel, affecting NAM Service English. It's quite annoying (Bob Thomas, CT, DX Listening Digest) Wait until November, when the RTTY will be in the clear (gh)

SYRIA R. Damascus, 2052-2129 on 13610. A really amazing signal with (at times) almost non-existent audio — what a waste of power (Rich Skoba, NJ, DX Listening Digest)

TAIWAN RTI has added on-demand programming via <http://www.cbs.org.tw/english/index.htm> (Richard Cuff, swprograms)

TIBET [non] A major change in SW transmissions of Xizang PBS. Xi'an and Baoji [China] used to relay Xizang PBS Chinese and Tibetan programs. Traditional low freq channels like 4035, 4750, 4820, 5240 and several 49 mb ones are silent. Full schedule from site under CHINA (Olle Alm, BC-DX)

TURKEY Voice of Turkey Special DX Corner in memoriam Gigi Lytle: Reshida Morali and I have joined forces for the October 27, edition to be dedicated to Gigi's memory. Please go to my site, <http://www.ka2emz.com> and look for a link to send your recollections and memories of Gigi to Reshida (Bill Bergadano, swprograms)

UNITED ARAB EMIRATES Merlin Communications has signed a contract to operate and maintain Emirates Media's SW transmitter site starting 1st August 2001. These outstanding facilities offer exceptional coverage of key targets in the Middle East, Africa, Central Asia, Eastern Europe and the Indian Sub Continent. Final contract to be signed within 45 days will enable Merlin to sell capacity to international broadcasters interested in transmitting to these regions.

The SW facility consists of four 500 kilowatt transmitters that are able to operate at half power, providing cost effective coverage; 41 fixed antenna systems, as well as 2 rotating antennas. Some of our existing customers, including BBC WS, Radio Canada International and (NHK) will commence services from this facility imminently (Merlin Press Release)

This is the Abu Dhabi (Dhabayya) site, not Dubai. Got Brown Boveri-Switzerland units, 4 x 500 kW in 1985 (Kai Ludwig, Germany, BC-DX)

It seems the Abu Dhabians are cool with allowing evangelical Christians on their Islamic transmitters, not only WYFR but also the following: (gh)

Adventist World Radio started relays in August via Al Dhabayya to Africa and Southern Asia, with each unit operating at 250 kW. This schedule of 5h per day is expected to increase markedly for B-00.

Africa			
0300-0330	11975	250	Amharic
1700-1800	17875	250	Afar, Oro
0300-0400	11945	250	Oro, Tigrinia
1630-1800	15520	250	Samali, Amharic, Tigrinia

Southern Asia			
1330-1400	15495	250	English
1400-1430	15385	250	Urdu

(Adrian Peterson, AWR, IN)

Is Abu Dhabi still doing any SW of its own? 11945 above was previously used by Emirates Broadcasting at 0400-0600. Looks like we should check for Radio Abu Dhabi (Kai Ludwig, Germany, DX Listening Digest) I have not traced any domestic Arabic between about 0600 and 2200 on any of their former frequencies such as 21735 (0200-1600), 17760 (2000-2200), 15215 (1630-1800 & 1900-2200), 13755 (1630-2000), 11940 (heard at 1000-2000), or 9695 (2000-2200). (Noel Green UK, DX Listening Digest)

Dubai seems to be doing some technical work. They usually leave all four transmitters on the air with blank carrier throughout the night. Two are still noisy, but the level of the noise seems to have gone down. This noise of the Leszczynka (Poland) type has been there ever since they first came on the air, so it seems to be a design bug. Just as in the case of Leszczynka the theory of pump vibrations carried into the power tubes by the cooling water seems to be a very realistic one. The character of the noise is more mechanical than electronic. The so called microphonic effect is probably well known to most DXers who have used tube receivers. If you knocked at a tube you could hear the knocks in the receiver audio (Olle Alm, Sweden, BC-DX) English products were erected in Dubai: All Marconi, 3 x 300 kW in 1979, and additional single 500 kW in 1985 (Kai Ludwig, ibid.)

UK The BBC seems to have put many of its eggs into the Internet basket, and I think that's because they see the potential for huge income, especially from non-UK residents who want to access their services. I don't know any mechanism for PPV on shortwave :-). In that respect, Byford and co. no doubt see the cutting of shortwave to North America and the Pacific as a first decisive step along the road they have chosen. Clearly the UK government approves of this strategy as they would love BBCWS to become self-supporting, or partly so, thereby reducing the service's dependency on government grants. I'm beginning to understand now that the BBCWS shortwave decision is part of a much broader strategy, which for various reasons they're not yet ready to admit in public. If they are forced to change that strategy, the implications are major. Perhaps that's why they're unwilling to be blown of course. But many people believe they set sail too early! (Andy Sennitt, standard disclaimer, swprograms)

USA New SW station planned: WWCV, World Wide Christian Voice, Manchester, TN, with 4 x 50 / 100 kW fully frequency agile 1-30 MHz AM transmitters; 2 x 190' high rhombics, azimuths 340 and 045 degrees, full reciprocal feed capabilities at 160

and 225. 4 x 190' high phased corner reflectors at 360, 090, 180, 270 deg. 2 x 190' high 7-element wide-spaced yagis at 310 and 130 deg (WWFV, rec.radio.shortwave via John Norfolk) Another Dave Frantz project

The second broadcast of *World Of Radio* on WBCQ changed to UT Thursday 0415 on 7415. Radio Carline programming is on 7415 Thursday thru Sunday at 2000-2100. Our ship project is still in the works. The vessel named the "Katie" is lying in Boston harbor. As soon as we raise about \$30,000.00 we shall fit her with a studio, refit the interior, and then commence broadcasting via WBCQ. Our main backer backed out in June so things have been on hold. Shipborne radio projects seem to have this problem of raising funding. We really want to do this. It would be great promotion for shortwave radio. A floating studio promoting the medium, traveling from port to port broadcasting good programs via WBCQ (Allan Weiner, WBCQ Central, *World Of Radio*)

WWCR planned to add *Arabic Baptist Church*, M-F at 1000-1100 on 15685 for Asia; in Arabic language, frequency usage adjusted to accommodate with 15685 coming on an hour earlier than before. See also ETHIOPIA non (gh)

You might want to write about your memories of listening to the Voice of America over the years. In February, 2002, VOA will celebrate its 60th anniversary. A committee is beginning to plan activities to mark that anniversary. You can help our committee by sending in any anecdotes or reminiscences of listening to VOA during any of its sixty years. And if you have any old audio recordings of VOA, those would be especially welcome. e-mail to cw@voanews.com (Kim Elliot, VOA Communications World via John Norfolk)

John Vodenik, formerly at Bethany, now at VOA Delano, offers to QSL reports for this site only, when sent to: John Vodenik, VOA Delano, 11015 Melcher, Delano, California, 93215 (Stewart H. MacKenzie)

WWV heard putting spurs 26 kHz above and below 15 MHz at 2027; same accompanying 10 MHz another day at 1140 (David Hodgson, TN, harmonics yahoo group)

URUGUAY SODRE, 9620, should be 24h still. Try overnight between Sat and Sun. Operator in charge has been a defendant of SW, always been keen to switch it on (Horacio Nigro, Uruguay, Cumbre DX)

A large, beautiful wall decoration in wood and metal - partly in silver - was received in the mail from CWA155 Banda Oriental together with a tape recording of one of their regular transmissions. Station is run by the Porro-San Martin family, Mr José A Porro, the technician and Mrs Nora San Martin de Porro, the station manager. Their daughter, Mrs Anolia and her husband Gustavo Velazco are in charge of a daily transmission at 0100-0300 UT on 6155, 2 kW into an omni antenna. This is non-commercial, different from CW155 R Sarandi del Yi, 1550 kHz. The SW fare consists of "folklore uruguayo" (ballads with guitar accompaniment), but as long as composers or interpreters are Uruguayan they also play tangos, milongas and tropical-sounding music of the "bailanta" type. In the XVIII century Banda Oriental was a common reference to the "eastern shores" of the Uruguay river, which as an independent country in 1828 was named República Oriental del Uruguay. Sarandi del Yi is a village of 6,500 inhabitants 200 km north of Montevideo. Usual verie is a nicely printed letter and picture postcard. Reports can be e-mailed to norasan@adinet.com.uy or by p-mail to CWA155 Banda Oriental, Sarandi 328, Sarandi del Yi, CP 97100, Durazno, Uruguay. There has been a reception window here after 0200 (Henrik Klemetz, Sweden, DX Listening Digest)

VENEZUELA The QSL manager of R. Amazonas, José Francisco Ocaña, has authorized me to issue QSLs for reports sent to my address, with 3 IRCs r.p. (3 dollar bills accepted only at sender's risk from places where IRCs are unavailable). Radio Amazonas, Sr. Jorge García Rangel, Calle Roma, Qta: Costa Rica No. A-16, Urbanización Alto Barinas, Barinas 5201, Venezuela (Jorge García Rangel, Banda Tropical, Club Dixistas de la Amistad)

[non] Aló Presidente now on Sat, ex Sun. Unsure if time and Cuban relays remain unchanged (Henrik Klemetz, Sweden, DX Listening Digest)

VIETNAM VOV-4 minority language service retimed some programs. Now at 0930-1030 on 6020 and 0930-1100 on 7210, replacing previous times in 1145-1300 period. Each frequency carries a separate stream of 30-minute language segments. 6020 and 7210 carry VOV's 2nd and 1st networks respectively at other times. Hmong Service on 5035v and 6165 seems unchanged at 1200-1330 (Alan Davies, Thailand, Cumbre DX)

[non] Another Radio Free Vietnam, this one based in New Orleans, started August 1 at 1400-1430 M-F on 15230 via Russia. The original RFV from California has been via KWHR but this is a different organization, per Ludo Maes, TDP via SWBC list (Joe Hanlon in Philadelphia) See <http://www.radiofreevietnam.com> (Wolfgang Büschel, Robert Thompson) Address: P. O. Box 29245, New Orleans, LA 70189, email vkysion@bigfoot.com or rflva@aol.com (Mike Barraclough, World DX Club Contact) Quickly shifted to 15235. Somebody forget to pull the plug on 15235 at 1430, and the Democratic Voice of Burma program [of 15405?] was heard on RFV frequency 15235 too. Or just a satellite feed circuit error? 73 (Wolfgang Büschel, Germany, DX Listening Digest)

The other RFV is the station of the Government of Free Vietnam. Ullis Fleming poses along the URL for a good *Washington Post* article on them: <http://www.washingtonpost.com/wp-dyn/articles/A4058-2001Jul29.html> (Hans Johnson, Cumbre DX)

ZAMBIA ZNBC Radio 1. All programming is in local languages - BEMBA, KAONDE, LOZI, LUNDA, LUVALE and NYAMJA - except for the Radio 2 Network News in ENGLISH three times daily at 0500-0510, 1115-1127, 1800-1810. Programmes are subject to variation. Not subject to Summer/Winter time changes. Address: P O Box 50015, Lusaka, Zambia. Tel: +260 1 250692. Fax: +260 1 254013. 0245-2205 daily on 6265 and FM (© BBC Monitoring)

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

0000 UTC on 3310

BOLIVIA: Radio Mosoj Chaski. Regional Quecha music to station ID. (Johan Berglund, Sweden/Hard Core DX) Bolivia's **Radio Illimani** 6025, 1009. News in Aymara to Andean music "Escuela de Conduccion El Volante." News produced by Agencia Boliviana de Informaciones with report on the roads. **Radio La Cruz del Sur** 4876.7, 0941 with religious anthems and Aymara commentary. (Arnaldo L. Slaen, Buenos Aires, Argentina)

0000 UTC on 11920

MOROCCO: RTV Marocaine. Arabic service to Africa and Middle East. Time pips to ID and regional news with interference. (William McGuire, Cheverly, MD)

0000 UTC on 9845

NETHERLANDS ANTILLES: Radio Netherlands relay. Time pips to Discover segment. (Brian Bagwell, St. Louis, MO) **Bonaire** relay 9790, 1000 focus on Research File on new HIV drug. (Bob Fraser, Cohasset, MA) Radio Netherlands 11865, 1530 with very poor copy. (Sue Wilden, Noblesville, IN) Radio Netherlands' **Canada** relay to NA 9515 at 1200. (Fraser, MA)

0002 UTC on 5019

BOLIVIA: Radio Horizonte. Music program by female hostess to Spanish ID. Bolivian's audible; tentative **Radio Eco** 4702 at 0022 with romantic music ballads; **Radio Yura** 4716.8 at 1108; **Radiodifusora Tropic** 4552 at 2335; **Radio Mallku** 4796.4 at 2131; **Radio Santa Ana** 4649 at 2342; **Radio la Palabra** 4732 at 2349; **Radio Centenario** 4855 at 2358 with Spanish sports program. SINPO=332232. (Slaen, ARG)

0002 UTC on 15806.6

PIRATES (EURO): Netherlands-Radio Black Arrow. Fair copy at signal peak, "very good morning, this is Black Arrow from the Netherlands," followed by *Hit the Road Jack* tune at 0005, followed by Van Halen's *Running With the Devil*. **Radio Bandonica** 11484.78 at 0418-0445 with *In America* tune, quite weak to fair; **Radio Borderhunter** 15794.96 LSB at 0449-0510, rock tunes to email address, slight drift from 15794.92 by 0530. No sign of **Radio City** 21570 USB broadcast anytime between 0450-0530. (Dave Valko, PA/SW Pirates)

0100 UTC on 3343

PERU: Radio Altura. Tentative on Spanish logging for station frequency drifting from 3340. Peru's **Radio Tarma** noted in Spanish on 4775 at 0150. (Johan Berglund, Sweden/HCDX)

0109 UTC on 9525

CANADA: Voice of Viet Nam relay. Sports news and discussion on development of football league, followed by Sunday Show to 0125*. (Tim Martin, VA)

0130 UTC on 6180

BRAZIL: Radio Nacional da Amazonia. Portuguese. Tentative logging on station. A few mentions of "Amazonia", so could be. Seems to be an earlier sign-on. (Lee Silvi, Mentor, OH) Brazil's **Radio Missoes da Amazonia** 4865, 0951. Religious talk in "Tupa" language. **Radio Cultura** 5015, 1001 with complete ID; **Radio Difusora** 5055, 1006. Regional music to Portuguese ID, fair signal quality. (Slaen, ARG)

0130 UTC on 15050

COSTA RICA: Radio for Peace Int'l. Discussion via the *Naturalist* program with fair signal quality. (Wilden, IN)

0220 UTC on 15340

ROMANIA: Radio Romania Int'l. Station ID to program feature on national politics. (McGuire, MD) Audible 0420-0450 English 11940 // 15365, fair signal quality. (Bagwell, MO)

0230 UTC on 9915

UNITED KINGDOM: BBC. News topic on refugee center riot and promo for BBC On Air magazine. **BBC via Okeechobee, FL** relay 9590 at 2340. (Wilden, IN) **BBC Thailand** relay with world news; **BBC via UK** 15225, 1815 with national and regional news. (McGuire, MD)

0245 UTC on 15215

USA: Radio Taipei Int'l via Okeechobee, FL. Spanish service with evening features. (Wilden, IN)

0305 UTC on 15415

LIBYA: Radio Jamahiriya. Arabic service including station ID and traditional Arabic music. (McGuire, MD) Libya's **Voice of Africa** noted 0130-0145, 11815. (Bagwell, MO)

0330 UTC on 11895

SWEDEN: Radio Sweden. Station identification to national news and report on drug arrest in Sweden. (McGuire; Tom Banks, Dallas, TX)

0515 UTC on 7185

SOUTH AFRICA: Radio Sonder Grense. Afrikaans. Signal peaked at this time, suffering from adjacent channel interference from both sides and tuning-out around 0545. Lots of talk, commercials and poor at best. (Paul Ormandy, Oamaru, New Zealand/Cumbre DX)

0957 UTC on 4855.6

PERU: Radio La Hora. Spanish. Huaynos music to ads in Quecha language. ID as, "Radio La Hora...manda pocha.." Peru's **Radio Virgen del Carmen** 4886.6, ID "musicatotal con...desde Huancavelica 4885 onda corta, 1500 kilohertz onda media y en simultaneo..."; **Ondas del Huallaga** 3329.6, 1035; **Radio Sicuani** 4826.4, 1055. (Slaen, ARG)

1001 UTC on 5025

CUBA: Radio Rebelde. News about the conference of Jean Bertrand Aristide in the Habana University. Spanish time check to sports news. Signal SINPO 24432. (Slaen, ARG)

1210 UTC on 15240

NORTHERN MARIANAS. VOA relay. VOA News Now into sports report at 1220. (Fraser, MA)

1330 UTC on 13650

CANADA: Radio China Int'l relay. *Voices From Other Lands* with segment on US husband and wife journalists who witnessed China's Revolution in 1949. (Fraser, MA)

1520 UTC on 15745

USA: Wewn. Robert Royal discusses his book and history behind the Catholic church in *Catholic Martyrs of the 20th Century*. (Wilden, IN)

1540 UTC on 17705

GREECE: Voice of. Interview with Ohio State University student about Greek cultural studies and presentation of Hellenism. Greek service at 1658. (Martin, VA) **VOA's Kavala** relay 11985, 0300. (McGuire, MD)

1840 UTC on 11675

RUSSIA: Voice of. Program on old Russian songs. (Fraser, MA) 15455 at 2015. (McGuire, MD; Banks, TX)

1900 UTC on 17545

ISRAEL: Kol Israel. News items on no change in Israel's policy towards terrorism. (Fraser, MA)

1910 UTC on 15476

ARGENTINE ANTARCTIC TERRITORY: LRA36 Radio Nacional Arangel San Gabriel, Base Antartica Esperanza. Argentine music to promo, "les recordamos que estamos en LRA36 Radio Nacional Arcangel San Gabriel, desde la Base Antartica Esperanza...en los 15475 kilohertz...nuestro correo electronico es...y nuestro telefono..." (Slaen, ARG)

1915 UTC on 17660

ECUADOR: HCJB. Studio 9 program featuring Ecuador's climate, weather and earthquakes. (Fraser, MA) Ecuador's **La Vo del Napo** 3280 at 0130, fair-poor signal quality. (Banks, TX) Tentative on **Radio Quito** 4919 at 1015 in Spanish. (Slaen, ARG)

2307 UTC on 15410

ANTIGUA: Deutsche Welle relay. German service with good signal quality. Sines, Portugal relay audible in English 9785 at 0505. (Wilden, IN)

2346 UTC on 11905

FRENCH GUIANA: Swiss Radio Int'l relay. Report on the increasing wildlife in Switzerland. (Fraser, MA)

Thanks to our contributors - Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times (or e-mail
gayle@webworkz.com)
English broadcast unless otherwise noted.

DX is back for the Trop Heads!

Have you noticed the shortwave bands improving lately? Gone are the crackles, snaps and static of summer listening. The lure of the DX season has returned, including the call of DXing the lower tropical shortwave bands.

There are four broadcasting bands (120 meters, 90 meters, 75 meters and 60 meters) over the regions of 2000 kHz to 6000 kHz, primarily used in equatorial regions of Africa, Asia, South and Central America.

In many of these continents, shortwave radio remains the only contact with the outside world, where the stations broadcast to their local and national listening audience, hence the appeal to the DXer.

Whether you are a dedicated "trop head" DXer or a casual program listener, tropical band DXing offers a contrast of cultures. Many DXers focus on one country and become connoisseurs of the music, language

and culture, not to mention the appeal of QSL cards.

The Danish Shortwave Club International (DSWCI) has published the 3rd edition of its annual *Domestic Broadcasting Survey*, which includes the *Tropical Bands Survey*. This 44 page booklet covers all active stations broadcasting to a domestic audience or relaying such broadcast to compatriots in the shortwave spectrum of 2200-3000 kHz, as well as active clandestine stations. Two useful features include the parallel frequencies and reference to the station ID, and the deletion of most frequencies which have not been heard during the past year.

For additional information to enhance tropical listening, visit their website at: <http://www.dswci.dk> or write: DSWCI, c/o Bent Nielsen, Egekkrogen 14, DK 3500 Vaerloese, Denmark.



BARBADOS

Global Wireless 8P0, 8433 kHz USB. Partial data card unsigned. Received in nine days for a utility report and two mint stamps. Station address: Global Wireless, Attn: A. Larkin, 550 Pilgrim Dr., Foster City, CA 94404. (George Clement, Powder Springs, GA)

BELGIUM

Radio Vlaanderen Int'l, 11985 kHz. Full data unsigned card, plus station pennant and schedule. Received in 37 days for an English report. Station address: B-1043, Brussels, Belgium. (Joe Squashic, Wake Forest, NC)

CANADA

CKZN, 6160 kHz. Full data Newfoundland & Labrador card signed by Shawn Williams-Engineer, plus a letter and sticker. Received in one year four months, for an English report. Station address: CBC, P.O. Box 12010, Station A., St. John's, NF A1B 3T8 Canada. (Don Dacus, Russellville, AR) Received full data card, one month after follow up plus schedule, and list of MW & FM stations. (Patrick Martin, Seaside, OR) Received full data folder card in 233 days. (Randy Stewart, Battlefield, MO)

GERMANY

Sudwestrundfunk, 7265 kHz. Full data SWR globe card with illegible signature, plus stickers, schedule and souvenir postcard. Received in five weeks for an English report, one IRC (returned) Station address: Neckarstrasse 230, D-70190 Stuttgart, Germany. (Joe Talbot, Red Deer, Alberta, Canada/Cumbre DX)

KENYA

Kenya BC Corp., 4935 kHz. Date/frequency letter signed by Robinson Wanjau Githae-Engineer in charge of Maralal Radio. My report was addressed to the now retired engineer in charge Mr. Martin Ouma Ojach at P.O. Box 38, Maralal. Letter states that KBC no longer broadcasts in English on shortwave due to "modernization process and installation of FM stations." Reply

received for a taped report and one IRC. (Mickey Delmage, Alberta, Canada/Cumbre DX)

MALAWI

MBC, 3380 kHz. Verification letter signed by Joseph C. Chikagwa-Director of Engineering. Received in ten months for an English report and one IRC. Engineer mentions the station is off the air but they need \$ 20,000 U.S. to replace the transmitter valves. (Tom Banks, Dallas, TX)

MEDIUM WAVE

KBJA 1640 kHz AM, Sandy, UT. Full data QSL card signed by Kristin Perry-Chief Operator. Received in 28 days for an AM report. Station address: 10348 South Redwood Rd., South Jordan, UT 84095. (Patrick Griffith, N0NNK/WPE9HVW, Westminster, CO; Martin OR)

KAXW 1660 kHz AM, Merced, CA. Full data letter signed by Lorelei Mouillesseaux-Office/Traffic Manager. Received in eight days for an AM report. Station address: 514 E. Bellevue Rd., Atwater, CA 95301. (Martin, OR)

KWSJ 1660 kHz AM Kansas City, MO. Verification form letter signed by Ken Wolf-Chief Engineer. Received in seven days after follow up. Station address: 4935 Belinder Rd., Westwood, KS 66205. (Martin, OR)

MEXICO

Radio Mexico Int'l-XERMX, 9705 kHz. Full data card unsigned, postcard and station pennant. Received in ten months for an English report. Station address: Instituto Mexicano de la Radio, Apartado Postal 21-300, 04021-Mexico 21, D.F., Mexico. (David Weronka, Benson, NC)

MOLDOVA

Voice of Russia via Kishinev, 11750 kHz. Full data email verification from Ms. Olga Troshina-World Service/English, in one day for email report. She promised a regular QSL card via postal mail. Email address: letters@vor.ru (Stewart, MO)

NETHERLANDS ANTILLES

Radio Netherlands relay, 6165 kHz. Full data unsigned card, plus pennant and calendars. Received in 35 days for an English report. Station address: P.O. Box 222, 1200 JG Hilversum, The Netherlands. (Squashic, NC)

SWEDEN

Radio Sweden, 9495 kHz. Full data QSL card signed with illegible initials, plus program schedule. Received in 23 days for an English report and souvenir postcards. Station address: SE-105, 10 Stockholm, Sweden. (Duane Hadley, Bristol, TN) Received in 17 days. (Squashic, NC)

SWITZERLAND

Swiss Radio Int'l, 9905 kHz. Full data card unsigned. Received in 50 days for an English report. Station address: CH-3000, Berne 15, Switzerland. (Squashic, NC)

TANZANIA-ZANZIBAR

Voice of Tanzania-Zanzibar and personal letter from Mr. Ali Bakari Moumbwa, with mention that he isn't responsible for reception reports but the station's chief engineer is Mr. Khalid Hassan. Card is one Guido Schotmans designed for the station. Station address: P.O. Box 2068, Tanzania-Zanzibar. (Daniel Canonica, Muggio, Switzerland)

UNITED KINGDOM

Radio Telefis Eireann (RTE) via Rampsham, 6155 kHz. Full data card unsigned plus brochure. Received in 56 days for an English report, one IRC and two souvenir postcards. Station address: Broadcasting Developments, RTE, Dublin 4, Ireland. (Frank Hillton, Charleston, SC) 13640, full data Irish landscape postcard. (Weronka, NC)

USA

Radio Taipei Int'l via Okeechobee, FL relay. Full data unsigned card, plus station souvenirs. Received in 45 days for an English report. Station address: P.O. Box 24-38, Taipei, Taiwan. (Squashic, NC)

RCI, the CBC and the Role of International Radio

Radio Canada International is again in crisis, but it's different this time.

Shortwave listeners have been called upon more than once over the past decade to write to station and government officials and explain how RCI serves as a unique source of information and insight into Canada and its people, culture and institutions. It can be said that these efforts have been partially successful, but *only* to the point that there now seems to be a bare baseline consensus that Canada should have an international broadcaster.

❖ A Troubled Recent History

Such was not always the case. Deep and continuous cuts to the budget of the national public broadcaster, the Canadian Broadcasting Corporation (CBC), forced it to prioritize. This process led the CBC to the conclusion that RCI was a luxury it could not afford. For a time, it appeared that RCI would cease to exist until the government stepped in at the last minute and brokered an agreement whereby the latter agreed to provide specific funding for RCI in exchange for the CBC's agreement to administer it.

However, it was a loveless marriage. Although organizationally in charge, the CBC largely ignored RCI. Consequently, RCI – on its own – started to reinvigorate the service and its independent identity, both of which had also been deeply wounded by drastic budget cuts. The government eventually agreed to provide more substantial and stable funding and, by early 2000, things seemed to be finally looking up for RCI.

The government, though, has always been uncomfortable about appearing to have a more direct relationship with RCI than would seem prudent in a society that prides itself on its independent media. So, with the CBC suddenly showing renewed interest in having an international service, it seems the government is delighted and content to let the CBC develop its own plans for the service. The more independent-minded leadership of RCI has been effectively trumped and replaced with a hierarchy more closely "attuned" to the larger CBC.

❖ Secrecy and Suspicion

For RCI, this is again an uncertain time. The CBC's renewed interest is viewed suspiciously by long-time RCI staff and supporters. The not altogether unfounded fear

is that the CBC does not have the best interests of RCI, its expressed mission, its professional staff or its international audience at heart. Those fears have been reinforced by the sudden moves of RCI's new management to cut back services during a time of apparently ample funding. Announcements about the need for "reorganization" and "reassessment," unaccompanied by invitations to dialogue or any clear indication of direction, have again damaged morale and given staff and listeners the impression that the future is not bright.

It's hard to understand why Canada is having so much difficulty figuring out what role its international broadcaster should play. RCI's past mandates never positioned it on the ramparts of the Cold War, in the same way as many other international broadcasters. Politically, Canada – while always an integral part of the Western alliances – has distinguished itself as a nation with a more internationalist perspective. Important Canadian legacies include its commitment to international peacekeeping and generally more open and inclusive social policies. The role of the CBC from its beginnings has been to provide a means for Canadian national expression in the arts, literature, sciences, intellectual thought and political and social theory in the stead of the generally "good-natured beast" (to paraphrase Trudeau) to its south. Projecting these things to an international audience would seem to provide RCI with an enviable *raison d'être*.

What little the CBC has provided in the way of clues to its vision for RCI indicates that it is seeking institutional allies within Canadian society that would more directly benefit – in a more tangible sense – from RCI broadcasts and activities. The first thing that comes to mind in this regard are individuals and corporations involved in international business and commerce. It probably also means more expensive forays into other media like television and the Internet, efforts that would likely restrict or even shrink resources available for radio.

❖ Not Unique to Canada

The current circumstances that RCI finds itself in are not unique to Canada, of course. To one extent or other, many international radio services have been undergoing this kind of re-evaluation in the post-Cold War years. However, the most disconcerting factor here is not the re-evaluation itself, but the appar-

ently closed manner in which it seems to be taking place. Why shouldn't RCI's professional staff have a say in how the station repositions itself for the future? Why not include listeners in the dialogue?

In attending last year's *Challenges for International Broadcasting* conference in Montreal, the one disconcerting aspect of it to me was the obvious disconnect that exists between upper levels of management administering these organizations and the day to day broadcast professionals charged with maintaining meaningful contact with their audiences. That disconnect appears to be replicated in the current RCI/CBC situation and that is most unfortunate.

❖ A Useful Model?

The most successful model for dealing with the future thus far appears to be that of Radio Australia. RA has a closer relationship with its parent and domestic partner, the Australian Broadcasting Corporation, than it had at one time. However, the ABC has recognized RA's expertise in serving an international audience and has granted it the requisite level of independence to accomplish that goal successfully. The ABC and RA have also established a professional relationship by which RA determines on its own which ABC domestic programming it should use to serve its international audience. In turn, the ABC uses RA and its more intimate knowledge of the country's Asian and Pacific neighbors to produce programming for the ABC's domestic audience about the region.

Hopefully, this is the kind of mutually beneficial relationship that the CBC and RCI ultimately will have, as well.

(Late information about changes to RCI programming appears on the front page of *MT's Shortwave Guide*.)

The RCI Action Committee

A more detailed and updated discussion of the RCI situation is available from <http://www.geocities.com/rciaction/>, the web site of the RCI Action Committee. There are sections devoted to an explanation of the situation, suggestions as to how listeners can help and a place to allow listeners to comment and leave their thoughts.

HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Savings) 4, 5, 6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC *Sunday* will be heard on *Saturday* evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes

s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly

In the same column ⑥, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

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

The frequencies ⑦ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations

and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before publication.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Choose a program or station you want to hear.

Selected programs appear on the lower half of the page for prime listening hours – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT MONITORING TEAM

Gayle Van Horn Frequency Manager gayle@webworkz.com	John Figliozzi Program Manager jfiglio1@nycap.rr.com
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Mark Fine, VA
fineware@erols.com

Program Highlights

John Figliozzi

RCI at 0100

While specific details remain sketchy at print deadline (late August) for this issue of MT, we do know that further changes to RCI programming will go into effect on October 1.

Since most RCI programming still consists of relays of CBC Radio domestic content, most of the schedule to North America will remain unchanged, at least until the clock changes at the end of the month. However, the daily schedule between 0100 and 0200 UT, where RCI-produced programs are broadcast, will now experience some rather drastic changes.

What had appeared to be emerging as a strong RCI flagship program, the daily magazine *Canada Today*, will be reduced from 50 minutes to 20, air only as one (presumably pre-recorded) daily edition and be hosted by veteran RCI journalist Jim Craig. *Canada Today* had recently been presented in as many as five live editions daily, with several hosts including Wojtek Gwiadzda on the North American edition. The second half hour during the week (0130-0200 UT) will consist of repeat broadcasts of each of the five "new" weekend feature programs, most of which unfortunately take on the appearance of old wine in new bottles. All current RCI features cease as of October 1.

Here are the working titles and projected hosts for the five features: *Canada and the World* with Lynn Desjardins, *Arts and Culture* with Marc Montgomery, *Business Report* (which had once been titled internally as – believe it or not – "Let's Make a Deal") with David Blair, *Meet the Press* and *The Mailbag*, both with Ian Jones. As devoted RCI listeners will note, Marc Montgomery – who had developed a popular following as host of *The Maple Leaf Mailbag* over the past couple of years – has inexplicably been dropped as host of this important listener contact program. Precise broadcast days and times for these programs were not announced by print deadline.

This month's *Programming Spotlight* column discusses some of the curiosities associated with the most recent **Radio Canada International** internal turmoil.

Shortwave Guide

0000 UTC - 8PM E / 7PM C / 5PM P

0000	0015	Cambodia, National Radio Of	11940as				
0000	0015	Japan, Radio	6145na	13650pa	17810pa		
0000	0027	Czech Rep, Radio Prague Intl	7345na	11615na			
0000	0030	Australia, Christian Voice	17850as				
0000	0030	Australia, Radio	9660pa	12080pa	15240as	15415as	17580pa
		17755as 17795va	21740va				
0000	0030	Egypt, Radio Cairo	9900am				
0000	0030	Thailand, Radio	9690va				
0000	0030	UK, BBC World Service	3915as	5965as	5975am	6195as	7105as
		9410me 9590am 9915sa	11810as	11810as	11945as	11955sa	12095as
		15280as 15310as 15360as	17615as	17790as			
0000	0045	India, All India Radio	9705as	9950as	11620as	13605as	
0000	0056	North Korea, Voice of Korea	4405va	11460na	11710na	13760na	
		15180na					
0000	0057	Canada, R Canada International	11895as				
0000	0100	Anguilla, Caribbean Beacon	6090am				
0000	0100	Australia, ABC/Alice Springs	4835do				
0000	0100	Australia, ABC/Katherine	5025do				
0000	0100	Australia, ABC/Tennant Creek	4910do				
0000	0100	Canada, CBC Northern Service	9625do				
0000	0100	Canada, CFRX Toronto ON	6070do				
0000	0100	Canada, CFVP Calgary AB	6030do				
0000	0100	Canada, CHNX Halifax, NS	6130do				
0000	0100	Canada, CKZN St John's NF	6160do				
0000	0100	Canada, CKZU Vancouver BC	6160do				
0000	0100	Costa Rica, R for Peace Intl	15050va	21815usb			
0000	0100	Costa Rica, University Network	5030am	6150am	7375am	9724sa	
		11870am 13749na					
0000	0100	Ecuador, HCJB	9745na	15115na	21455usb		
0000	0100	Finland, Scandv Weekend Radio	5990va	11720va			
0000	0100	Guyana, Voice of	3289do				
0000	0100	Japan, Radio	6145na				
0000	0100	Malaysia, Radio	7295do				
0000	0100	Malaysia, RTM Kota Kinabalu	5980do				
0000	0100	Malaysia, RTM Sarawak	7160do				
0000	0100	Namibia, Namibian BC Corp	3270af	3289af			
0000	0100	Netherlands, Radio	6175na	9590na	9845na		
0000	0100	New Zealand, R New Zealand Int	17675pa				
0000	0100	New Zealand, ZLXA	3935do				
0000	0100	Papua New Guinea, NBC	9675do	11880irr			
0000	0100	Singapore, SBC Radio One	6150do				
0000	0100	Solomon Islands, SIBC	5020do	9545do			
0000	0100	Spain, R Exterior Espana	15385na				
0000	0100	Ukraine, R Ukraine International	5905eu	7320as	9640as	12040na	
0000	0100	USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
		6350va 6458va 6847va	10320va	10940va	12579va	12689va	
		13254va 13362va 16847va					
0000	0100	USA, KAJI Dallas TX	13815va				
0000	0100	USA, KTBN Salt Lake City UT	15590na				
0000	0100	USA, KWHR Naalehu HI	17510as				
0000	0100	USA, Voice of America	5995am	6130am	7405am	9455am	9775am
		11695am 13740am					
0000	0100	USA, WBCQ Monticello ME	7415na	9330na			
0000	0100	USA, WEWN Birmingham AL	5825na	13615na			
0000	0100	USA, WHRA Greenbush ME	7580eu				
0000	0100	USA, WHRI Noblesville IN	5745va	7315am			
0000	0100	USA, WINB Red Lion PA	12160am				
0000	0100	USA, WJCR Upton KY	7490am	13595as			
0000	0100	USA, WRMI Miami FL	9955sa				
0000	0100	USA, WRNO New Orleans LA	7355va				
0000	0100	USA, WSHB Cypress Crk SC	7535am	9430am	15285sa		
0000	0100	USA, WTJC Newport NC	9370na				
0000	0100	USA, WWBS Macon GA	11910na				
0000	0100	USA, WWCR Nashville TN	5070na	7435na	9475na	13845na	
0000	0100	USA, WWFV McCaysville GA	5085va	6890am			
0000	0100	USA, WYFR Okeechobee FL	6085na	9505na	15130na		
0000	0100	Vanuatu, Radio	3945do	4960do			
0000	0100	Zambia, Christian Voice	4965do				
0005	0010	Croatia, The Voice of Croatia	9925irr				
0030	0100	Australia, Christian Voice	17850as	21680pa			
0030	0100	Australia, Radio	9660pa	12080pa	15415as	17580pa	
		17750as 17755as 17795va	21740va				
0030	0100	Iran, Voice of Islamic Rep. of Iran	9022am	9835am	11970am		
0030	0100	Lithuania, Radio Vilnius	11690eu				
0030	0100	Sri Lanka, Sri Lanka BC Corp	15425as	4940do	6005as	6075as	9770as
0030	0100	Thailand, Radio	15395as				
0030	0100	UK, BBC World Service	5965as	5975am	6195as	7105as	9410me
		9590am 9915sa 11810as	11955sa	12095as	15280as	15360as	
		17790as					
0030	0100	USA, Voice of America	7215as	9770as	11760as	15185as	15290as
		17740as 17820as					
0030	0100	Yugoslavia, Radio	11870am				
0045	0100	Pakistan, Radio	11650as	15455as			
0045	0100	USA, WYFR Okeechobee, FL	15130na				
0050	0100	UK, International BC Tamil	11570as				
0055	0100	Italy, RAI International	9675na	11800na			

0100 UTC - 9PM E / 8PM C / 6PM P

0100	0115	Italy, RAI International	9675na	11800na			
0100	0115	Pakistan, Radio	11650as	15455as			
0100	0125	Netherlands, Radio	6165na	9845na			
0100	0127	Czech Rep, Radio Prague Intl	5915na	7345na			
0100	0127	Vietnam, Voice of	9525na				

0100	0130	Germany, Universal Life	9435as	9560na			
0100	0130	Hungary, Radio Budapest	9022am	9835am	11970am		
0100	0130	Iran, Voice of Islamic Rep. of Iran	5930na	7230ca	9440sa		
0100	0130	Slovakia, R Slovakia International	5995am	6130am	7405am	9455am	9775am
		13740am					
0100	0130	Uzbekistan, Radio Tashkent	7190as	9375as	9530as	9715as	
0100	0145	Germany, Deutsche Welle	6040na	9640am	11810na	13720am	
0100	0145	USA, WYFR Okeechobee FL	15130na				
0100	0156	North Korea, Voice of Korea	3560va	11734va	15230va	17735va	
0100	0159	Canada, R Canada International	5960am	9755am	13670am	13770am	
		15170am					
0100	0200	Anguilla, Caribbean Beacon	6090am				
0100	0200	Australia, ABC/Katherine	5025do				
0100	0200	Australia, ABC/Tennant Creek	4910do				
0100	0200	Australia, Christian Voice	21550as	21680pa			
0100	0200	Australia, Radio	9660pa	12080pa	15415as	17580pa	
		17750as 17755as 17795va	21725pa				
0100	0200	Canada, CBC Northern Service	9625do				
0100	0200	Canada, CFRX Toronto ON	6070do				
0100	0200	Canada, CFVP Calgary AB	6030do				
0100	0200	Canada, CHNX Halifax, NS	6130do				
0100	0200	Canada, CKZN St John's NF	6160do				
0100	0200	Canada, CKZU Vancouver BC	6160do				
0100	0200	China, China Radio International	9570na				
0100	0200	Costa Rica, R for Peace Intl	15050va	21815usb			
0100	0200	Costa Rica, University Network	5030am	6150am	7375am	9724sa	
		11870am 13749na					
0100	0200	Cuba, Radio Havana	6000na	9820na	11705usb		
0100	0200	Ecuador, HCJB	9745na	15115na	21455usb		
0100	0200	Finland, Scandv Weekend Radio	5990va	11720va			
0100	0200	Guyana, Voice of	3289do				
0100	0200	Indonesia, Voice of	9525as	11784as	15149as		
0100	0200	Japan, Radio	11860na	11870me	11880me	15325as	17685pa
		17810as 17835sa 17845as	17845as				
0100	0200	Malaysia, Radio	7295do				
0100	0200	Malaysia, RTM Kota Kinabalu	5980do				
0100	0200	Namibia, Namibian BC Corp	3270af	3289af			
0100	0200	Netherlands, Radio	6175na				
0100	0200	New Zealand, R New Zealand Int	17675pa				
0100	0200	New Zealand, ZLXA	3935do				
0100	0200	Papua New Guinea, NBC	9675do	11880irr			
0100	0200	Russia, Voice of Russia WS	7180na	11825na	12000na	17595na	
0100	0200	Singapore, SBC Radio One	6150do				
0100	0200	Solomon Islands, SIBC	5020do	9545do			
0100	0200	Spain, R Exterior Espana	15385na				
0100	0200	Switzerland, Swiss R International	9885am				
0100	0200	UK, BBC World Service	5965as	5975am	6195as	9410as	9590am
		9915sa 11835as 11955sa	12095as	15280as	15310as	15360as	
		17790as					
0100	0200	USA, Armed Forces Radio	6350va	6458va	6847va	10320va	10940va
		13254va 13362va 16847va					
		17790as					
0100	0200	USA, KAJI Dallas TX	13815va				
0100	0200	USA, KJES Vado NM	7555na				
0100	0200	USA, KTBN Salt Lake City UT	15590na				
0100	0200	USA, KWHR Naalehu HI	17510as				
0100	0200	USA, Voice of America	7115as	9635as	11705as	11725as	11820as
		13650as 15250as 17740as	17820as				
0100	0200	USA, WBCQ Monticello ME	7415na	9330na			
0100	0200	USA, WEWN Birmingham AL	5825na	13615na			
0100	0200	USA, WHRA Greenbush ME	7580eu				
0100	0200	USA, WHRI Noblesville IN	5745va	7315am			
0100	0200	USA, WINB Red Lion PA	12160am				
0100	0200	USA, WJCR Upton KY	7490am	13595as			
0100	0200	USA, WRMI Miami FL	9955na				
0100	0200	USA, WRNO New Orleans LA	7355va				
0100	0200	USA, WSHB Cypress Crk SC	7535na	9430am	15285sa		
0100	0200	USA, WTJC Newport NC	9370na				
0100	0200						

Shortwave Guide



0200	0300	tw	Argentina, RAE	11710am					
0200	0300	vi	Australia, ABC/Alice Springs	4835da					
0200	0300	vi	Australia, ABC/Katherine	5025da					
0200	0300	vi	Australia, ABC/Tennant Creek	4910da					
0200	0300		Australia, Christian Voice	21550as	21680pa				
0200	0300		Australia, Radio	9660pa	12080va	15240as	15415as	15515va	
			17580va	17750as	21725va				
0200	0300		Bulgaria, Radio	11700na					
0200	0300		Canada, CBC Northern Service	9625da					
0200	0300		Canada, CFRX Toronto ON	6070da					
0200	0300		Canada, CFVP Calgary AB	6030da					
0200	0300		Canada, CHNX Halifax, NS	6130da					
0200	0300		Canada, CKZN St John's NF	6160da					
0200	0300		Canada, CKZU Vancouver BC	6160da					
0200	0300		Costa Rica, R for Peace Intl	7455va	15050va				
0200	0300		Costa Rica, University Network	5030am	6150am	7375am	9724sa		
			11870am	13749na	13749na				
0200	0300		Cuba, Radio Havana	6000na	9820na	11705usb			
0200	0300		Ecuador, HCJB	9745na	15115na	21455usb			
0200	0300		Egypt, Radio Cairo	9475am					
0200	0300	a/monthly	Finland, Scandv Weekend Radio	5990va	11720va				
0200	0300		Guyana, Voice of	3289da	5949da				
0200	0300		Kenya, Kenya BC Corp	4885irr	4915irr				
0200	0300		Malaysia, Radio	7295da					
0200	0300		Malaysia, RTM Kota Kinabalu	5980da					
0200	0300		Namibia, Namibian BC Corp	3270af	3289af				
0200	0300		Netherlands, Radio	6135na	6175na				
0200	0300		New Zealand, R New Zealand Int	17675pa					
0200	0300		New Zealand, ZLX	3935da	7290da				
0200	0300	vi	Papua New Guinea, NBC	9675da	11880irr				
0200	0300		Russia, Voice of Russia WS	7180na	12000na	17595na			
0200	0300		Singapore, SBC Radio One	6150da	9545da				
0200	0300	vi	Salomon Islands, SIBC	5020da					
0200	0300		South Korea, R Korea Intl	7275na	11725sa	11810sa	15575na		
0200	0300		Sri Lanka, Sri Lanka BC Corp	6005as	6075as	6130da	9770as		
			15425as						
0200	0300		Taiwan, Radio Taipei International	5950na	9680na	11740am	15270as		
			15345as						
0200	0300		UK, BBC World Service	5975am	6135am	6195as	9410as	9770af	
			9915sa	11835as	11955va	12095as	15280as	15310as	15360as
			17790as						
0200	0300		UK, Merlin Network One	9430na					
0200	0300		USA, Armed Forces Radio	4278va	4319va	4993va	5765va		
			6350va	6458va	6847va	10320va	10940va	12579va	12689va
			13254va	13362va	16847va				
0200	0300		USA, KAIJ Dallas TX	5755va					
0200	0300		USA, KT8N Salt Lake City UT	7510na					
0200	0300		USA, KWHR Naalehu HI	17510as					
0200	0300		USA, Voice of America	7115as	9635as	11705as	11725as	11820as	
			13650as	15250as	17740as	7415na			
0200	0300		USA, WBCQ Monticello ME	9330na					
0200	0300		USA, WBCQ Monticello ME	9330na					
0200	0300		USA, WEWN Birmingham AL	5825na					
0200	0300		USA, WHRA Greenbush ME	7580eu					
0200	0300		USA, WHRI Noblesville IN	5745va	7315am				
0200	0300		USA, WINB Red Lion PA	12160am					
0200	0300		USA, WJCR Upton KY	7490am	13595as				
0200	0300		USA, WRMI Miami FL	7385na					
0200	0300		USA, WRNO New Orleans LA	7355va					
0200	0300		USA, WSHB Cypress Crk SC	5850na	7535am	9430na			
0200	0300		USA, WTJC Newport NC	9370na					
0200	0300		USA, WWCR Nashville TN	3215na	5070na	5935na	7435na		
0200	0300		USA, WWVW McCaysville GA	5085va					
0200	0300		USA, WYFR Okeechobee FL	6065na	9505na				
0200	0300	vi	Vanuatu, Radio	3945da	4960da	7260da			
0200	0300		Zambia, Christian Voice	4965da					
0200	1215		Cambodia, National Radio Of	11940as					
0205	0210		Croatia, The Voice of Croatia	9925irr					
0215	0220		Nepal, Radio 5005as	7165as					
0230	0257		Vietnam, Voice of	9525na					
0230	0300		Albania, R Tirana International	6115na	7160na				
0230	0300		Hungary, Radio Budapest	9570na					
0230	0300		Philippines, Radya Pilipinas	11885pa	15120pa	15270pa			
0230	0300		Slovakia, Adventist World Radio	7235as					
0230	0300		Sweden, Radio	9495am					
0230	0300		Switzerland, Swiss R International	9885am					
0250	0300		Vatican City, Vatican Radio	7305am	9605am				

0300 UTC - 11PM E / 10PM C / 8PM P

0300	0310		Vatican City, Vatican Radio	7305am	9605am				
0300	0327		Czech Rep, Radio Prague Intl	7345na	7385na	9870na			
0300	0330		Egypt, Radio Cora	9475am					
0300	0330		S Africa, Channel Africa	6035af					
0300	0330		Thailand, Radio	15395am					
0300	0330		UK, BBC World Service	3255af	5975am	6005of	6135om	6190af	
			6195eu	7120af	7160of	11730af	12035as	12095me	
			15280as	15310as	15360as	15575me	17760as	17790as	21660as
			21830as						
0300	0330		USA, WBCQ Monticello ME	7415na					
0300	0330	s	USA, WBCQ Monticello ME	9330na					
0300	0330	s	USA, WINB, Red Lion PA	12160am					
0300	0345		Germany, Deutsche Welle	9535na	9640na	13780am	15105na		
0300	0358		New Zealand, R New Zealand Int	17675pa					
0300	0400		Anguilla, Caribbean Beacon	6090am					
0300	0400	vi	Australia, ABC/Alice Springs	4835da					
0300	0400	vi	Australia, ABC/Katherine	5025da					
0300	0400	vi	Australia, ABC/Tennant Creek	4910da					
0300	0400		Australia, Christian Voice	21550as	21680pa				
0300	0400		Australia, Radio	9660pa	12080pa	15240as	15415as	15515va	
			17580va	17750as	21725va				
0300	0400	mtwhf	Bhutan, Bhutan BC Service	6035da					

0300	0400	vi	Botswana, Radio	3356da	4820da	7255da			
0300	0400		Canada, CBC Northern Service	9625da					
0300	0400		Canada, CFRX Toronto ON	6070da					
0300	0400		Canada, CFVP Calgary AB	6030da					
0300	0400		Canada, CHNX Halifax, NS	6130da					
0300	0400		Canada, CKZN St John's NF	6160da					
0300	0400		Canada, CKZU Vancouver BC	6160da					
0300	0400		China China Radio International	9690na					
0300	0400		Costa Rica, Fara del Caribe	5054ca	6175ca	9644ca			
0300	0400		Costa Rica, R for Peace Intl	7455va	15050va				
0300	0400		Costa Rica, University Network	5030am	6150am	7375am	9724sa		
			11870am	13749na	17645as				
0300	0400		Cuba, Radio Havana	6000na	9820na	11705usb			
0300	0400		Ecuador, HCJB	9745na	15115na	21455usb			
0300	0400	a/monthly	Finland, Scandv Weekend Radio	6170va	11720va				
0300	0400	vi	Guatemala, Radio Cultural	3300da	5955da				
0300	0400		Guyana, Voice of	3289da	5949da				
0300	0400	sm	Honduras, Radio Luz y Vida	3250ca					
0300	0400		Japan, Radio	17825ca	21610pa				
0300	0400		Kenya, Kenya BC Corp	4885irr	4915irr				
0300	0400	vi	Lesotho, Radio	4800da					
0300	0400		Malaysia, Radio	7295da					
0300	0400		Malaysia, Voice of Islam	6175as	9750as	15295as			
0300	0400		Namibia, Namibian BC Corp	3270af	3289af				
0300	0400		Netherlands, Radio	6135na	6175na				
0300	0400		Oman, Radio Sultanate of	15355va					
0300	0400	vi	Papua New Guinea, NBC	9675da	11880irr				
0300	0400		Philippines, Radya Pilipinas	11885	11750na	12000na	15455na		
0300	0400		Russia, Voice of Russia WS	7180na	12000na	17595na			
			17650na	17660na	17690na				
0300	0400		Singapore, SBC Radio One	6150da					
0300	0400	vi	Solomon Islands, SIBC	5020da					
0300	0400		Sri Lanka, Sri Lanka BC Corp	6005as	6075as	6130da	9770as		
			15425as						
0300	0400		Taiwan, Radio Taipei International	5950na	9680na	11875pa	15320as		
0300	0400		Turkey, Voice of	7270af	11655va	21715as			
0300	0400		Uganda, Radio	7196da					
0300	0400		Ukraine, R Ukraine International	7150as	7320as	7410as	9640as		
			12040as						
0300	0400		USA, Armed Forces Radio	4278va	4319va	4993va	5765va		
			6350va	6458va	6847va	10320va	10940va	12579va	12689va
			13254va	13362va	16847va				
0300	0400		USA, KAIJ Dallas TX						

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0400	0455	USA, WYFR Okeechobee FL	6065na	9355eu	9505nc				
0400	0456	China China Radio International	9560na	9730na					
0400	0500	Romania, R Romania International	11940na	15365na	17735es	21480as			
0400	0500	Anguilla, Caribbean Beacon	6090am						
0400	0500	Australia, ABC/Alice Springs	4835do						
0400	0500	Australia, ABC/Katherine	5025do						
0400	0500	Australia, ABC/Tennant Creek	4910do						
0400	0500	Botswana, Radio	4820do	7255do					
0400	0500	Canada, CBC Northern Service	9625do						
0400	0500	Canada, CFRX Toronto ON	6070do						
0400	0500	Canada, CFVP Calgary AB	6030do						
0400	0500	Canada, CHNX Halifax, NS	6130do						
0400	0500	Canada, CKZN St John's NF	6160do						
0400	0500	Canada, CKZU Vancouver BC	6160do						
0400	0500	Costa Rica, R for Peace Intl	7455vo	15050va					
0400	0500	Costa Rica, University Network	5030am	6150am	7375am	9724sa			
0400	0500	11870am 13749na	17645as						
0400	0500	Cuba, Radio Havana	6000na	9820na	11705usb				
0400	0500	Ecuador, HCJB	9745na	15115na	21455usb				
0400	0500	a/monthly	Finland, Scandv Weekend Radio	6170va	11720vo				
0400	0500	vi	Guatemala, Radio Cultural	3300do	5955do				
0400	0500	vi	Guyana, Voice of	3289do	5949do				
0400	0500	vi	Kenya, Kenya BC Corp	4885irr	4915irr				
0400	0500	vi	Lesotho, Radio	4800do					
0400	0500	vi	Malaysia, Radio	7295do					
0400	0500	vi	Malaysia, Voice of Islam	6175as	9750as	15295as			
0400	0500	vi	Myanmar, Radio	9730do					
0400	0500	vi	Namibia, Namibian BC Corp	3270af	3289af				
0400	0500	vi	Netherlands, Radio	6175na					
0400	0500	vi	New Zealand, R New Zealand Int	15340pa					
0400	0500	vi	New Zealand, ZLXA	3935do	7290do				
0400	0500	vi	Nigeria, Radio/Enugu	6025do					
0400	0500	vi	Papua New Guinea, NBC	9675do	11880irr				
0400	0500	vi	Russia, Voice of Russia WS	7180na	11750na	12000na	17565na		
0400	0500	vi	15455na 17650na	17660na					
0400	0500	vi	Singapore, SBC Radio One	6150do					
0400	0500	vi	Solomon Islands, SIBC	5020do	9545do				
0400	0500	vi	Uganda, Radio	7196do					
0400	0500	vi	UK, BBC World Service	3255af	5975am	6005af	6135am	6175am	
0400	0500	vi	6190af 6195eu	7120af	7160af	9410eu	12035eu	12095me	
0400	0500	vi	15280as 15310as	15420af	15575me	17640af	17760os	17790as	
0400	0500	vi	21660as 21830as						
0400	0500	vi	USA, Armed Forces Radio	4278va	4319vo	4993vo	5765vo		
0400	0500	vi	6350va 6458va	6847vo	10320va	10940vo	12579vo	12689vo	
0400	0500	vi	13254va 13362va	16847vo					
0400	0500	vi	USA, KAIJ Dallas TX	5755va					
0400	0500	vi	USA, KTBN Salt Lake City UT	7510no					
0400	0500	vi	USA, KWHR Naelehu HI	17780as					
0400	0500	vi	USA, Voice of America	4960af	5855af	6080af	7275af	7290af	
0400	0500	vi	9530vo 9575af	11965me	15205va	17895af			
0400	0500	vi	USA, WEWN Birmingham AL	5825na					
0400	0500	vi	USA, WHRA Greenbush ME	7580eu					
0400	0500	vi	USA, WHRI Noblesville IN	5745va	7315am				
0400	0500	vi	USA, WJCR Upton KY	7490am	13595as				
0400	0500	vi	USA, WMLK Bethel PA	9465eu					
0400	0500	vi	USA, WSHB Cypress Crk SC	11930eu	15195of				
0400	0500	vi	USA, WTJC Newport NC	9370na					
0400	0500	vi	USA, WWFV McCoysville GA	5085vo					
0400	0500	vi	Zambia, Christian Voice	6065do					
0405	0410	vi	Zimbabwe, Zimbabwe BC Corp	4828do	6045do				
0405	0500	vi	Croatia, The Voice of Croatia	9925irr					
0405	0500	vi	USA, WWCN Nashville TN	3210na	5070na	5935na	7435na		
0427	0525	o	Liberia, Voice of Hope	12060af	15320af				
0430	0500	o	Australia, Christian Voice	21550as	21680pa				
0430	0500	o	Australia, Radio	9660pa	12080pa	15240as	15415as	15515vo	
0430	0500	o	17580pa	21725pa					
0430	0500	o	Italy, Italian Radio Relay Service	3985va					
0430	0500	o	Netherlands, Radio	6145na	9590na				
0430	0500	vi	Nigeria, Radio/Ibadan	6050do					
0430	0500	vi	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do		
0430	0500	vi	Nigeria, Radio/Lagos	3326do	4990do				
0430	0500	vi	S Africa, Adv World Radio Africa	11975of					
0430	0500	vi	Sri Lanka, Sri Lanka BC Corp	6130do					
0430	0500	mtwhfo	Switzerland, Trans World Radio	3200af	4775of				
0430	0500	mtwhfo	Switzerland, Swiss R International	9885am					
0430	0500	mtwhfo	USA, WBCQ Monticello ME	7415no					
0430	0500	s twhfo	USA, WRMI Miami FL	7385no					
0430	0500	s twhfo	Yugoslavia, Radio	11870na					
0445	0500	s twhfo	Italy, RAI International	5975af	7235of				
0445	0500	s twhfo	USA, WYFR Okeechobee FL	9355eu					

0500 UTC - 1AM E / 12AM C / 10PM P

0500	0515	s hfo	Canada, CBC Northern Service	9625do					
0500	0515	s hfo	USA, KVOH Los Angeles CA	9975no					
0500	0515	s hfo	Zambia, National BC Corp	6265do					
0500	0520	s hfo	Vatican City, Vatican Radio	4005eu	5885eu	7250eu	9660of		
0500	0520	s hfo	11625of 15570af						
0500	0530	os	Australia, Christian Voice	21550os					
0500	0530	os	Australia, Radio	17750as					
0500	0530	s twhfo	France R France International	11710af	17800af				
0500	0530	s twhfo	Mexico, R Mexico International	9705am	11770am				
0500	0530	s twhfo	Netherlands, Radio	6165no					
0500	0530	s twhfo	S Africa, Adv World Radio Africa	9845no					
0500	0530	s twhfo	S Africa, Channel Africa	11720af	6015of				
0500	0530	s twhfo	Switzerland, Swiss R International	9610eu					
0500	0530	s twhfo	USA, WRMI Miami FL	7385na					
0500	0530	vi	Zimbabwe, Zimbabwe BC Corp	4828do	6045do				
0500	0545	vi	Germany, Deutsche Welle	9690na	9785na	11985na			
0500	0600	vi	Anguilla, Caribbean Beacon	6090am					
0500	0600	vi	Australia, ABC/Alice Springs	4835do					
0500	0600	vi	Australia, ABC/Katherine	5025do					

0500	0600	vi	Australia, ABC/Tennant Creek	4910do					
0500	0600	vi	Botswana, Radio	3356do	7255do				
0500	0600	vi	Canada, CFRX Toronto ON	6070do					
0500	0600	vi	Canada, CFVP Calgary AB	6030do					
0500	0600	vi	Canada, CHNX Halifax, NS	6130do					
0500	0600	vi	Canada, CKZN St John's NF	6160do					
0500	0600	vi	Canada, CKZU Vancouver BC	6160do					
0500	0600	vi	Costa Rica, R for Peace Intl	7455va	15050va				
0500	0600	vi	Costa Rica, University Network	5030am	6150am	7375am	9724sa		
0500	0600	vi	11870am 13749na	17645as					
0500	0600	vi	Cuba, Radio Havana	9550na	9820na	9830usb			
0500	0600	vi	Ecuador, HCJB	9745na	15115na	21455usb			
0500	0600	a/monthly	Finland, Scandv Weekend Radio	6170vo	11720vo				
0500	0600	vi	Guyana, Voice of	3289do					
0500	0600	vi	Italy, Italian Radio Relay Service	3985va					
0500	0600	vi	Japan, Radio	5975eu	6110na	7230eu	11715os	11760os	
0500	0600	vi	13630na 15195os	17810pa	21755pa				
0500	0600	vi	Kenya, Kenya BC Corp	4885irr	4915irr				
0500	0600	vi	Kuwait, Radio	15110as					
0500	0600	vi	Lesotho, Radio	4800do					
0500	0600	vi	Malaysia, Radio	7295do					
0500	0600	vi	Malaysia, RTM Sarawak	7160do					
0500	0600	vi	Malaysia, Voice of	6175va	9750va	15295va			
0500	0600	vi	Malaysia, Voice of Islam	6175as	9750as	15295as			
0500	0600	vi	Myanmar, Radio	9730do					
0500	0600	vi	Namibia, Namibian BC Corp	3270af	3289af				
0500	0600	vi	Netherlands, Radio	6175na					
0500	0600	vi	New Zealand, R New Zealand Int	15340pa					
0500	0600	vi	New Zealand, ZLXA	3935do	7290do				
0500	0600	vi	Nigeria, Radio/Enugu	6025do					
0500	0600	vi	Nigeria, Radio/Ibadan	6050do					
0500	0600	vi	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do		
0500	0600	vi	Nigeria, Radio/Lagos	3326do	4990do				
0500	0600	vi	Nigeria, Voice of	7255af	11770af	15120na			
0500	0600	vi	Papua New Guinea, NBC	9675do	11880irr				
0500	0600	vi	Russia, Voice of Russia WS	7180na	11750na	12000na	17565na		
0500	0600	vi	15455na 17650na	17660na					
0500	0600	vi	Singapore, SBC Radio One	6150do					
0500	0600	vi	Solomon Islands, SIBC	5020do	9545do				</

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0600	0700	Australia, Radio 17580pa 17750as	9660pa 21725pa	12080pa	15240pa	15415as	15515va
0600	0700	Botswana, Radio	7255do	9600do			
0600	0700	Canada, CFRX Toronto ON	6070do				
0600	0700	Canada, CFVP Calgary AB	6030do				
0600	0700	Canada, CHNX Halifax, NS	6130do				
0600	0700	Canada, CKZN St John's NF	6160do				
0600	0700	Canada, CKZU Vancouver BC	6160do				
0600	0700	Costa Rica, R for Peace Intl	7455va	15050va			
0600	0700	Costa Rica, University Network	5030am	6150am	7375am	9724sa	
		11870am 13749na	17645as				
0600	0700	Cuba, Radio Havana	9550na	9820na	9830usb		
0600	0700	Ecuador, HCJB	9745no	11680eu	15115na	21455usb	
0600	0700	Finland, Scandv Weekend Radio	6170va	6170va	11720va		
0600	0700	Germany, Overcomer Ministries	9430pa	9430pa	13810au		
0600	0700	Ghana, Ghana BC Corp	3366do	3366do	4915do		
0600	0700	Guyana, Voice of	3289do	5949do			
0600	0700	Italy, Italian Radio Relay Service	7120va				
0600	0700	Japan, Radio	7230eu	11740pa	13630pa	15195as	17870pa
		21755pa					
0600	0700	Kenya, Kenya BC Corp	4885irr	4915irr			
0600	0700	Kuwait, Radio	15110as				
0600	0700	Lesotho, Radio	4800do				
0600	0700	Liberia, ELWA	4760do				
0600	0700	Liberia, R Liberia International		6100do			
0600	0700	Malaysia, Radio	7295do				
0600	0700	Malaysia, RTM Sarawak	7160do				
0600	0700	Malaysia, Voice of	6175va	9750va	15295va		
0600	0700	Myanmar, Radio	9730do				
0600	0700	Namibia, Namibion BC Corp	3270af	3289af			
0600	0700	Netherlands, Radio	6175na				
0600	0700	New Zealand, ZLXA	3935do				
0600	0700	Nigeria, Radio/Enugu	6025do				
0600	0700	Nigeria, Radio/Ibadan	6050do				
0600	0700	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
0600	0700	Nigeria, Radio/Lagos	3326do	4990do			
0600	0700	Nigeria, Voice of	7255af	11770af	15120na		
0600	0700	Papua New Guinea, NBC		9675do	11880irr		
0600	0700	Russia, Voice of Russia WS	15490au	17635au	17685au	21790au	
0600	0700	Sierra Leone, Sierra Leone BS	3316do				
0600	0700	Singapore, SBC Radio One	6150do				
0600	0700	Salomon Islands, SIBC	5020do	9545do			
0600	0700	Sri Lanka, Sri Lanka BC Corp	3316do				
0600	0700	Swaziland, Trans World Radio	4775af	6035af	9500af		
0600	0700	UK, BBC World Service	6055af	6175am	6195eu	7160af	
		9410eu 9740as	11760me	11765af	11940af	12095eu	15310as
		15360as 15485eu	15565eu	17640af	17760as	17790as	21660as
0600	0700	USA, BBC World Service	17885af				
0600	0700	USA, Armed Forces Radio		4278va	4319va	4993va	5765va
		6350va 6458va	6847va	10320va	10940va	12579va	12689va
		13254va 13362va	16847va				
0600	0700	USA, KAIJ Dallas TX	5755va				
0600	0700	USA, KTBN Salt Lake City UT		7510na			
0600	0700	USA, KWHR Naalehu HI	11565pa	17780as			
0600	0700	USA, WEWN Birmingham AL		5825na			
0600	0700	USA, WHRA Greenbush ME		11730af			
0600	0700	USA, WHRI Noblesville IN		5745va	7315am		
0600	0700	USA, WJCR Upton KY	7490am	13595as			
0600	0700	USA, WMLK Bethel PA	9465eu				
0600	0700	USA, WRNO New Orleans LA		7395am			
0600	0700	USA, WSHB Cypress Crk SC		11615af	13650af		
0600	0700	USA, WTJC Newport NC	9370na				
0600	0700	USA, WWCR Nashville TN		3210na	5070na	5935na	7460na
0600	0700	USA, WYFR Okeechobee FL		5985no	7355eu		
0600	0700	Vanuatu, Radio	3945do	4960do	7260do		
0600	0700	Yemen, Rep of Yemen Radio		9780me			
0600	0700	Zambia, Christian Voice	9865do				
0600	0700	Zimbabwe, Zimbabwe BC Corp		5975do	6045do		
0605	0610	Croatia, The Voice of Croatia		9470irr			
0606	0700	New Zealand, R New Zealand Int		11675pa			
0610	0615	Vatican City, Vatican Radio		4005eu	5885eu	7250eu	9645eu
		11740eu 15595eu					
0610	0620	Greece, Voice of	9420eu	11900au	15630eu	17520pa	21530eu
0630	0640	Cameroon, CRTV Radio Buea		6005do			
0630	0700	Finland, YLE/Radio Finland		15315va	21670va		
0630	0700	Georgia, Georgian Radio		6080me			
0630	0700	USA, Voice of America	9530va	9680af	11805af	11965me	15205va
0630	0700	USA, Voice of America	5970af	6035af	6080af	7195af	11995af
		12080af 13670af					
0630	0700	Vatican City, Vatican Radio		11625af	13765af	15570af	
0641	0656	Romania, R Romania International		11775eu	11940na	15180na	15365eu
0645	0655	Monaco, Trans World Radio		9870eu			
0655	0700	Monaco, Trans World Radio		9870eu			

0700 UTC - 3AM E / 2AM C / 12AM P

0700	0720	Swaziland, Trans World Radio	4775af	6035af	9500af
0700	0727	Czech Rep, Radio Prague Intl	9880eu	11600eu	
0700	0730	Belgium, RVI Flanders R Intl	9865eu		
0700	0730	Papua New Guinea, NBC	9675do	11880irr	
0700	0730	Slovakia, R Slovakia International	9440au	15460au	17550au
0700	0730	UK, BBC World Service	6190af	9410eu	9740as
		11940af 12095eu	15310as	15360as	15400af
		15575as 17640eu	17760as	17790as	21660as
0700	0730	USA, BBC World Service	17885af		
0700	0730	USA, Voice of America	6873va		
0700	0756	Romania, R Romania International	17735pa		
0700	0800	Anguilla, Caribbean Beacon	6090am		
0700	0800	Australia, ABC/Alice Springs	4835do		
0700	0800	Australia, ABC/Katherine	5025do		
0700	0800	Australia, ABC/Tennant Creek	4910do		
0700	0800	Australia, Christian Voice	17820as	21680pa	
0700	0800	Australia, Radio	9660pa	12080va	15240va
				15415as	17580pa

0700	0800	Botswana, Radio	7255do	9600do			
0700	0800	Canada, CFRX Toronto ON		6070do			
0700	0800	Canada, CFVP Calgary AB		6030do			
0700	0800	Canada, CHNX Halifax, NS		6130do			
0700	0800	Canada, CKZN St John's NF		6160do			
0700	0800	Canada, CKZU Vancouver BC		6160do			
0700	0800	Costa Rica, R for Peace Intl		7455va	15050va		
0700	0800	Costa Rica, University Network		5030am	6150am	7375am	9724sa
		11870am 13749na	17645as				
0700	0800	Ecuador, HCJB	11680eu	11755po	21455usb		
0700	0800	Eq Guinea, Radio Africa		15185af			
0700	0800	Eq Guinea, Radio East Africa		15185af			
0700	0800	Finland, Scandv Weekend Radio		6170va	11720va		
0700	0800	France, R France International		15605af			
0700	0800	Germany, Deutsche Welle		13640eu			
0700	0800	Germany, Overcomer Ministries		9430po	13810ou		
0700	0800	Germany, Trans World Radio		12070eu			
0700	0800	Germany, Voice of Hope	5975eu	21590me			
0700	0800	Ghana, Ghana BC Corp		3366do	4915do		
0700	0800	Guyana, Voice of	3289do	5949do			
0700	0800	Italy, Italian Radio Relay Service		7120va			
0700	0800	Kenya, Kenya BC Corp	4885irr	4915irr			
0700	0800	Kuwait, Radio	15110as				
0700	0800	Lesotho, Radio	4800do				
0700	0800	Liberia, ELWA	4760do				
0700	0800	Liberia, R Liberia International		6100do			
0700	0800	Malaysia, Radio	7295do				
0700	0800	Malaysia, RTM Sarawak	7160do				
0700	0800	Malaysia, Voice of	6275as	9750as	15295as		
0700	0800	Monaco, Trans World Radio		9870eu			
0700	0800	Myanmar, Radio	9730do				
0700	0800	Namibia, Namibion BC Corp		3270af	3289af		
0700	0800	New Zealand, R New Zealand Int		11675pa			
0700	0800	New Zealand, ZLXA		3935do	7290do		
0700	0800	Nigeria, Radio/Enugu	6025do				
0700	0800	Nigeria, Radio/Ibadan	6050do				
0700	0800	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
0700	0800	Nigeria, Radio/Lagos	3326do	4990do			
0700	0800	Nigeria, Voice of	7255af	11770af	15120na		
0700	0800	Russia, Voice of Russia WS		15490au	17495au	17525au	17635au
		17685au					
0700	0800	Sierra Leone, Sierra Leone BS		3316do			
0700	0800	Singapore, SBC Radio One		6150do			
0700	0800	Salomon Islands, SIBC	5020do	9545do			
0700	0800	Sri Lanka, Sri Lanka BC Corp		3316do			
0700	0800	Taiwan, Radio Taipei International		5950na			
0700	0800	USA, Armed Forces Radio		4278va	4319va	4993va	5765va
		6350va 6458va	6847va	10320va	10940va	12579va	12689va
		13254va 13362va	16847va				
0700	0800	USA, KAIJ Dallas TX	5755va				
0700	0800	USA, KTBN Salt Lake City UT		7510na			
0700	0800	USA, KWHR Naalehu HI	11565pa	17780as			
0700	0800	USA, WEWN Birmingham AL		5825na			
0700	0800	USA, WHRA Greenbush ME		11730af			
0700	0800	USA, WHRI Noblesville IN		5745va	7315am		
0700	0800	USA, WJCR Upton KY	7490am	13595as			
0700	0800	USA, WMLK Bethel PA	9465eu				
0700	0800	USA, WRNO New Orleans LA		7395am			
0700	0800	USA, WSHB Cypress Crk SC		11615af	13650af		
0700	0800	USA, WTJC Newport NC	9370na				
0700	0800	USA, WWCR Nashville TN		3210na	5070na	5935na	7460na
0700	0800	USA, WYFR Okeechobee FL		7355eu	13695af	15170af	

Shortwave Guide



0800	0900		11870am 13749na 17645as	21455usb				
0800	0900	mtwhf	Ecuador, HCJB 11755pa	15185af				
0800	0900	as/vl	Eqt Guinea, Radio Africa	15185af				
0800	0900	a/monthly	Finland, Scandv Weekend Radio	6170va	11720va			
0800	0900		Germany, Deutsche Welle	13640eu				
0800	0900		Germany, Overcomer Ministries	13800pa	13810au			
0800	0900		Germany, Trans World Radio	12070eu				
0800	0900		Germany, Voice of Hope 5975eu	21590me				
0800	0900	vl	Ghana, Ghana 8C Corp	3366do	4915do			
0800	0900		Guyana, Voice of	3289do				
0800	0900		Indonesia, Voice of	9525pa	11784pa	15149pa		
0800	0900	as/vl	Italy, Italian Radio Relay Service	7120va				
0800	0900		Kenya, Kenya 8C Corp	4885srr	4915srr			
0800	0900	vl	Lesotho, Radio	4800do				
0800	0900		Liberia, ELWA	4760do				
0800	0900		Liberia, R Liberia International	6100do				
0800	0900		Malaysia, Radio	7295do				
0800	0900	s	Malta, Voice of Mediterranean	11770eu				
0800	0900		Namibia, Namibian 8C Corp	7165af	7215af			
0800	0900		Netherlands, Radio	6175na				
0800	0900		New Zealand, R New Zealand Int	11675pa				
0800	0900		New Zealand, ZLXA	3935do	7290do			
0800	0900	vl	Nigeria, Radio/Enugu	6025do				
0800	0900	vl	Nigeria, Radio/Ibadan	6050do				
0800	0900	vi	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
0800	0900	vl	Nigeria, Radio/Lagos	3326do	4990do			
0800	0900		Nigeria, Voice of	7255af	11770af	15120na		
0800	0900	v	Papua New Guinea, NBC	4890do	9675srr			
0800	0900		Russia, Voice of Russia WS	15490au	17495au	17525au	17635au	
0800	0900		17685au					
0800	0900	s	S Africa, Amateur Radio League	9750af	21560af			
0800	0900		Singapore, SBC Radio One	6150do				
0800	0900	vl	Saloman Islands, SIBC 5020do					
0800	0900		South Korea, R Korea Intl	9570am	13670eu			
0800	0900		UK, BBC World Service	6190af	11940af	12095eu	15310as	
0800	0900		15360as 15400af 15485eu	15565eu	17640eu	17760as	17830af	
0800	0900		17885af 21470af 21660as	21830as				
0800	0900	as	UK, BBC World Service	15575os				
0800	0900		USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
0800	0900		6350va 6458va 6847va	10320va	10940va	12579va	12689va	
0800	0900		13254va 13362va 16847va					
0800	0900		USA, KAJI Dallas TX	5755va				
0800	0900		USA, KNLS Anchor Point AK	11765as				
0800	0900		USA, KTBN Salt Lake City UT	7510na				
0800	0900		USA, KWHR Naalehu HI 11565pa	17780as				
0800	0900		USA, Voice of America 11930as	13610as	15150as			
0800	0900		USA, WEWN Birmingham AL	5825na				
0800	0900		USA, WHRA Greenbush ME	11730af				
0800	0900		USA, WHRI Noblesville IN	5745va	7315am			
0800	0900		USA, WJCR Upton KY 7490am	13595as				
0800	0900		USA, WRNO New Orleans LA	7395am				
0800	0900		USA, WSHB Cypress Crk SC	9845au	9860eu	11615eu		
0800	0900		USA, WTJC Newport NC 9370na					
0800	0900		USA, WWCR Nashville TN	3210na	5070na	5935na	7460na	
0800	0900	vl	Vanuatu, Radio	3945do				
0800	0900		Zambia, Christian Voice 9865do					
0800	0900	vl	Zimbabwe, Zimbabwe 8C Corp	5975do	6045do			
0805	0810		Croatia, The Voice of Croatia	13820srr				
0810	0830	s	Armenia, Voice of	15270eu				
0815	0900		Guam, KTWR/ Trans World R	15200os	15330os			
0815	0900	f	Seychelles, FEBA Radio	15460os				
0830	0900	vl	Australia, ABC/Alice Springs	2310do				
0830	0900	vl	Australia, ABC/Katherine	2485do				
0830	0900	vl	Australia, ABC/Tennant Creek	2325do				
0830	0900		Australia, Radio	5995pa	9710pa	12080va	13605pa	15240va
0830	0900		15415as 17750as 21725pa					
0830	0900		Austria, AWR Europe	17780af				
0830	0900		Georgia, Georgian Radio	11910me				
0830	0900		Italy/Adv World Radio Europe	9610eu				
0830	0900		Lithuania, Radio Vilnius 9710eu					
0830	0900		Switzerland, Swiss R International	21770af				
0855	0900	s	Taiwan, CBS 11725as					

0900 UTC - 5AM E / 4AM C / 2AM P

0900	0915	vl	Ghana, Ghana 8C Corp	3366do	4915do			
0900	0929		Czech Rep, Radio Prague Intl	21745os				
0900	0930		Australia, Radio	11880as	13605pa	15240as	21820as	
0900	0930		Guam, KTWR/ Trans World R	15330os				
0900	0930		UK, BBC World Service	6190af	6195as	9605as	9740as	11760me
0900	0930		11940af 11945as 12095eu	15190sa	15310as	15360os	15400af	
0900	0930		15485eu 15565eu 15575as	17640eu	17655as	17760os	17790as	
0900	0930		17830af 17885af 21470af	21660os				
0900	0945		Germany, Deutsche Welle	6160pa	12035af	15410af	15470af	
0900	0945		17715pa 17770pa 17800af	17820as	21560af	21680pa	21790as	
0900	0945		USA, WINB Red Lion PA 13845va					
0900	1000		Anguilla, Caribbean Beacon	6090am				
0900	1000	vl	Australia, ABC/Alice Springs	2310do				
0900	1000	vl	Australia, ABC/Katherine	2485do				
0900	1000	vl	Australia, ABC/Tennant Creek	2325do				
0900	1000	vl	Botswana, Radio	9600do				
0900	1000		Canada, CFRX Toronto ON	6070do				
0900	1000		Canada, CFVP Calgary AB	6030do				
0900	1000		Canada, CHNX Halifax, NS	6130do				
0900	1000		Canada, CKZN St John's NF	6160do				
0900	1000		Canada, CKZU Vancouver BC	6160do				
0900	1000		China China Radio International	11730pa	15210pa			
0900	1000		Costa Rica, R for Peace Intl	7455va	15050va			
0900	1000		Costa Rica, University Network	5030am	6150am	7375am	9724sa	
0900	1000		11870am 13749na 17645as					
0900	1000		Ecuador, HCJB	11755pa	21455usb			
0900	1000	mtwhf	Eqt Guinea, Radio Africa	15185af				

0900	1000	cs/vl	Eqt. Guinea, Radio East Africa	15185af				
0900	1000	a/monthly	Finland, Scandv Weekend Radio	6170va	11720va			
0900	1000	a	Germany, Good News World R	5985eu	5995eu			
0900	1000		Germany, Overcomer Ministries	13800pa	13810au			
0900	1000		Germany, Trans World Radio	12070eu				
0900	1000		Germany, Voice of Hope 5975eu	21590me				
0900	1000		Guyana, Voice of	3289do	5949do			
0900	1000	as/vl	Italy, Italian Radio Relay Service	7120va				
0900	1000		Kenya, Kenya 8C Corp	4885srr	4915srr			
0900	1000	vl	Lesotho, Radio	4800do				
0900	1000		Liberia, ELWA	4760do				
0900	1000		Liberia, R Liberia International	6100do				
0900	1000		Malaysia, Radio	7295do				
0900	1000		Namibia, Namibian 8C Corp	7165af	7215af			
0900	1000		New Zealand, R New Zealand Int	11675pa				
0900	1000		New Zealand, ZLXA	3935do	7290do			
0900	1000	rl	Nigeria, Radio/Enugu	6025do				
0900	1000	rl	Nigeria, Radio/Ibadan	6050do				
0900	1000	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
0900	1000	vl	Nigeria, Radio/Lagos	3326do	4990do			
0900	1000		Paiou, KHBN/Voice of Hope	15725os				
0900	1000	vl	Papua New Guinea, NBC	4890do	9675srr			
0900	1000		Singapore, SBC Radio One	6150do				
0900	1000	vl	Saloman Islands, SIBC 5020do					
0900	1000		Sri Lanka, Sri Lanka 8C Corp	6130do				
0900	1000		USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
0900	1000		6350va 6458va 6847va	10320va	10940va	12579va	12689va	
0900	1000		13254va 13362va 16847va					
0900	1000		USA, KAJI Dallas TX	5755va				
0900	1000		USA, KTBN Salt Lake City UT	7510na				
0900	1000		USA, KWHR Naalehu HI 11565pa	17780as				
0900	1000		USA, Voice of America 11930as	13610as	15150as			
0900	1000		USA, WEWN Birmingham AL	5825na				
0900	1000		USA, WHRA Greenbush ME	11730af				
0900	1000		USA, WHRI Noblesville IN	5745va	7315am			
0900	1000		USA, WJCR Upton KY 7490am	13595as				
0900	1000		USA, WRNO New Orleans LA	7395am				
0900	1000	mtwhfa	USA, WSHB Cypress Crk SC	9845au	9860eu	11615eu		
0900	1000		USA, WTJC Newport NC 9370na					
0900	1000		USA, WWCR Nashville TN	3210na	5070na	5935na	7460na	
0900	1000	vl	Vanuatu, Radio	3945do				
0900	1000	mt hfa	Vatican City, Vatican Radio	5885eu				
0900	1000		Zambia, Christian Voice 9865do					
0900	1000	vl	Zimbabwe, Zimbabwe 8C Corp	5975do	6045do			
0910	0920		Greece, Voice of	12105eu				
0915	1000	vl	Ghana, Ghana 8C Corp	6130do	4915do			
0915	1000	vl/as	Ghana, Ghana 8C Corp	4915do				
0930	1000		Australia, Radio	11880as	13605pa	15240as	21820as	
0930	1000		Netherlands, Radio	9790os	12065os			

Shortwave Guide



1000	1100	Namibia, Namibian BC Corp	7165af	7215af					
1000	1100	New Zealand, ZLXA	3935do						
1000	1100	Nigeria, Radio/Enugu	6025do						
1000	1100	Nigeria, Radio/Ibadan	6050do						
1000	1100	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do			
1000	1100	Nigeria, Radio/Lagos	4990do	7285do					
1000	1100	Papua New Guinea, NBC	4890do	9675sirr					
1000	1100	Singapore, SBC Radio One	6150do						
1000	1100	Salomon Islands, SIBC	5020do						
1000	1100	USA, Armed Forces Radio	4278va	4319va	4993va	5765va			
		6350va	6458va	6847va	10320va	10940va	12579va	12689va	
		13254va	13362va	16847va					
1000	1100	USA, KAIJ Dallas TX	5755va						
1000	1100	USA, KTBN Salt Lake City UT	7510na						
1000	1100	USA, KWHR Naalehu HI	9930as	11565pa					
1000	1100	USA, Voice of America	5745am	7370am	9590am	9770pa	15240as		
		15425as							
1000	1100	USA, WEWN Birmingham AL	7425na	15745eu					
1000	1100	USA, WHRI Noblesville IN	6040na	9495am					
1000	1100	USA, WINB Red Lion PA	13845va						
1000	1100	USA, WJCR Upton KY	7490am	13595as					
1000	1100	USA, WRMI Miami FL	9955am						
1000	1100	USA, WRNO New Orleans LA	7395am						
1000	1100	USA, WSHB Cypress Crk SC	6095am	9455sa	11870as				
1000	1100	USA, WTJC Newport NC	9370na						
1000	1100	USA, WWCR Nashville TN	5070na	5935na	7435na	9475na			
1000	1100	USA, WYFR Okeechobee FL	5950na	4960do					
1000	1100	Vanuatu, Radio	3945do	7260do					
1000	1100	Zambia, Christian Voice	9865do						
1000	1100	Zimbabwe, Zimbabwe BC Corp	5975do	6045do					
10000	1030	Switzerland, Swiss R International	15315eu						
1006	1100	New Zealand, R New Zealand Int	15175pa						
1030	1035	Israel, Kol Israel	15640va	17545va					
1030	1045	Ethiopia, Radio	5990do	7110do	9705do				
1030	1100	Guam, KSDA/ Adventist World R	11560as						
1030	1100	Malaysia, RTM Sarawak	7160do						
1030	1100	Mongolia, Voice of	12085ou						
1030	1100	Netherlands, Radio	5965na	6045eu	9760as	9860eu	12065as		
		13710as							
1030	1100	Palau, KHBN/Voice of Hope	9965as	15725as					
1030	1100	Sri Lanka, Sri Lanka BC Corp	4940do	11835as	15120as	17850as			
1030	1100	UAE, Radio Dubai	13675va	15395va	21605va				
1030	1100	UK, BBC World Service	6190af	6195va	9740as	11760me	11940af		
		12095eu	15310as	15485eu	15565eu	15575as	17640eu	17790as	
		17885af	21470af						

1100 UTC - 7AM E / 6AM C / 4AM P

1100	1105	Pakistan, Radio	17520eu	21465eu					
1100	1120	Kazakhstan, Radio Almaty	9620eu	11840eu					
1100	1127	Vietnam, Voice of	7285as						
1100	1130	Australia, Radio	5995pa	6020pa	9475as	9580va	11650pa		
		11880as	12080va	13605va	15240as	21820as			
1100	1130	Netherlands, Radio	5965na	6045eu	9760as	9860eu	12065as		
		13710as							
1100	1130	Sri Lanka, Sri Lanka BC Corp	4940do	11835as	15210as	17850as			
1100	1130	UK, BBC Caribbean Report	6195ca	15220ca					
1100	1130	UK, BBC World Service	6190af	6195as	9740as	9815as	11760me		
		11940af	11955as	12095eu	15280as	15310as	15400af	15485eu	
		15565eu	15575as	17640eu	17700as	17790sa	17830af	17885af	
		21470af							
1100	1130	UK, BBC World Service	6195am	15190as	15220am				
1100	1130	Ukraine, R Ukraine International	12040eu	15135na					
1100	1145	Germany, Deutsche Welle	11785af	15410af	17860af	21780af			
1100	1150	UAE, Radio Dubai	13675va	15395va	21605va				
1100	1200	Anguilla, Caribbean Beacon	11775am						
1100	1200	Australia, ABC/Alice Springs	2310do						
1100	1200	Australia, ABC/Katherine	2485do						
1100	1200	Australia, ABC/Tennant Creek	2325do						
1100	1200	Botswana, Radio	7255do	9600do					
1100	1200	Bulgaria, Radio	17500eu						
1100	1200	Canada, CBC Northern Service	9625do						
1100	1200	Canada, CFRX Toronto ON	6070do						
1100	1200	Canada, CFVP Calgary AB	6030do						
1100	1200	Canada, CHNX Halifax, NS	6130do						
1100	1200	Canada, CKZN St John's NF	6160do						
1100	1200	Canada, CKZU Vancouver BC	6160do						
1100	1200	Costa Rica, R for Peace Intl	15050va						
1100	1200	Costa Rica, University Network	5030am	6150am	7375am	9724sa			
		11870am	13749na	17645as					
1100	1200	Ecuador, HCJB	12005am	15115am	21455usb				
1100	1200	Eq Guinea, Radio Africa	15185af						
1100	1200	Eq Guinea, Radio East Africa	15185af						
1100	1200	Finland, Scandv Weekend Radio	6170va	11720va					
1100	1200	Germany, Voice of Hope	21590me						
1100	1200	Ghana, Ghana BC Corp	6130do						
1100	1200	Ghana, Ghana BC Corp	4915do						
1100	1200	Guyana, Voice of	5949do						
1100	1200	Iran, Voice of Islamic Rep. of Iran	15385as	15430as	15585as	21470as			
		21730as							
1100	1200	Italy, Italian Radio Relay Service	7120va						
1100	1200	Japan, Radio	6120na	9695pa	15590as				
1100	1200	Kenya, Kenya BC Corp	4885sirr						
1100	1200	Lesotho, Radio	4800do						
1100	1200	Liberia, ELWA	4760do						
1100	1200	Liberia, R Liberia International	6100do						
1100	1200	Malaysia, Radio	7295do						
1100	1200	Malaysia, TRM Sarawak	7160do						
1100	1200	Namibia, Namibian BC Corp	7165af	7215af					
1100	1200	New Zealand, R New Zealand Int	15175pa						
1100	1200	New Zealand, ZLXA	3935do						
1100	1200	Nigeria, Radio/Enugu	6025do						
1100	1200	Nigeria, Radio/Ibadan	6050do						

1100	1200	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do			
1100	1200	Nigeria, Radio/Lagos	4990do	7285do					
1100	1200	Palau, KHBN/Voice of Hope	9965as						
1100	1200	Papua New Guinea, NBC	4890do	9675sirr					
1100	1200	Singapore, R Singapore Intl	6150as	9600as					
1100	1200	Switzerland, Swiss R International	13735as	21770as					
1100	1200	Taiwan, Radio Taipei International	7445as	11905as					
1100	1200	Taiwan, Voice of Asia	7445as						
1100	1200	USA, Armed Forces Radio	4278va	4319va	4993va	5765va			
		6350va	6458va	6847va	10320va	10940va	12579va	12689va	
		13254va	13362va	16847va					
1100	1200	USA, KAIJ Dallas TX	5755va						
1100	1200	USA, KTBN Salt Lake City UT	7510na						
1100	1200	USA, KWHR Naalehu HI	9930as	11565pa					
1100	1200	USA, Voice of America	6160as	9645as	9760as	9770pa	15160as		
		15240as	15425as						
1100	1200	USA, WEWN Birmingham AL	7425na	15745eu					
1100	1200	USA, WHRI Noblesville IN	6040na	9495am					
1100	1200	USA, WINB Red Lion PA	13845va						
1100	1200	USA, WJCR Upton KY	7490am	13595as					
1100	1200	USA, WRMI Miami FL	9955am						
1100	1200	USA, WRNO New Orleans LA	7395am						
1100	1200	USA, WSHB Cypress Crk SC	6095am	9455am	11590am	11660am			
1100	1200	USA, WTJC Newport NC	9370na						
1100	1200	USA, WWCR Nashville TN	5070na	5935na	7435na	15685na			
1100	1200	USA, WYFR Okeechobee FL	5850na	4960do					
1100	1200	Vanuatu, Radio	3945do	7260do					
1100	1200	Zambia, Christian Voice	9865do						
1100	1200	Zimbabwe, Zimbabwe BC Corp	5975do	6045do					
1115	1127	Zambia, National BC Corp	6045do						
1115	1145	Nepal, Radio	5005as	7165as					
1120	1140	Kazakhstan, Radio Almaty	9620eu	11840eu					
1130	1145	Libya, Voice of Africa	11815af	15435af	17725af				
1130	1200	Australia, Radio	5995pa	6020pa	9475as	9580va	11650pa		
		11880as	12080va	13605va					
1130	1200	Austria, R Austria International	6155eu	13730eu					
1130	1200	Belgium, RVI Flanders R Intl	9865as	9925eu					
1130	1200	Netherlands, Radio	5965na	6045eu	9760as	9860eu	12065as		
		13710as							
1130	1200	South Korea, R Korea Intl	9650na						
1130	1200	Sri Lanka, Sri Lanka BC Corp	4940do						
1130	1200	Sweden, Radio	17505as	18960na					
1130	1200	UK, BBC World Service	6190af	6195as	9740as	9815as	11760me		
		11940af	11955as	12095eu	15220am	15280as	15310as	15485eu	
		15575as	17640eu	17700as	17830af	17885af	21470af		
1130	1200	Ukraine, R Ukraine International	15135na						
1130	1200	Vatican City, Vatican Radio	15595va	17515va					
1140	1200	Kazakhstan, Radio Almaty	9620eu	11840eu					
1145	1200	Germany, Deutsche Welle	13640eu						

1200 UTC - 8AM E / 7AM C / 5AM P

1200	1205	New Zealand, R New Zealand Int	15175pa						
1200	1220	UK, BBC Caribbean Report	6195ca	15220ca					
1200	1220	UK, BBC World Service	6190af	6195as	9740as	9815as	11760me		
		11940af	11955as	12095eu	15280as	15310as	15485eu	15565eu	
		15575as	17640eu	17700as	17830af	17885af	21470af		
1200	1220	UK, BBC World Service	6195am	15220am					
1200	1225	Netherlands, Radio	5965na	9860eu					
1200	1230	France, R France International	15540eu	25820af					
1200	1230	Iran, Voice of Islamic Rep. of Iran	15385as	15430as	15585as	21470as			
		21730as							
1200	1230	Philippines, FEBC	15110as						
1200	1230	Sri Lanka, Sri Lanka BC Corp	4940do						
1200	1230	Switzerland, Swiss R International							

Shortwave Guide

1200	1300	Malaysia, Radio	7295do						
1200	1300	Namibia, Namibian BC Corp	7165af	7215af					
1200	1300	Netherlands, Radio	9515na						
1200	1300	New Zealand, ZLXA	3935do						
1200	1300	Nigeria, Radio/Enugu	6025do						
1200	1300	Nigeria, Radio/Ibadan	6050do						
1200	1300	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do			
1200	1300	Nigeria, Radio/Lagos	4990do	7285do					
1200	1300	Palau, KHBN/Voice of Hope	9965os						
1200	1300	Papua New Guinea, NBC	4890do	9675irr					
1200	1300	Singapore, R Singapore Intl	7130os	9600os					
1200	1300	Taiwan, Radio Taipei International	7130os	9610ou					
1200	1300	USA, Armed Forces Radio	4278va	4319va	4993va	5765va			
			6350va	6458va	6847va	10320va	10940va	12579va	12689va
			13254va	13362va	16847va				
1200	1300	USA, KAIJ Dallas TX	13815va						
1200	1300	USA, KT8N Salt Lake City UT	7510na						
1200	1300	USA, KWHR Noalehu HI	9930as	11565pa					
1200	1300	USA, Voice of America	6160as	9645as	9760as	15160as	15240as		
			15425as						
1200	1300	USA, WEWN Birmingham AL	7425na	15745eu					
1200	1300	USA, WHRI Noblesville IN	6040na	9495am					
1200	1300	USA, WINB Red Lion PA	13570am						
1200	1300	USA, WJCR Upton KY	7490am	13595as					
1200	1300	USA, WRMI Miami FL	15724na						
1200	1300	USA, WRMI Miami FL	9955am						
1200	1300	USA, WRNO New Orleans LA	7395am						
1200	1300	USA, WSHB Cypress Crk SC	6095am	9455am	9875as	11590am			
			12065am	11660as	17635as				
1200	1300	USA, WTJC Newport NC	9370na						
1200	1300	USA, WWCN Nashville TN	7435na	12160na	13845na	15685na			
1200	1300	USA, WWFV McCaysville GA	12172va						
1200	1300	Vonauatu, Radio	3945do	4960do	7260do				
1200	1300	Zambia, Christian Voice	9865do						
1200	1300	Zimbabwe, Zimbabwe BC Corp	5975do	6045do					
1205	1300	New Zealand, R New Zealand Intl	6095pa						
1215	1300	Egypt, Radio Cairo	17595as						
1220	1300	UK, BBC World Service	6190af	6195os	9740os	9815os	11760me		
			11940af	11955as	12095eu	15220am	15280os	15310as	15485eu
			15565eu	15575os	17640eu	17700os	17830af	17885af	21470af
			12019as	15115as					
1230	1300	Finland, YLE/Radio Finland	15400na	17670na					
1230	1300	Germany, Overcomer Ministries	6110eu						
1230	1300	Italy/Adv World Radio Europe	9610eu						
1230	1300	Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9770as			
			15425as						
1230	1300	Sweden, Radio	17505as	18960na	21530as				
1230	1300	Thailand, Radio	9885va						
1230	1300	Turkey, Voice of	17810os	17830eu					
1230	1300	UK, Wales Radio Intl/Merlin	17810ou						
1245	1300	Seychelles, FEBA Radio	15535me						
1245	1300	USA, WYFR Okkeechobee FL	17750na						
1255	1300	Taiwan, CBS	6180as	7250as	9630as	11725as	11775as		

1300 UTC - 9AM E / 8AM C / 6AM P

1300	1329	Czech Rep, Radio Prague Intl	13580eu	21745as					
1300	1330	Australia, Radio	5995pa	6020pa	9475as	9580va	11650va		
			11880as	21820as					
1300	1330	Egypt, Radio Cairo	17595as						
1300	1330	Germany, Universal Life	9955na						
1300	1330	Guam, KSDA/ Adventist World R	15385as						
1300	1330	Turkey, Voice of	17830eu						
1300	1400	Anguilla, Caribbean Beacon	11775am						
1300	1400	Australia, ABC/Alice Springs	2310do						
1300	1400	Australia, ABC/Katherine	2485do						
1300	1400	Australia, ABC/Tennant Creek	2325do						
1300	1400	Botswana, Radio	7255do	9600do					
1300	1400	Canada, CBC Northern Service	9625do						
1300	1400	Canada, CFRX Toronto ON	6070do						
1300	1400	Canada, CFVP Calgary AB	6030do						
1300	1400	Canada, CHNX Halifax, NS	6130do						
1300	1400	Canada, CKZN St John's NF	6160do						
1300	1400	Canada, CKZU Vancouver BC	6160do						
1300	1400	Canada, R Canada International	9640am	15305am					
1300	1400	Canada, R Canada International	17820am						
1300	1400	Canada, R Canada International	17800am						
1300	1400	China, China Radio International	7405na	9570na	11675pa	11900pa			
			11980os	15180os					
1300	1400	China, Voice of Hope	13820as						
1300	1400	Costa Rica, R for Peace Intl	15050va	21815usb					
1300	1400	Costa Rica, University Network	5030am	6150am	7375am	9724sa			
			11870am	13749na	17645as				
1300	1400	Ecuador, HCJB	12005am	15115am	21455usb				
1300	1400	Eq. Guinea, Radio East Africa	15185af						
1300	1400	Finland, Scandv Weekend Radio	6170vo	11720va					
1300	1400	Germany, Deutsche Welle	13640eu						
1300	1400	Germany, Overcomer Ministries	6110eu	13810af					
1300	1400	Germany, Voice of Hope	15715me						
1300	1400	Ghana, Ghana BC Corp	4915do	6130do					
1300	1400	Guyana, Voice of	5949do						
1300	1400	Italy, Italian Radio Relay Service	7120va						
1300	1400	Jordan, Radio	11690eu						
1300	1400	Kenya, Kenya BC Corp	4885irr	4915irr					
1300	1400	Lesotho, Radio	4800do						
1300	1400	Liberia, R Liberia International	6100do						
1300	1400	Malaysia, Radio	7295do						
1300	1400	Namibia, Namibian BC Corp	7165af	7215af					
1300	1400	Netherlands, Radio	9515na	11865na					
1300	1400	New Zealand, R New Zealand Intl	6095pa						
1300	1400	New Zealand, ZLXA	3935do						
1300	1400	Nigeria, Radio/Enugu	6025do						
1300	1400	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do			

1300	1400	Nigeria, Radio/Lagos	4990do	7285do					
1300	1400	Palau, KHBN/Voice of Hope	9965os						
1300	1400	Papua New Guinea, NBC	4890do	9675irr					
1300	1400	S Africa, Channel Africa	11720af	17780af	21725af				
1300	1400	Singapore, R Singapore Intl	6150as	9600as					
1300	1400	South Korea, R Korea Intl	9570as	13670am					
1300	1400	Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9770as			
			15425as						
1300	1400	Uganda, Radio	7196do						
1300	1400	UK, BBC World Service	6190af	9740as	9815as	11760me	11940af		
			12095eu	15220am	15310as	15420af	15485eu	15565eu	15575me
			17640eu	17700os	17830af	17885af	21470af		
1300	1400	USA, Armed Forces Radio	6350va	6458va	6847va	10320va	10940va	12579va	12689va
			13254va	13362va	16847va				
1300	1400	USA, KAIJ Dallas TX	13815va						
1300	1400	USA, KJES Vado NM	11715na						
1300	1400	USA, KNLS Anchor Point AK	11765as						
1300	1400	USA, KT8N Salt Lake City UT	7510na						
1300	1400	USA, KWHR Noalehu HI	9930as	11565pa					
1300	1400	USA, Voice of America	6160as	9645as	9760as	15160as	15425as		
1300	1400	USA, WBCQ Monticello ME	17495na						
1300	1400	USA, WEWN Birmingham AL	11875na						
1300	1400	USA, WHRI Noblesville IN	6040na	15105am					
1300	1400	USA, WINB Red Lion PA	13570am						
1300	1400	USA, WJCR Upton KY	7490am	13595as					
1300	1400	USA, WRMI Miami FL	15724na						
1300	1400	USA, WRMI Miami FL	9955am						
1300	1400	USA, WRNO New Orleans LA	7395am						
1300	1400	USA, WSHB Cypress Crk SC	9430na	9455am	9940as				
1300	1400	USA, WTJC Newport NC	9370na						
1300	1400	USA, WWCN Nashville TN	7435na	12160na	13845na	15685na			
1300	1400	USA, WWFV McCaysville GA	12172va						
1300	1400	USA, WYFR Okkeechobee FL	11550as	11830na	11970na	17750na			
1300	1400	Zambia, Christian Voice	9865do						
1300	1400	Zimbabwe, Zimbabwe BC Corp	5975do	6045do					
1330	1350	UAE, Radio Dubai	13630va						
1330	1357	Vietnam, Voice of	9730eu	11630eu	13740eu				
1330	1400	Australia, Radio	5995pa	6020pa	9475as	9580va	11650va		
			11660os	21820os					
1330	1400	Austria, R Austria International	6155eu	13730eu	21789as				
1330	1400	Germany, Voice of Hope	15750as						
1330	1400	Guam, KSDA/ Adventist World R	11705as	11980as					
1330	1400	India, All India Radio	9690os	11620os	13710os				
1330	1400	Sweden, Radio	17505va	18960na					
1330	1400	UAE, AWR Africa	15495va						
1330	1400	UK, BBC World Service	6190af	6195va	9740as	9815as	11760me		
			11940af	12095eu	15220am	15310as	15420af	15485eu	15565eu
			15575me	17640eu	17700as	17830af	17885af	21470af	
1330	1400	Uzbekistan, Radio Toshkent	7285as	9715as	15295as	17775as			

1400 UTC - 10AM E / 9AM C / 7AM P

1400	1430	Ecuador, HCJB	12005am	15115am	21455usb				
1400	1430	Germany, Voice of Hope	15750me	17550as					
1400	1430	Guam, KSDA/ Adventist World R	17720as						
1400	1430	Thailand, Radio	9830os						
1400	1430	UK, BBC World Service	15245as						
1400	1430	USA, Voice of America	18275va						
1400	1456	Romania, R Romania International	15250eu	17735eu					
1400	1500	Anguilla, Caribbean Beacon	11775am						
1400	1500	Australia, ABC/Alice Springs	2310do						
1400	1500	Australia, ABC/Katherine	2485do						
1400	1500	Australia, ABC/Tennant Creek	2325do						
1400	1500	Australia, Radio	5995va	9580va	11660as				
1400	1500	Botswana, Radio	7255do	9600do					
1400	1500	Cameroon, CRTV Radio Buea	6005do						
1400									

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1400	1500	vi	Nigeria, Radio/Enugu	6025da					
1400	1500	vi	Nigeria, Radio/Ibadan	6050da					
1400	1500	vi	Nigeria, Radio/Kaduna	4770da	6090da	7275da	9570da		
1400	1500	vi	Nigeria, Radio/Lagos	4990da	7285da				
1400	1500		Oman, Radio Sultanate of	15140va					
1400	1500		Palau, KHBN/Voice of Hope	9965as					
1400	1500	os	Russia, Voice of Russia WS	9745as	12055as	15560as			
1400	1500		S Africa, Channel Africa	11720af	17780af	21725af			
1400	1500		Singapore, SBC Radio One	6150da					
1400	1500		Sri Lanka, Sri Lanka BC Corp	4940da	6005as	6075as	9770as		
				15425as					
1400	1500		Switzerland, Swiss R International	9575as	17680as				
1400	1500		Taiwan, Radio Taipei International	15265as					
1400	1500		Uganda, Radio	7196da					
1400	1500		UK, BBC World Service	6190af	6195as	9740as	9815as	11940af	
				12095eu	15310as	15485eu	15575me	17640eu	17700as
				17830af	17840am	21470af	21660af		
1400	1500		USA, Armed Forces Radio	4278va	4319va	4993va	5765va		
				6350va	6458va	6847va	10320va	10940va	12579va
				13254va	13362va	16847va			
1400	1500		USA, KAJI Dallas TX	13815va					
1400	1500		USA, KJES Vado NM	11715na					
1400	1500		USA, KTBN Salt Lake City UT	7510na					
1400	1500		USA, KWHR Naalehu HI	9930as	11565pa				
1400	1500		USA, Voice of America	6160as	7125as	9645as	9760as	15160as	
				15255va	15425as				
1400	1500		USA, WBCQ Monticello ME	17494na					
1400	1500		USA, WEWN Birmingham AL	11875na					
1400	1500		USA, WHRI Noblesville IN	6040na	15105am				
1400	1500		USA, WINB Red Lion PA	13750am					
1400	1500		USA, WJCR Upton KY	7490am	13595as				
1400	1500	mtwhfa	USA, WRMI Miami FL	15724na					
1400	1500	s	USA, WRMI Miami FL	9955am					
1400	1500		USA, WRNO New Orleans LA	7395am					
1400	1500		USA, WTJC Newport NC	9370na					
1400	1500		USA, WWCN Nashville TN	9475na	12160na	13845na	15685na		
1400	1500		USA, WWFV McCaysville GA	12172va					
1400	1500		USA, WYFR Okeechobee FL	11550as	11830na	11970na	17750na		
1400	1500	vi	Zambia, Christian Voice	9865da					
1400	1500		Zimbabwe, Zimbabwe BC Corp	5975da	6045da				
1415	1420		Nepal, Radio 5005as	7165as					
1430	1500		Guam, KTWV/Trans World R	15330as					
1430	1500		Malaysia, RTM Kata Kinabalu	5980da					
1430	1500		Myanmar, Radio	5985da					
1430	1500		Netherlands, Radio	9890as	11835as	12075as	15220na		
1445	1500	f	Seychelles, FEBA Radio	11600as					

1500 UTC - 11AM E / 10AM C / 8AM P

1500	1530		Australia, Radio	5995va	9580va	11650va	11660as		
1500	1530		Germany, Voice of Hope	17550as					
1500	1530		Mexico, R Mexico International	9705am	11770am				
1500	1530		Mongolia, Voice of	12015as	12085as				
1500	1530	h	S Africa, Channel Africa	17770af					
1500	1530		Seychelles, FEBA Radio	11600as					
1500	1530		UK, BBC World Service	5975as	6190af	6195as	9740as	11860af	
				11940af	12095eu	15310as	15400af	15420af	15485eu
				17700as	17830af	17840am	21470af	21490af	21660af
1500	1530		USA, VOA Special English	12040as	15550as	6160as	9590as	9760as	9845as
1500	1556		North Korea, Voice of Korea	13760na	4405va	6574na	9335na	11710na	
1500	1559		Canada, R Canada International	15455as	17720as				
1500	1559	os	Canada, R Canada International	9640am	15305am	17800am			
1500	1600		Anguilla, Caribbean Beacon	11775am					
1500	1600	vi	Australia, ABC/Alice Springs	2310da					
1500	1600	vi	Australia, ABC/Katherine	2485da					
1500	1600	vi	Australia, ABC/Tennant Creek	2325da					
1500	1600	vi	Botswana, Radio	7255da	9600da				
1500	1600		Canada, CBC Northern Service	9625da					
1500	1600		Canada, CFRX Toronto ON	6070da					
1500	1600		Canada, CFVP Calgary AB	6030da					
1500	1600		Canada, CHNX Halifax NS	6130da					
1500	1600		Canada, CKZN St John's NF	6160da					
1500	1600		Canada, CKZU Vancouver BC	6160da					
1500	1600		China China Radio International	7160as	7405na	9785as	13685af		
				15125af					
1500	1600		China, Voice of Hope	13820as					

Hauser's Highlights:

NEW ZEALAND: RNZI

Sept-Oct schedule as planned in July, subject to change:

1650-1850	9825	NE Pac, Fiji, Samoa, Cook Is	35'	Mon-Fri
1851-2215	15160	All Pacific	0	Daily
2216-0458	17675	All Pacific	0	Daily
0459-0705	15340	All Pacific	0	Daily
0706-1105	9885	All Pacific	0	Daily
1106-1305	11675	NW Pac, Bougainville, E Timor, As	325'	Daily
1305-1650	6095	All Pacific	0	

Usual Close-down is 1305 UT: 6095 is for occasional over-night broadcasts to the Pacific, for Sports commentaries or Cyclone Warnings (Adrian Sainsbury, Technical Manager, Radio New Zealand International <http://www.rnzi.com>)

1500	1600		Costa Rica, R for Peace Intl	15050va	21815usb				
1500	1600		Costa Rica, University Network	5030am	6150am	7375am	9724sa		
				11870am	13749na	17645as			
1500	1600	as/vl	Eqt Guinea, Radio East Africa	15185af					
1500	1600	a/monthly	Finland, Scandv Weeknd Radio	5990va	11720va				
1500	1600		Germany, Deutsche Welle	13640eu					
1500	1600	as	Germany, Overcamer Ministries	17490eu					
1500	1600		Germany, Overcamer Ministries	5110eu	13810af				
1500	1600		Germany, Voice of Hope	15715me					
1500	1600	vi	Ghana, Ghana BC Corp	4915da	6130do				
1500	1600		Guam, KTWV/Trans World R	15330as					
1500	1600		Guyana, Voice of	5949da					
1500	1600		Japan, Radio	7200pa	9750as	11730as			
1500	1600		Jordan, Radio	11690na	17680af				
1500	1600		Kenya, Kenya BC Corp	4885irr	4915irr				
1500	1600	vi	Lesotho, Radio	4800do					
1500	1600		Libera, R Liberia International	6100da					
1500	1600		Malaysia, Radio	7295da					
1500	1600		Malaysia, RTM Kata Kinabalu	5980da					
1500	1600		Malaysia, RTM Sarawak	7160da					
1500	1600		Myanmar, Radio	5985da					
1500	1600		Nambian, Nambian BC Corp	7165af	7215af				
1500	1600		Netherlands, Radio	9515na	9890as	11835as	11865na	12075as	
				15220na					
1500	1600	accsna	New Zealand, R New Zealand Int	6095pa					
1500	1600		New Zealand, ZLXA	3935da					
1500	1600	vi	Nigeria, Radio/Enugu	6025da					
1500	1600	vi	Nigeria, Radio/Ibadan	6050da					
1500	1600	vi	Nigeria, Radio/Kaduna	4770da	6090da	7275da	9570da		
1500	1600	vi	Nigeria, Radio/Lagos	4990da	7285da				
1500	1600		Russia, Voice of Russia WS	4940me	4965me	4975me	7325me		
				9730eu	11500as	11985me			
1500	1600		Singapore, SBC Radio One	6150da					
1500	1600		Sri Lanka, Sri Lanka BC Corp	4940da	6005as	6075as	9770as		
				15425as					
1500	1600		Uganda, Radio	7196da					
1500	1600	s	UK, Merlin Network One	6175eu					
1500	1600		USA, Armed Forces Radio	4278va	4319va	4993va	5765va		
				6350va	6458va	6847va	10320va	10940va	12579va
				13254va	13362va	16847va			
1500	1600		USA, KAJI Dallas TX	13815va					
1500	1600		USA, KTBN Salt Lake City UT	15590na					
1500	1600		USA, KWHR Naalehu HI	9930as	11565pa				
1500	1600		USA, Voice of America	7125as	9645as	9700me	15205eu	15255va	
1500	1600		USA, WBCQ Monticello ME	17494na					
1500	1600		USA, WEWN Birmingham AL	11875na					
1500	1600		USA, WHRA Greenbush ME	17650af					
1500	1600		USA, WHRI Noblesville IN	13760va	15105am				
1500	1600		USA, WINB Red Lion PA	13570am					
1500	1600		USA, WJCR Upton KY	7490am	13595as				
1500	1600	mtwhfa	USA, WRMI Miami FL	15724na					
1500	1600	s	USA, WRMI Miami FL	9955am					
1500	1600		USA, WRNO New Orleans LA	7395am	15420af				
1500	1600		USA, WTJC Newport NC	9370na					
1500	1600		USA, WWCN Nashville TN	9475na	12160na	13845na	15685na		
1500	1600		USA, WWFV McCaysville GA	12172va					
1500	1600		USA, WYFR Okeechobee FL	5280as	11830na	17750na			
1500	1600		Zambia, Christian Voice	4965da					
1500	1600	vi	Zimbabwe, Zimbabwe BC Corp	5975da	6045da				
1515	1600	m	Seychelles, FEBA Radio	11600as					
1530	1600		Australia, Radio	5995va	9475as	9580va	11650va	11660as	
1530	1600		Austria, AWR Europe	7165eu	17660as				
1530	1600		Austria, R Austria International	6155eu	13730eu	17865na			
1530	1600	vi	Botswana, Radio	3356da	4820da	7255da			
1530	1600		Georgia, Georgian Radio	6180me					
1530	1600		Iran, Voice of Islamic Rep. of Iran	7245as	9635as	11775na			
1530	1600	mtwhf	S Africa, World Beacon	6145af					
1530	1600	as	Seychelles, FEBA Radio	11600as					
1530	1600		UK, BBC World Service	5975as	6190af	6195as	9740as	9815as	
				11940af	12095eu	15310as	15400af	15420af	15485eu
				17830af	17840am	21470af	21660af		
1550	1600		Vatican City, Vatican Radio	12065au	13765au	15235au			

1600 UTC - 12PM E / 11AM C / 9AM P

1600	1610		Vatican City, Vatican Radio	12065au	13765au	15235au			
1600	1615		Pakistan, Radio	11570me	15100af	15725af	17720af		
1600	1625		Netherlands, Radio	9890as	11835as	12075as	15220na		
1600	1627		Czech Rep, Radio Prague Intl	5930eu	21745af				
1600	1630		Iran, Voice of Islamic Rep. of Iran	7245as	9635as	11775as			
1600	1630		Israel, Kol Israel	15615va	17545va	21670va			
1600	1630		Jordan, Radio	11690na	17680af			</	

Shortwave Guide



1900 UTC - 3PM E / 2PM C / 12PM P

1800	1830		UK, BBC World Service	3255af	5975as	6190af	6190eu	6195eu	
			9410eu 9510as	12095eu	15400af	15420af	15575me	17830af	
			21470af						
1800	1830	mtwh	UK, Merlin Network One	11590as					
1800	1830		UK, Merlin Network One	11540as					
1800	1830	f	UK, Merlin Network One	11535as					
1800	1830		UK, RTE Radio	15315me					
1800	1858		Yemen, Rep of Yemen Radio	9780me					
1800	1859		Canada, R Canada International	13690af	15470af	17820af	21570af		
1800	1900		Anguilla, Caribbean Beacon	11775om					
1800	1900	mtwhf	Argentina, RAE	15345eu					
1800	1900	vl	Australia, ABC/Alice Springs	2310do					
1800	1900	vl	Australia, ABC/Katherine	2485do					
1800	1900	vl	Australia, ABC/Tennant Creek	2325do					
1800	1900		Australia, Radio	6080pa	9475as	9580va	9815pa		
			11880va						
1800	1900		Bangladesh, Bangla Betar	7185eu	9550eu	15520eu			
1800	1900	vl	Botswana, Radio	3356do	4820do				
1800	1900		Canada, CBC Northern Service	9625do					
1800	1900		Canada, CFRX Toronto ON	6070do					
1800	1900		Canada, CFPV Calgary AB	6030do					
1800	1900		Canada, CHNX Halifax, NS	6130do					
1800	1900		Canada, CKZN St John's NF	6160do					
1800	1900		Canada, CKZU Vancouver BC	6160do					
1800	1900		Costa Rica, R for Peace Intl	15050va	21815usb				
1800	1900		Costa Rica, University Network	5030am	6150om	7375am	9724sa		
			11870om 13749na	17645as					
1800	1900	mtwhf	Eat Guinea, Radio Africa	15185af					
1800	1900	a/monthly	Finland, Scandv Weekend Radio	6170va	11720va				
1800	1900		Germany, Deutsche Welle	6140eu					
1800	1900		Germany, Unt Methodist Church	13820af	15485af				
1800	1900		Germany, Voice of Hope 9495eu						
1800	1900	vl	Ghana, Ghana BC Corp	3366do	4915do				
1800	1900	s	Greece, Voice of	9420eu	15630eu	17705na			
1800	1900		Guyana, Voice of	5949do					
1800	1900		India, All India Radio	7410as	9950as	11935as	13750af	13790af	
			15155af 17670af						
1800	1900	vl	Italy, Italian Radio Relay Service	3985va					
1800	1900		Kenya, Kenya BC Corp	4885irr	4915irr				
1800	1900		Kuwait, Radio	11990va					
1800	1900	vl	Lesotho, Radio	4800do					
1800	1900		Liberia, ELWA	4760do					
1800	1900		Liberia, R Liberia International	5100do					
1800	1900		Namibia, Namibion BC Corp	3270af	3289af				
1800	1900		New Zealand, R New Zealand Int	15160pa					
1800	1900	vl	New Zealand, ZLX	3935do					
1800	1900		Nigeria, Radio/Enugu	6025do					
1800	1900	vl	Nigeria, Radio/Ibadan	6050do					
1800	1900	vl	Nigeria, Radio/Lagos	3326do	6090do	7275do	9570do		
1800	1900		Philippines, Radyo Pilipinas	11720pa	15190pa	17720pa			
1800	1900		Russia, Voice of Russia WS	7300eu	7310eu	7420eu	9480eu		
			9745af 9775e	9820eu	9890eu	11510af	11695me	11980af	
1800	1900	m	S Africa, Amateur Radio League	3215af					
1800	1900	as	S Africa, Radio Lufonia	3345af					
1800	1900		S Africa, World Beacon	3230af	9675af	17665af			
1800	1900		Sierra Leone, Sierra Leone BS	3316do					
1800	1900		Sri Lanka, Sri Lanka BC Corp	3316irr					
1800	1900		Swaziland, Trans World Radio	3200af	9500af				
1800	1900		Taiwan, Radio Taipei International	3955eu					
1800	1900		Uganda, Radio	7196do					
1800	1900		UK, World Beacon	15585af	17665af				
1800	1900		USA, Armed Forces Radio	4278va	4319va	4993va	5765va		
			6350va 6458va	6847va	10320va	10940va	12579va	12689va	
			13254va 13362va	16847va					
1800	1900		USA, KAIJ Dallas TX	13815va					
1800	1900		USA, KJES Vado NM	15385ua					
1800	1900		USA, KTBN Salt Lake City UT	15590na					
1800	1900		USA, KWHR Naalehu HI	17510as					
1800	1900		USA, Voice of America	6035af	7415af	9760af	9770me	11975af	
			15410af 15580af	17895af					
1800	1900	mtwhfa	USA, WBQC Monticello ME	17494na					
1800	1900		USA, WEWN Birmingham AL	11875na	13615na	15745eu			
1800	1900		USA, WHRA Greenbush ME	17650af					
1800	1900		USA, WHRI Noblesville IN	9495om	13760va				
1800	1900		USA, WINB Red Lion PA	13570om					
1800	1900		USA, WJCR Upton KY	7490am					
1800	1900		USA, WMLK Bethel PA	15265eu					
1800	1900	mtwhf	USA, WRMI Miami FL	15724na					
1800	1900		USA, WRNO New Orleans LA	7395am	15420af				
1800	1900		USA, WSHB Cypress Crk SC	15665va	18910af				
1800	1900		USA, WTJC Newport NC	9370na					
1800	1900		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na		
1800	1900		USA, WWFV McCaysville GA	12172va					
1800	1900		USA, WYFR Okeechobee FL	18980eu					
1800	1900		Zambia, Christian Voice 4965do						
1800	1900	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do				
1815	1845	s	S Africa, Radio Lufonia	7155af					
1830	1855		Greece, Voice of	11645eu					
1830	1900		Ascension Island, RTE Radio	21630af					
1830	1900		Austria, R Austria International	5945eu	6155eu				
1830	1900	vl	Cameroon, CRTV Radio Bueo	6005do					
1830	1900		Canada, RTE Radio	13640na					
1830	1900		Georgia, Georgian Radio	11760eu					
1830	1900		Netherlands, Radio	6020af	7120af	9895af	11655af	13700af	
			17605af 21590af						
1830	1900		Slovakia, R Slovakia International	5920eu	6055eu	7345eu			
1830	1900		Turkey, Voice of	9730as	9785eu				
1830	1900		UK, BBC World Service	3255af	6005af	6190af	6195eu	9410eu	
			9630af 12095as	15400af	15400af	15575me	17830af	21470af	
1830	1900	os	USA, Voice of America	11690af	13730af	15525af			
1830	1900		Yugoslavia, Radio	6100eu					
1845	1900		Albania, R Tirana International	7210eu	9510eu				
1845	1900		Congo, RTV Congolaise 4765af	5985af					
1900	1915		Congo, RTV Congolaise	4765do	5985af				
1900	1927		Vietnam, Voice of	9730eu	11630af	13740eu			
1900	1930		Hungary, Radio Budapest	7130eu					
1900	1930		Israel, Kol Israel	9435va	11605va	15615va	15640af	17545va	
1900	1930		Philippines, Radyo Pilipinas	11720pa	15190pa	17720pa			
1900	1930		Switzerland, Swiss R International	6110eu					
1900	1930		Turkey, Voice of	9730as	9785eu				
1900	1945		Germany, Deutsche Welle	11805af	11965af	13720af	15390af		
			17810af						
1900	1945		India, All India Radio	7410as	9950as	11935as	13750af	13790af	
			15155af 17670af						
1900	1956		North Korea, Voice of Korea	9335na	11710na	13760na	4405va	6574na	6595na
1900	2000		Anguilla, Caribbean Beacon	11775om					
1900	2000	vl	Australia, ABC/Katherine	2485do					
1900	2000	vl	Australia, ABC/Tennant Creek	2325do					
1900	2000		Australia, Radio	6080pa	7240va	9500as	9580va	9815pa	
			11880va						
1900	2000	vl	Botswana, Radio	3356do	4820do				
1900	2000		Bulgaria, Radio	11900eu					
1900	2000		Canada, CFRX Toronto ON	6070do					
1900	2000		Canada, CFPV Calgary AB	6030do					
1900	2000		Canada, CHNX Halifax, NS	6130do					
1900	2000		Canada, CKZN St John's NF	6160do					
1900	2000		Canada, CKZU Vancouver BC	6160do					
1900	2000		Canada, CBC Northern Service	9625do					
1900	2000		China, China Radio International	6165af	9440of	9585af			
1900	2000		Costa Rica, R for Peace Intl	15050va	21815usb				
1900	2000		Costa Rica, University Network	5030am	6150om	7375am	9724sa		
			11870om 13749na	17645as					
1900	2000		Ecuador, HCJB	17660eu					
1900	2000	mtwhf	Eat Guinea, Radio Africa	15185af					
1900	2000	a/monthly	Finland, Scandv Weekend Radio	6170va	11690va				
1900	2000		Germany, Voice of Hope 7290eu	15750as					
1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do				
1900	2000	vl	Italy, Italian Radio Relay Service	3985va					
1900	2000		Kenya, Kenya BC Corp	4885irr	4915irr				
1900	2000		Kuwait, Radio	11990va					
1900	2000	vl	Lesotho, Radio	4800do					
1900	2000		Liberia, ELWA	4760do					

Shortwave Guide



1930	2000	Sweden, Radio	6065eu				
1930	2000	Switzerland, Swiss R International	13770af	15220af	17580af	17735of	
1935	1955	Italy, RAI International	9750eu				
1940	2000	mtwhfa Armenia, Voice of	9960eu				
1950	1950	Vatican City, Vatican Radio	4005eu	5885eu	7250eu	9645eu	

2000 UTC - 4PM E / 3PM C / 1PM P

2000	2010	Vatican City, Vatican Radio	4005eu	5885eu	7250eu	9645eu	
2000	2015	Swaziland, Trans World Radio	3200af				
2000	2025	Netherlands, Radio	7120af	9895af	11655af	13700af	
2000	2025	Poland, Radio Polonia	6035eu	7185eu	7265eu	9525eu	
2000	2027	Czech Rep, Radio Prague Intl	5930eu	5930eu	11600ou		
2000	2030	Ecuador, HCJB	17660eu				
2000	2030	Iran, Voice of Islamic Rep. of Iran	9022eu	11670eu	13730eu		
2000	2030	Mongolia, Voice of	12015eu				
2000	2030	Switzerland, Swiss R International	13770af	15220af	17580af	13660af	
2000	2030	USA, Voice of America	4950af	6035af	6095af	7375af	7415af
2000	2045	Germany, Deutsche Welle	7130eu	7157irr	9684irr	11785irr	
2000	2045	Iraq, Radio Iraq International	5995eu	11690eu	15325eu	17870eu	
2000	2059	Canada, R Canada International	21570eu				
2000	2100	Algeria, R Algiers International	11715eu	11750eu	15160vo		
2000	2100	Anguilla, Caribbean Beacon	11775am				
2000	2100	vi Australia, ABC/Alice Springs	2310do				
2000	2100	vi Australia, ABC/Katherine	2485do				
2000	2100	vi Australia, ABC/Tennant Creek	2325do				
2000	2100	vi Australia, Radio	9500as	9580vo	11880vo	12080vo	
2000	2100	vi Botswana, Radio	3356co	4820do			
2000	2100	Canada, CBC Northern Service	9625do				
2000	2100	Canada, CFRX Toronto ON	6070do				
2000	2100	Canada, CFVP Calgary AB	6030do				
2000	2100	Canada, CHNX Halifax, NS	6130do				
2000	2100	Canada, CKZN St John's NF	6160do				
2000	2100	Canada, CKZU Vancouver BC	6160do				
2000	2100	China China Radio International	5965eu	9440af	9840eu	11735of	
2000	2100	Costa Rica, R for Peace Intl	15050vo	21815usb			
2000	2100	Costa Rica, University Network	5030am	6150am	7375am	9724so	
2000	2100	mtwhf Eqt Guinea, Radio Africa	15185af				
2000	2100	a/monthly Finland, Scandv Weekend Radio	6170vo	11690vo			
2000	2100	vi Germany, Voice of Hope 7290eu	15750as				
2000	2100	vi Ghana, Ghana BC Corp	3366do	4915do			
2000	2100	Indonesia, Voice of	9525eu	11784eu	15149eu		
2000	2100	vi Italy, Italian Radio Relay Service	3985vo				
2000	2100	Kenya, Kenya BC Corp	4885irr	4915irr			
2000	2100	Kuwait, Radio	11990vo				
2000	2100	vi Lesotho, Radio	4800do				
2000	2100	Liberia, ELWA	4760do				
2000	2100	Liberia, R Liberia International	5100do				
2000	2100	Namibia, Namibian BC Corp	3270af	3289af			
2000	2100	New Zealand, R New Zealand Int	15160pa				
2000	2100	New Zealand, ZLXA	3935do	7290do			
2000	2100	vi Nigeria, Radio/Enugu	6025do				
2000	2100	vi Nigeria, Radio/Ibadan	6050do				
2000	2100	vi Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
2000	2100	vi Nigeria, Radio/Lagos	3326do	4990do			
2000	2100	Nigeria, Voice of	7255af	11770af	15120na		
2000	2100	Papua New Guinea, NBC	4890do				
2000	2100	Russia, Voice of Russia WS	7500eu	7420eu	9775eu	9820eu	
2000	2100	Russia, World Beacon	7360eu				
2000	2100	S Africa, World Beacon	3230af	9675af	11640af	15465eu	
2000	2100	vi Solomon Islands, SIBC	5020do				
2000	2100	mtwhf Spain, R Exterior Espana	9595af	15290eu			
2000	2100	vi Sri Lanka, Sri Lanka BC Corp	12085eu	13610eu			
2000	2100	Syria, Radio Damascus	7196do				
2000	2100	Uganda, Radio	7196do				
2000	2100	UK, BBC World Service	3255af	6005af	6190af	6195eu	9=10eu
2000	2100	UK, World Beacon	7420af	9675af	17830af		
2000	2100	USA, Armed Forces Radio	6350vo	6458vo	6847vo	10320vo	10940vo
2000	2100	USA, KAIJ Dallas TX	13815vo				
2000	2100	USA, KJES Vado NM	15385na				
2000	2100	USA, KTBN Salt Lake City UT	15590na				
2000	2100	USA, KWHR Naalehu HI	17510as				
2000	2100	USA, WBCQ Monticello ME	7415na				
2000	2100	USA, WBCQ Monticello ME	1749na				
2000	2100	USA, WEWN Birmingham AL	11875na	13615na	15745eu		
2000	2100	USA, WHRA Greenbush ME	17650af				
2000	2100	USA, WHRI Nablesville IN	5745vo	9495am			
2000	2100	USA, WINB Red Lion PA	13570am				
2000	2100	USA, WJCR Upton KY	7490am	13595as			
2000	2100	USA, WMLK Bethel PA	15265eu				
2000	2100	smtwhf USA, WRMI Miami FL	15724na	7395am	15420af		
2000	2100	USA, WRNO New Orleans LA					
2000	2100	USA, WTJC Newport NC	9370na				
2000	2100	USA, WWCN Nashville TN	9475na	12160na	13845na	15685na	
2000	2100	USA, WWFV McCoysville GA	12172vo				
2000	2100	USA, WYFR Okeechobee FL	17725af	17845af	18980eu		
2000	2100	vi Vanuatu, Radio	3945do	4960do			
2000	2100	Zambia, Christian Voice	4965do				
2000	2100	vi Zimbabwe, Zimbabwe BC Corp	4828do	6045do			
2000	2100	USA, WSHB Cypress Crk SC	15665vo	18910af			
2010	2030	Vatican City, Vatican Radio	9660af	11625af	13765af		

2025	2045	Italy, RAI International	7125af	9635af	11800af		
2030	2045	vi Libya, Voice of Africa	11815af	15435af	17725af		
2030	2045	Thailand, Radio	9680eu				
2030	2057	Vietnam, Voice of	9730eu	11630af	13740af		
2030	2100	Australia, Christian Voice	9865po	11840as			
2030	2100	th Belarus, R Belarus International	7105eu	7210eu			
2030	2100	Cuba, Radio Havana	13660usb	13750eu			
2030	2100	Ecuador, HCJB	17660eu	21455usb			
2030	2100	Egypt, Radio Cairo	15375af				
2030	2100	S Africa, Adv World Radio Africa	9745af				
2030	2100	Turkey, Voice of	7170as				
2030	2100	f UK, Wales Radio Intl/Merlin	7325eu				
2030	2100	USA, Voice of America	6035af	6095me	7375af	7415af	9760af
2030	2100	9770af	11975af	15410af	15445af	15580af	17745af
2030	2100	os USA, Voice of America	4950af				
2030	2100	Uzbekistan, Radio Tashkent	9540eu	9545eu	9910eu	9950eu	
2045	2100	India, All India Radio	7150eu	7410eu	9650eu		
			11620ou	11715au			

2100 UTC - 5PM E / 4PM C / 2PM P

2100	2110	Kenya, Kenya BC Corp	4885irr	4915irr			
2100	2115	Egypt, Radio Cairo	15375af				
2100	2130	vi Australia, ABC/Alice Springs	2310do				
2100	2130	vi Australia, ABC/Katherine	2485do				
2100	2130	vi Australia, ABC/Tennant Creek	2325do				
2100	2130	vi Australia, Christian Voice	9865po	11840as			
2100	2130	Australia, Radio	7240vo	9500as	9580vo	9660po	11880vo
			12080vo	17715vo	21740vo		
2100	2130	Austria, AWR Europe	15165af				
2100	2130	China China Radio International	5965eu	9840eu	11735af	13640af	
2100	2130	Cuba, Radio Havana	13660usb	13750eu			
2100	2130	South Korea, R Korea Intl	3975eu	15575eu			
2100	2130	Turkey, Voice of	7170as				
2100	2130	UK, BBC World Service	3255af	3915as	5965as	6005af	6190af
			6195vo	9410eu	11835af	11945as	12095as
2100	2130	os UK, BBC World Service	5975am	3915as			
2100	2130	Yugoslavia, Radio	6100eu				
2100	2145	Germany, Deutsche Welle	9670po	9765po	9875af	11865af	
			11915po	15135af			
2100	2145	USA, WYFR Okeechobee FL	13855af	15120af	17845af	18980eu	
2100	2156	Romania, R Romania International	9725eu	11740eu	11940eu	15365eu	
2100	2200	Angola, R Nacional de Angola	3374vo	4950vo	7245vo		
2100	2200	Anguilla, Caribbean Beacon	11775am				
2100	2200	vi Botswana, Radio	3356do	4820do			
2100	2200	Bulgaria, Radio	11990eu				
2100	2200	Canada, CBC Northern Service	9625do				
2100	2200	Canada, CFRX Toronto ON	6070do				
2100	2200	Canada, CFVP Calgary AB	6030do				
2100	2200	Canada, CHNX Halifax, NS	6130do				
2100	2200	Canada, CKZN St John's NF	6160do				
2100	2200	Canada, CKZU Vancouver BC	6160do				
2100	2200	Costa Rica, R for Peace Intl	15050vo	21815usb			
2100	2200	Costa Rica, University Network	5030am	6150am	7375am	9724so	
			11870am	13749na	17645as		
2100	2200	Ecuador, HCJB	17660eu	21455usb			
2100	2200	mtwhf Eqt Guinea, Radio Africa	15185af				
2100	2200	f/monthly Finland, Scandv Weekend Radio	6170vo	11720vo			
2100	2200	vi Ghana, Ghana BC Corp	3366do	4915do			
2100	2200	India, All India Radio	7150eu	7410eu	9650eu	9910eu	9950eu
			11620ou	11715au			
2100	2200	vi Italy, Italian Radio Relay Service	3985vo				
2100	2200	Japan, Radio	6035po	6055eu	6180eu	11830eu	11855af
			17825na	17860pa	21670po		
2100	2200	vi Lesotho, Radio	4800do				
2100	2200	Liberia, ELWA	4760do				
2100	2200	Liberia, R Liberia International	5100do				
2100	2200	Namibia, Namibian BC Corp	3270af	3289af			
2100	2200	New Zealand, R New Zealand Int	15160pa				
2100	2200	New Zealand, ZLXA	3935do	7290do			
2100	2200	vi Nigeria, Radio/Enugu	6025do				
2100	2200	vi Nigeria, Radio/Ibadan					

Shortwave Guide



2100	2200	USA, WRNO New Orleans LA	7395am	15420af			
2100	2200	USA, WSHB Cypress Crk SC	15665va	18910af			
2100	2200	USA, WTJC Newport NC 9370na					
2100	2200	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na	
2100	2200	USA, WWFV McCaysville GA	12172va				
2100	2200	USA, WYFR Okeechobee FL	17725af				
2100	2200	Vanuatu, Radio	3945do				
2100	2200	Zambia, Christian Voice 4965do					
2100	2200	Zimbabwe, Zimbabwe BC Corp	4828do	6045do			
2115	2130	UK, BBC Caribbean Report	5975ca	11675ca	15390ca		
2115	2200	Egypt, Radio Cairo	9990eu				
2120	2200	Greece, Voice of	9425au				
2130	2145	UK, BBC Calling Falklands	11680sa				
2130	2157	Czech Rep, Radio Prague Intl	11600au	15545af			
2130	2200	Albania, R Tirana International	7130eu	9540eu			
2130	2200	Australia, ABC/Alice Springs	4835do				
2130	2200	Australia, ABC/Katherine	5025do				
2130	2200	Australia, ABC/Tennant Creek	4910do				
2130	2200	Australia, Christian Voice	9725sa	11840as			
2130	2200	Australia, Radio	7240va	9660pa	12080pa	17715va	
2130	2200	Austria, R Austria International	5945eu	6155eu			
2130	2200	Guam, KSDA/ Adventist World R	11980as	15240as			
2130	2200	Hungary, Radio Budapest	3975eu				
2130	2200	Iran, Voice of Islamic Rep of Iran	9570as	13745as			
2130	2200	South Korea, R Korea Intl	15575eu				
2130	2200	Sweden, Radio	6065eu	15255as			
2130	2200	UK, BBC World Service	3255af	3915as	5965as	5975am	6005af
2130	2200	6190af 6195va 9410eu	11835af	11945as	12095sa	15400af	
2130	2200	Uzbekistan, Radio Tashkent	7105eu	9540eu			
2145	2200	USA, WYFR Okeechobee FL	13855af	15120af	17845af		

2200 UTC - 6PM E / 5PM C / 3PM P

2200	2215	New Zealand, R New Zealand Int	15160pa				
2200	2220	Greece, Voice of	9425au	15650au			
2200	2230	Canada, R Canada International	9755am	13670am	17695am		
2200	2230	Canada, R Canada International	15305am	17880am			
2200	2230	Canada, R Canada International	9755am	13670am	17695am		
2200	2230	India, All India Radio	7150au	7410eu	9650eu	9910au	9950eu
2200	2230	11620au 11715au					
2200	2230	Iran, Voice of Islamic Rep of Iran	9570as	13745as			
2200	2230	Mexico, R Mexico International	9705am	11770am			
2200	2230	Papua New Guinea, NBC	4890do				
2200	2230	USA, Voice of America	5855af	6035af	7375af	7415af	11975af
2200	2230	Yugoslavia, Radio	7230au				
2200	2245	Egypt, Radio Cairo	9990eu				
2200	2245	USA, WYFR Okeechobee FL	11740na	15120af	17725af	17845af	
2200	2300	Anguilla, Caribbean Beacon	6090am				
2200	2300	Australia, ABC/Alice Springs	4835do				
2200	2300	Australia, ABC/Katherine	5025do				
2200	2300	Australia, ABC/Tennant Creek	4910do				
2200	2300	Australia, Christian Voice	17850as				
2200	2300	Australia, Radio	11880as	15240as	17715va	17795va	21740va
2200	2300	Canada, CBC Northern Service	9625do				
2200	2300	Canada, CFRX Toronto ON	6070do				
2200	2300	Canada, CFVP Calgary AB	6030do				
2200	2300	Canada, CHNX Halifax, NS	6130do				
2200	2300	Canada, CKZN St John's NF	6160do				
2200	2300	Canada, CKZU Vancouver BC	6160do				
2200	2300	China China Radio International	7170eu				
2200	2300	Costa Rica, R for Peace Intl	15050va	21815usb			
2200	2300	Costa Rica, University Network	5030am	6150am	7375am	9724sa	
2200	2300	11870am 13749na 17645as					
2200	2300	Eat Guinea, Radio Africa	15185af				
2200	2300	Finland, Scandy Weekend Radio	5990va	11720va			
2200	2300	Ghana, Ghana BC Corp	3366do	4915do			
2200	2300	Italy, Italian Radio Relay Service	3985va				
2200	2300	Malaysia, Radio	7295do				
2200	2300	Namibia, Namibian BC Corp	3270af	3289af			
2200	2300	Netherlands, Radio	6175na	9590na			
2200	2300	New Zealand, ZLXA	3935do	7290do			
2200	2300	Nigeria, Radio/Enugu	6025do				
2200	2300	Nigeria, Radio/Ibadan	6050do				
2200	2300	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
2200	2300	Nigeria, Radio/Lagos	3326do	4990do			
2200	2300	Nigeria, Voice of	7255af	11770af	15120na		
2200	2300	Solomon Islands, SIBC	5020do	9545do			
2200	2300	Sri Lanka, Sri Lanka BC Corp	4940irr				
2200	2300	Taiwan, Radio Taipei International	11565eu	15600eu			
2200	2300	Turkey, Voice of	7190va	11845va			
2200	2300	UK, BBC World Service	5965as	5975am	6195na	7105as	9660as
2200	2300	11835af 11955as	15400af				
2200	2300	USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
2200	2300	6350va 6458va 6847va	10320va	10940va	12579va	12689va	
2200	2300	13254va 13362va 16847va					
2200	2300	USA, KAU Dallas TX	13815va				
2200	2300	USA, KTBN Salt Lake City UT	15590na				
2200	2300	USA, KWHR Naalehu HI 17510as					
2200	2300	USA, Voice of America	7215as	9705as	9770as	11760as	15185as
2200	2300	15290as 15305as 17740as	17820as				
2200	2300	USA, WBCQ Monticello ME	7415na	9330na			
2200	2300	USA, WBCQ Monticello ME	9330na	17494na			
2200	2300	USA, WEWN Birmingham AL	9385na	9975eu	13615na		
2200	2300	USA, WHRA Greenbush ME	7580eu				
2200	2300	USA, WHRI Noblesville IN	5745va	9495am			
2200	2300	USA, WINB Red Lion PA 13570am					
2200	2300	USA, WJCR Upton KY 7490am	13595as				
2200	2300	USA, WRMI Miami FL 9955am					
2200	2300	USA, WRNO New Orleans LA	7395am	15420af			
2200	2300	USA, WSHB Cypress Crk SC	13770eu	15285sa			
2200	2300	USA, WTJC Newport NC 9370na					

2200	2300	USA, WWCR Nashville TN	7435na	9475na	12160na	13845na	
2200	2300	USA, WWFV McCaysville GA	5085va	12172va			
2200	2300	Vanuatu, Radio	3945do	4960do	7260do		
2200	2300	Zambia, Christian Voice 4965do					
2200	2359	Liberia, R Liberia International		5100do			
2205	2230	Italy, RAI International	9675as	11900as	15265as		
2216	2300	New Zealand, R New Zealand Int	17675pa				
2230	2257	Czech Rep, Radio Prague Intl	11600na	15445na			
2230	2300	Belgium, RVI Flanders R Intl	15565na				
2230	2300	Canada, R Canada International	9755am	13670am	17695am		
2230	2300	Cuba, Radio Havana	9550am				
2230	2300	Papua New Guinea, NBC	4890do	11880irr			
2245	2300	India, All India Radio	9705as	9950as	11620as	13605as	
2245	2300	USA, WYFR Okeechobee FL	11740na				

2300 UTC - 7PM E / 6PM C / 4PM P

2300	0000	Anguilla, Caribbean Beacon	6090am				
2300	0000	Australia, ABC/Alice Springs	4835do				
2300	0000	Australia, ABC/Katherine	5025do				
2300	0000	Australia, ABC/Tennant Creek	4910do				
2300	0000	Bulgaria, Radio	11700na				
2300	0000	Cameroon, CRTV Radio Buea	6005do				
2300	0000	Canada, CBC Northern Service	9625do				
2300	0000	Canada, CFRX Toronto ON	6070do				
2300	0000	Canada, CFVP Calgary AB	6030do				
2300	0000	Canada, CHNX Halifax, NS	6130do				
2300	0000	Canada, CKZN St John's NF	6160do				
2300	0000	Canada, CKZU Vancouver BC	6160do				
2300	0000	China China Radio International	5990na				
2300	0000	Costa Rica, R for Peace Intl	15050va	21815usb			
2300	0000	Costa Rica, University Network	5030am	6150am	7375am	9925sa	
2300	0000	11870am 13749na 17645as					
2300	0000	Ecuador, HCJB	17660as				
2300	0000	Egypt, Radio Cairo	9900am				
2300	0000	Finland, Scandy Weekend Radio	5990va	11720va			
2300	0000	Ghana, Ghana BC Corp	3366do	4915do			
2300	0000	India, All India Radio	9705as	9950as	11620as	13605as	
2300	0000	Liberia, R Liberia International	5100do				
2300	0000	Malaysia, Radio	7295do				
2300	0000	Malaysia, RTM Kota Kinabalu	5980do				
2300	0000	Namibia, Namibian BC Corp	3270af	3289af			
2300	0000	Netherlands, Radio	6175na	9590na			
2300	0000	New Zealand, R New Zealand Int	17675pa				
2300	0000	New Zealand, ZLXA	3935do	7290do			
2300	0000	Papua New Guinea, NBC	4890do	11880irr			
2300	0000	Singapore, SBC Radio One	6150do				
2300	0000	Solomon Islands, SIBC	5020do	9545do			
2300	0000	Sri Lanka, Sri Lanka BC Corp	4940do				
2300	0000	UK, BBC World Service	3915as	5965as	5975am	6035as	6195as
2300	0000	7105as 11945as 11955as	12095sa	15280as			
2300	0000	USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
2300	0000	6350va 6458va 6847va	10320va	10940va	12579va	12689va	
2300	0000	13254va 13362va 16847va					
2300	0000	USA, KAU Dallas TX	13815va				
2300	0000	USA, KTBN Salt Lake City UT	15590na				
2300	0000	USA, KWHR Naalehu HI 17510as					
2300	0000	USA, VOA Special English	7190as	7200as	9545as	11805pa	
2300	0000	11925as 13735as 13775as	15205pa				
2300	0000	USA, Voice of America	7215as	9705as	9770as	11760as	15185as
2300	0000	15290as 15305as 17740as	17820as				
2300	0000	USA, WBCQ Monticello ME	7415na	9330na			
2300	0000	USA, WBCQ Monticello ME	9330na	17494na			
2300	0000	USA, WEWN Birmingham AL	9385na	9975eu	13615na		
2300	0000	USA, WHRA Greenbush ME	7580eu				
2300	0000	USA, WHRI Noblesville IN	5745va	9495am			
2300	0000	USA, WINB Red Lion PA 13570am					
2300	0000	USA, WJCR Upton KY 7490am	13595as				
2300	0000	USA, WRMI Miami FL 9955am					
2300	0000	USA, WRNO New Orleans LA	7395va	15285sa			
2300	0000	USA, WSHB Cypress Crk SC	13770eu				
2300	0000	USA, WTJC Newport NC 9370na					
2300	0000	USA, WWBS Macon GA 11910na					
2300	0000	USA, WWCR Nashville TN	7435na	9475na	12160na	13845na	
2300	0000	USA, WWFV McCaysville GA	5085va	6890va			
2300	0000	Vanuatu, Radio	3945do	4960do	7260do		
2300	0000	Zambia, Christian Voice 4965do					
2300	2305	Nigeria, Radio/Enugu	6025do				
2300	2305	Nigeria, Radio/Ibadan	6050do				
2300	2305	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
2300	2305	Nigeria, Radio/Lagos	3326do	4990do			
2300	2330	Australia, Radio	9660pa	11880as	12080va	15240as	17715va
2300	2330	17795va 21740va					
2300	2330	Canada, R Canada International	6040am	11865am	15305am		
2300	2330	Cuba, Radio Havana					

Notes:

1. Some Radio New Zealand International (RNZI) programs will be heard one hour earlier UTC beginning October 14, when New Zealand shifts to summer time. Seasonal clock changes take place in most of the rest of the world on the last Sunday of the month and this will result in changes to the timing of some stations' transmission and program times. These changes will be reflected in next month's SWG.
2. BBC's stream abbreviations: (am)=Americas; (eu)=Europe/N. Africa; (me)=Middle East, SW Asia, CIS (former Soviet Union); (wcaf)=West and Central Africa; (esaf)=East and Southern Africa; (af)=both (wcaf) and (esaf); (sas)=South Asia; (eas)=East Asia.

0000 UTC - Page 43 Freqs**BBC World Service (am)**

0000 S/M World Briefing, T-A News; 0005 T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Omnibus (documentary), 0020 S/M Sports Roundup; 0030 S Arts in Action, M The World Today, T Music Mix, W UK Top 20, H/A Westway (drama serial), F World of Music; 0045 H UK Album Chart, A Music X-Press.

HCJB, Ecuador

0000 S Did You Hear?, M Hour of Decision, T-A Insight for Living; 0028 T-A Money Minute; 0030 S Saludos Amigos, M Mountain Meditations, T-A A New Beginning; 0056 A Slice of Infinity.

Radio Australia

0000 D News; 0005 S The Europeans, A Feedback (letters/station news); 0010 M AWAYE! (Aboriginal culture), T The Science Show, W The Notional Interest (Australian politics), H Background Briefing (documentary), F Hind-sight (Australian history); 0030 A Country Breakfast (rural life).

Radio Netherlands

0000 S Aural Tapestry (cultural threads), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F Talking It Over (interviews), A A Good Life (global development); 0015 F From Sapphire to Loser (classical music); 0030 S Roughly Speaking (youth culture), M Aural Tapestry, T EuroQuest (Europe in context), W A Good Life, H Dutch Horizons, F Research File, A Documentary.

Radio Japan

0000 D News; 0010 S Hello from Tokyo (listener contact), M Weekend Square; 0015 T-A 44 Minutes (feature magazine).

Radio New Zealand International

0000 S/A RNZ News; M-F Midday Report; 0012 S This Week in Parliament, A Focus on Politics; 0033 S Spectrum (life in NZ), A The Sampler (latest CDs).

Radio for Peace International, Costa Rica

0000 S World of Radio, M Spiritual Awakening, T CounterSpin (media analysis), W Radio Nation ("The Nation" magazine), H Steppin' Out of Babylon, F A Public Affair, A WINGS (women's news); 0030 S RFPI Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary); 0035 T/H/A Earthwatch (ecology); 0040 T/H/A Earth & Sky (astronomy); 0045 T Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

Radio Prague

0000 D News; 0005 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0010 S Saturday Music (classical/folk/jazz), M The Arts; 0015 M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; 0020 W Talking Point, F Economic Report.

Voice of America (News Now)

0000 T-A World News; 0010 T-A Regional News; 0014 T-A USA News; 0018 T-A Sports; 0022 T-A Features; 0030 T-A World News; 0033 T Encounter, W Our World, H Kaleidoscope, F Best of 'Talk to America' A Press Conference USA.

WBCQ, Maine

7415 kHz.: 0000 S A Different Kind of Oldies Show, M Radio New York International, H Idio-Audio, F Radio Detective

(antique radio), A Allan Weiner Worldwide. 9335 kHz.: 0000 S Pagan Poupourri.

WHRI, Indiana

7580 kHz.: 0000 A 20 The Countdown Magazine (from F 2300).

WWCR, Tennessee

5070 kHz.: 0030 F Ken's Country Classics.

0100 UTC - Page 43 Freqs**BBC World Service (am)**

0100 S The World Today, M-A News; 0105 M Wright Around the World (musical variety), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Discovery (science); 0130 S Reporting Religion, T Everywoman, W Focus on Faith, H Pick of the World (BBC's best), F People & Places, A Essential Guide; 0145 S Letter from America (Alistair Cooke comments).

China Radio International

0100 D News; 0110 S Report on Developing Countries, M-F Current Affairs, A Global Review; 0120 S In the Spotlight (cultural magazine), A Listeners' Garden; 0130 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0100 D News; 0105 S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); 0115 S Inside Europe, M Arts on the Air; 0130 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador

0100 D Latin American & World News; 0110 S DX Partyline, M Musical Mailbag, T-A Studio 9 (Latin American regional report); 0130 T Inside HCJB, W Soludos Amigos, H Hom Radio Today, F Woman to Woman, A Musico del Ecuador.

Radio Australia

0100 D News; 0105 S Correspondents' Report, A Asia Pacific (regional current affairs); 0110 M-F Asia Pacific; 0130 S O2 Sounds (new releases), M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A Arts Talk.

Radio Budapest

0100 D News; 0110 S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

Radio Canada International

0100 D News; 0105 S/M Feature (one of those listed below); 0110 T-A Canada Today (current events magazine); 0130 D Feature (one of the following: Conodo and the World, Arts and Culture, Business, Meet the Press, Mailbag). [Further information was unavailable from RCI at print deadline.]

Radio Habana Cuba

0100 D International News; 0110 M Weekly Review, T-S National News; 0115 T-S Viewpoint; 0130 M RHC 40 Years, T-S News Bulletin; 0135 T-A Time Out (sports); 0140 S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; 0150 M Breakthrough (science report).

Radio Netherlands

0100 S/M News, T-A Newslite; 0105 S Europe Unzipped, M Wide Angle (week in review).

Radio New Zealand International

0100 D RNZ News; 0106 S Film Show, M-F Codenza (light classics), A Home Grown (NZ music, including Musical Chairs-artist feature 0130); 0130 S Bookmarks.

Radio for Peace International, Costa Rica

0100 S Making Contact, M Spiritual Awakening, T Disability Radio Worldwide, W World of Radio, H Every Living Thing (nature), F For Right Radio Review, A Continent of Media; 0130 S Alternative Radio (political/social analysis), T Steppin' Out of Babylon, W RFPI Mailbag, A World of Radio.

Radio Prague

0100 D News; 0105 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0110 S Saturday Music (classical/folk/jazz), M The Arts; 0115 M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; 0120 W Talking Point, F Economic Report.

Voice of America (News Now)

0100 T-A World News; 0110 T-A Regional News; 0114 T-A USA News; 0118 T-A Sports; 0122 T-A Features; 0130 T-A World News; 0133 A Communications World; 0136 T-F Dateline (news magazine); 0145 T-F Science; 0149 T-F Business; 0154 T-F Feature.

Voice of Russia

0100 D News; 0111 S News & Views, M Sunday Panorama, T-A Commonwealth Update; 0124 M Russia: People & Events; 0130 D News in Brief; 0132 S Moscow Yesterday & Today, M Timelines, T Folk Box, W Jazz Show, H Musical Portraits of the 20th Century, F Science & Engineering, A Christian Message from Moscow; 0146 F Music At Your Request; 0154 H Russia: People & Events.

Voice of Vietnam

0100 D News; 0105 D Current Affairs; 0110 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0115 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0120 S Music, A Literature and Arts.

WBCQ, Maine

7415 kHz.: 0100 S Marion's Attic (vintage recordings); 9335 kHz.: 0100 S Bedtime Revelation Stories.

WHRI, Indiana

7315 kHz.: 0105 M Music (Christian contemporary and gospel)

WWCR, Tennessee

3215 kHz.: 0105 T-A Golden Age of Radio Theatre. 5070 kHz.: 0130 A New Horizons (science); 0145 S Ask WWCR (letters).

Radio Austria International

0130 D Report from Austria (magazine); 0135 S Week in Review, M Radio E; 0150 S Listener Letters.

RTE, Ireland

0130 S/M Sportsnews; T-A The News at Six.

Voice of America (Special English)

0130 T-A News; 0140 T Agriculture Today, W/H Science Report, F Environment Report, A In the News; 0145 T Science in the News, W Explorations, H Making of a Nation, F American Mosaic; A American Stories.

0200 UTC - Page 43 Freqs**BBC World Service (am)**

0200 D The World Today; 0230 S From Our Own Correspondent, M Assignment, T-A World Business Report; 0245 T/W/F/A Analysis, H From Our Own Correspondent.

BBC World Service (me)

0200 D The World Today; 0230 S From Our Own Correspondent, A Global Business

HCJB, Ecuador

0200 S Ham Radio Today, M Sunday Nite, T Let My People Think, W The Book & the Spode (archaeology), H Adventures in Odyssey (Christian stories for children), F Viewpoint (issues), A Walkin' in the Sunshine (country music); 0215 W Words for Women; 0230 S Just Jazz, T-A Back to the Bible.

Radio Australia

0200 D News; 0205 S Margaret Throsby (interviews and music), A Background Briefing (documentary); 0210 M-F The World Today (ABC Radio flagship news program). [Special service: 0205 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only]

Radio Habana Cuba

0200 D International News; 0210 M From Habana, T-S National News; 0215 T-S Reports and music; 0230 M The Jazz Place, T-S News Bulletin; 0235 S World of Stamps, T-A Reports and music; 0245 S RHC 40 Years; 0250 S Cuban music.



Radio Korea International

0200 D News; 0210 S Seoul Report (week in review), M Korean Pop Interactive (requests), T-A News Commentary; 0215 T-A Seoul Calling (magazine); 0230 S From Us to You (letters), M Multiwave Feedback (letters/DX news), T Exploring the New Millennium, W Cultural Promenade, H Economic Radar, F Korea & Its Splendors, A Notes of Nostalgia (traditional music).

Radio New Zealand International

0200 D RNZ News; 0205 S Eureka! (science)*, M-F In Touch with New Zealand (music/variety), A Home Grown (from 0106)*; 0230 S Feature program or series*.

[*may be preempted by live sport].

Radio for Peace International, Costa Rica

0200 S Alternative Radio (from 0130), M New Dimensions, T University Forum (interviews), W Continent of Media, H WINGS (women's news), F Russian Ecological Radio Service, A RFPI Mailbag; 0230 S Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W TUC Radio, H Global Community Forum (interviews), F A Woman's Voice, A Disability Radio Worldwide.

Radio Taipei International

0200 D News; 0215 S Great Wall Forum (discussing the mainland), M Jade Bells & Bamboo Pipes (traditional music), T Taiwan Culture, W Taiwan Today, H Journey into Chinese Culture, F Taipei Magazine, A Kaleidoscope (life in Taiwan); 0230 T Trends, W Confucius Confusion, H Life Unusual, F East Meets West (visitors), A Naluwan, 0245 S Mailbag Time, M-A Let's Learn Chinese.

Voice of Russia

0200 D News; 0211 S/M/H Moscow Mailbag, T/F Science & Engineering, W/A Newmarket (business); 0230 D News in Brief; 0232 S Songs from Russia, M This is Russia, T Kaleidoscope (Russian events), W Musical Portraits of the 20th Century, H Moscow Yesterday & Today, F Russian by Radio, A Audio Book Club (Russian lit.); 0246 S You Write to Moscow; 0254 W Russia: People & Events.

WBCQ, Maine

7415 kHz.: 0200 S Magic Radio.
9335 kHz.: 0200 S World of Radio.

WHRI, Indiana

7315 kHz.: 0205 M-A Music (Christian contemporary and gospel).

Radio Budapest

0230 D News; 0240 S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

Radio Sweden

0230 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); 0245 T Sports Scan, W Close Up (profiles of Swedes-1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

Voice of Vietnam

0230 D News; 0235 D Current Affairs; 0240 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0245 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0250 S Music, A Literature and Arts

WWCR, Tennessee

3215 kHz.: 0230 A World of Radio.
5070 kHz.: 0200 S Communications World; 0230 S World of Radio.

0300 UTC - Page 44 Freqs

BBC World Service (am)

0300 S/M World Briefing, T-A News; 0305 T Panel Game or Quiz, W The Alternative (music), H Greenfield Collection (classical music), F Jazzmatazz, A Composer of the Month; 0320 S/M Sports Roundup; 0330 S Science in Action, M Westway Omnibus (drama serial), T Body & Mind (health), W Patterns of Faith, H A Radio

History of the World, F Heart & Soul (religion), A Write On (letters) or From Where I Stand (British views); 0345 T-A Off the Shelf (book readings).

BBC World Service (me)

0300 D World Briefing; 0320 D Sports Roundup; 0330 S Science in Action, M World Business Review, T-A World Business Report; 0345 M Write On or From Where I Stand (British views), T/W/F/A Analysis, H From Our Own Correspondent.

BBC World Service (esaf)(wcaf)

0300 D World Briefing; 0320 D Sports Roundup; 0330 S Postmark Africa, M-F Network Africa, A Africon Quiz or This Week And Africa.

BBC World Service (sas)

0300 S World Briefing, M-A News; 0305 M Talking Point, T-A Outlook; 0320 S Sports Roundup; 0330 S Science in Action; 0345 M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

Channel Africa

0300 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0300 D News; 0310 S Report on Developing Countries, M-F Current Affairs, A Global Review; 0320 S In the Spotlight (cultural magazine), A Listeners' Garden; 0330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0300 D News; 0305 S Saturday Review, M Sunday Review, T-A Newslink (European current affairs); 0315 S Spectrum (sci/tech), M Arts on the Air; 0330 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador

0300 S Rock Solid, M The Sower, T-A Hope for the Heart; 0313 T-A Getting the Message; 0315 M The Word Today, T-A Rendezvous (inspirational music); 0330 M Renewing Your Mind, T Unshackled (radio's oldest drama series), W Science, Scripture and Salvation, H The Living Word, F Otaochimov, A Inspirational Classics (liturgical music); 0345 W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

Radio Australia

0300 D News; 0305 S Feedback (letters/station news), A Rural Reporter; 0310 M-F Regional Sports Report; 0320 M-F Pacific Focus (M business, T health, W environment, H sport, F culture); 0330 S Ockham's Razor (a science issue), A Educational series; 0340 M Oz Music Show (rock), T Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal), H Australian Country Style, F Jazz Notes.

[Special service: 0305 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0300 D International News; 0310 M Weekly Review, T-S National News; 0315 T-S Viewpoint; 0330 M RHC 40 Years, T-S News Bulletin; 0335 T-A Time Out (sports); 0340 S/W DXers Unlimited, M/H Mailbag Show, T/F Caribbean Outlook, A Weekly Review; 0350 M Breakthrough (science report).

Radio New Zealand International

0300 S/A RNZ News*, M-F Pacific Regional News; 0305 S Maori feature*, A Music feature*; 0308 M Tagata o te Moana (Pacific culture), T Top 5, W Pacific Report, H Mailbox (letters & DX news) or RNZI Talk (meet the RNZI staff), F Dateline Pacific; 0330 T New Releases, W Tradewinds, H The World in Sport, F Pacific Correspondent; 0335 S World of Music (BBC). [*may be preempted by live sport].

Radio for Peace International, Costa Rica

0300 S Far Right Radio Review (from 0230), M Voices of Our World (Maryknoll program), T Honoring Mother Earth: Indigenous Voices (from 0230), W Living Enrichment Center, H Global Community Forum (from 0230), F A Woman's Voice (from 0230), A Earthspan (War & Peace Foundation news & comment); 0330 S Blickwinkel (in German), M Perspective (UN program), T In the Moment, W Peace Forum, H Scope (UN program), F Tropi-

cal Conservation Newshour (rainforests), A Newmaier Report; 0345 S/M Hightower Report (commentary), T-A UN Today; 0350 S/M Earthwatch (ecology); 0355 S/M Earth & Sky (astronomy).

Radio Prague

0300 D News; 0305 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0310 S Saturday Music (classical/folk/jazz), M The Arts; 0315 M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; 0320 W Talking Point, F Economic Report.

Radio Taipei International

0300 D News; 0315 S Great Wall Forum, M Taiwan Economic Journal, T Taiwan Culture, W Taiwan Today, H Soundbite, F New Music Lounge, A Kaleidoscope; 0330 M People, T Trends, W Confucius Confusion, H Life Unusual, F Business Chinese, A Mailbag Time; 0345 S Asia Pacific, M-A Let's Learn Chinese.

Voice of Russia

0300 D News; 0311 M Sunday Panorama, T-S News & Views; 0324 M Russia: People & Events; 0330 D News in Brief; 0332 S Kaleidoscope (Russian events), M Audio Book Club (Russian lit.), T/H/A 20th Century: Footprints in History, W/F Russian history/culture.

WBCQ, Maine

7415 kHz.: 0300 S The Big Kaboom.

WHRI, Indiana

5745 kHz.: 0300 S DXing with Cumbre, M Joe 2K; 0330 S Joe 2K.

7315 kHz.: 0305 S/M 20, The Countdown Magazine (Christian rock music charts)

7580 kHz.: 0305 M-A Music (Christian contemporary and gospel); 0335 S Music (Christian contemporary and gospel)

WWCR Tennessee

3215 kHz.: 0305 M America's Greatest Heroes; 0310 M Profiles.

5070 kHz.: 0300 A Spectrum (communications discussion); 0330 M The Old Record Shop (vintage recordings).

Radio Sweden

0330 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); 0345 T Sports Scan, W Close Up (profiles of Swedes-1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

Voice of Vietnam

0330 D News; 0335 D Current Affairs; 0340 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0345 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0350 S Music, A Literature and Arts.

0400 UTC - Page 44 Freqs

BBC World Service (am)

0400 D The World Today; 0430 S Global Business, A Assignment; 0450 M-F Sports Roundup.

BBC World Service (eu)

0400 D The World Today; 0430 S Global Business, A Weekend; 0450 M-F Sports Roundup.

BBC World Service (me)

0400 D The World Today; 0430 S In Praise of God, A Assignment; 0450 M-F Sports Roundup.

BBC World Service (esaf)

0400 D The World Today; 0430 S The Story of Africa, M-F Network Africa, A Talkabout Africa.

BBC World Service (wcaf)

0400 D The World Today; 0430 S The Story of Africa, M-F Network Africa, A Talkabout Africa.

BBC World Service (sas)

0400 S/A The World Today, M-F News; 0405 M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H

Shortwave Guide



Meridian Writing, F Omnibus (documentary); 0430 S In Praise of God, M Music Mix, T UK Top 20, W/F Westway (soap opera), H World of Music, A Assignment; 0445 W UK Album Chart, F Music X-Press.

Channel Africa

0400 S Network Africa (week in review), M-F Doteline Africa (news magazine), A Channel Africa Sport.

China Radio International

0400 D News; 0410 S Report on Developing Countries, M-F Current Affairs, A Global Review; 0420 S In the Spotlight (cultural magazine), A Listeners' Garden; 0430 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

0400 D Latin American & World News; 0410 S DX Partyline, M Musical Mailbag, T-A Studio 9 (Latin American regional report); 0430 T Inside HCJB, W Saludos Amigos, H Ham Radio Today, F Woman to Woman, A Musica del Ecuador.

Radio Australia

0400 D News; 0405 S/A Pacific Focus (S arts, A environment); 0410 M-F Margaret Throsby (interviews and music); 0430 S Arts Talk, A The Buzz (technology issues).

[Special service: 0405 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0400 D International News; 0410 M From Habana, T-S National News; 0415 T-S Reports and music; 0430 M The Jazz Place, T-S News Bulletin; 0435 S World of Stamps, T-A Reports and music; 0445 S RHC 40 Years; 0450 S Cuban music.

Radio Netherlands

0430 S/M News; T-A Newline; 0435 S Europe Unzipped, M Sincerely Yours (letters); 0455 S Insight (commentary).

Radio New Zealand International

0400 D RNZ News; 0408 S Playhouse (radio theatre), M-F In Touch with New Zealand (from 0205), A Tagata o te Moana (Pacific culture).

Radio for Peace International, Costa Rica

0400 S CounterSpin (media analysis), M Music Medicine, T A Woman's Voice, W A Public Affair, H Alternative Radio (political & social analysis), F This Way Out (gay/lesbian magazine), A Honoring Mother Earth: Indigenous Voices; 0430 S Freespeech Radio News (repeat of Fri. newscast), F Like It Is (African-American issues).

Radio Vlaanderen Internationaal

0400 S Music from Flanders, M Radio World, T-A News; 0404 T-A Belgium Today; 0408 M Tourism in Flanders, T-A Press Review; 0413 T Focus on Europe, W Green Society (ecology), H/A Around the Arts, F Economics; 0414 M Brussels 1043 (letters); 0418 T Sports, H Around Town, F International Report, A Tourism in Flanders; 0424 M-A Soundbox (Flemish rock).

Hauser's Highlights:

OMAN: Radio Oman

Ministry of Information, PO Box 600, 113 Muscat.

Tel: +968-603222. Fax: +968-603812.

Web Site: <http://www.oman-tv.gov.om/>

Arabic:

0000-0100 9760
0100-0200 7235
0200-0300 6085 7235
0300-0400 6085
0400-0600 9515 15355
0600-1000 13640 17630
1000-1400 13640
1400-1500 15375
1500-1800 15140 15375
1800-2000 6190 15355
2000-2200 6085 9735
2200-2300 9735
2300-2400 9760

English:

1400-1500 15140
0300-0400 15355

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Voice of Russia

0400 D News; 0411 S/M Musical Portraits of the 20th Century, T/F Moscow Mailbag, W/A Science and Engineering, H Newmarket (business); 0430 D News in Brief; 0432 S Moscow Yesterday and Today, M Jazz Show, T Yours for the Asking, W Musical Portraits of the 20th Century, H Folk Box, F Audio Book Club (Russian lit.), A Timelines; 0446 T Music At Your Request, W Russia: People & Events.

WBCQ, Maine

7315 kHz.: 0400 S Tom & Darryl (electronic media), M-A Amos 'n Andy.

WHRI, Indiana

5745 kHz.: 0405 S Music (Christian contemporary and gospel), 0430 S DXing with Cumbre.
7315 kHz.: 0400 S 20, The Countdown Magazine (from 0305); 0405 M-F Music (Christian contemporary and gospel).

WWCR, Tennessee

3210 kHz.: 0400 T-S Worldwide Country Radio (country music).
5070 kHz.: 0430 M New Horizons (science/technology); 0445 M Ask WWCR (letters).

0500 UTC - Page 45 Freqs

BBC World Service (eu)

0500 D The World Today; 0530 S Reporting Religion, A Arts in Action.

BBC World Service (me)

0500 D The World Today; 0530 S Global Business, A Arts in Action.

BBC World Service (esaf)

0500 D The World Today; 0530 S Artbeat, M-F Network Africa, A African Quiz or This Week And Africa.

BBC World Service (wcaf)

0500 D The World Today; 0530 S Artbeat, M-F Network Africa, A Talkabout Africa.

BBC World Service (sas)

0500 S The World Today, M-A News; 0505 M One Planet (ecology), T Discovery (science), W Health Matters, H Science View, F Sports International, A Wright Around the World (music requests); 0530 S Reporting Religion, M People and Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World.

BBC World Service (eas)

0500 D The World Today; 0530 S Write On or From Where I Stand (British views), A Arts in Action.

Channel Africa

0500 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0500 D News; 0510 S Report on Developing Countries, M-F Current Affairs, A Global Review; 0520 S In the Spotlight (cultural magazine), A Listeners' Garden; 0530 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0500 D News; 0505 S Talking Point (journalists), M Religion & Society, T-A Newlink (European current affairs); 0515 S Marks & Markets, M COOL (youth magazine); 0530 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador

0500 S Ham Radio Today, M Sunday Nite, T Let My People Think, W The Book & the Spade (archaeology), H Adventures in Odyssey (Christian stories for children), F Inspirational Classics (liturgical music), A Walkin' in the Sunshine (country music); 0515 W Words for Women; 0530 S Just Jazz, T-A A New Beginning; 0556 T-A Slice of Infinity.

Radio Australia

0500 D News; 0505 S/A Pacific Focus (S business, A sport); 0510 M-F Pacific Beat (Pacific islands magazine with regional sports report @ 0530); 0530 S Fine Music Australia (classical), A Lingua Franca (about language); 0545 A Short Story.

[Special service: 0505 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0500 D International News; 0510 M Weekly Review, T-S National News; 0515 T-S Viewpoint; 0530 M RHC 40 Years, T-S News Bulletin; 0535 T-A Time Out (sports); 0540 S/W DXers Unlimited, M/H Mailbag Show, T/F Caribbean Outlook, A Weekly Review; 0550 M Breakthrough (science report).

Radio Japan

0500 D News; 0510 S Pop Goes Asia, A Hello from Tokyo (listener contact); 0515 M-F 44 Minutes (feature magazine).

Radio Netherlands

0500 S Aural Tapestry (cultural threads), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F Talking It Over (interviews, A A Good Life (global development); 0515 F From Sapphire to Laser (classical music).

Radio New Zealand International

0500 D RNZ News; 0505 S Spiritual Outlook, M-F Checkpoint (comprehensive news), A Best of Kim Hill (interviews).

Radio for Peace International, Costa Rica

0500 S TUC Radio, M Neumaier Report, T Earthspoon (War & Peace Foundation news & comment), W Making Contact (reports & interviews), H RFPI Mailbag, F Voices of Our World (Maryknoll program), A University Forum (interviews); 0515 M Living Enrichment Center; 0530 S Continent of Media, T-A Freespeech Radio News (Pacifico Reporters Against Censorship daily newscast).

Voice of Nigeria

0500 S Reflections, M-F Wave Train (music), A African Safari (music); 0505 S Link-Up (music requests); 0530 S/A News, M-F VON Scope (news magazine).

WBCQ, Maine

0500 S Radio Timtron Worldwide.

WHRI, Indiana

5745 kHz.: 0500 A DXing with Cumbre; 0530 A World Harvest Country Style.

7315 kHz.: 0500 M-F Music (Christian contemporary and gospel), A DXing with Cumbre.

7435 kHz.: 0500 A Joe 2 K.

WWCR, Tennessee

3210 kHz.: 0500 M World of Radio; 0505 A Rock the Universe (Christian rock music); 0530 M Communications World.

5070 kHz.: 0500 T Ask WWCR (letters)

0600 UTC - Page 45 Freqs

BBC World Service (eu)

0600 D World Briefing; 0620 D Sports Roundup; 0630 S Agenda (trends), M-F World Business Report, A People and Politics; 0645 M Letter from America (Alistair Cooke comments), T/W/F Analysis, H From Our Own Correspondent.

BBC World Service (me)

0600 S World Briefing, M-A News; 0605 M Talking Point, T-A Outlook; 0620 S Sports Roundup; 0630 S Agenda (trends); 0645 M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

BBC World Service (esaf)

0600 S World Briefing, M-A News; 0605 M Talking Point, T-A Outlook; 0620 S Sports Roundup; 0630 S Agenda (trends); 0645 M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

BBC World Service (wcaf)

0600 D World Briefing; 0620 D Sports Roundup; 0630 S Agenda (trends), M-F Network Africa, A African Quiz or This Week And Africa.

BBC World Service (eas)

0600 S/A World Briefing, M-F News; 0605 M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing; 0620 S/A Sports Roundup; 0630 S Westway Omnibus, M Composer of the Month, T Music Mix, W UK Top 20, H Panel

Shortwave Guide



game or Quiz, F World of Music, A People and Politics.

Channel Africa

0600 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

HCJB, Ecuador

0600 S Saludos Amigos, M Mountain Meditations, T-A Family Life Today; 0630 S Did You Hear?, M Renewing Your Mind, T-A Stories of Great Christs; 0645 S/H Specialized English, T Chords of Love (sacred music), W CCR Drama, F Science, Scripture & Salvation, A Wonderful Words of Life (hymns).

Radio Australia

0600 D News; 0605 S The Europeans, A Feedback (letters/station news); 0610 M-F Regional Sports Report; 0620 M-F Pacific Focus (M business, T health, W environment, H sport, F culture); 0630 A Oz Sounds (new releases); 0640 M Oz Music Show (rock), T Music Deli (diverse world/folk), W Blacktrucker (contemporary Aboriginal), H Australian Country Style, F Jazz Notes.

[Special service: 0605 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0600 D International News; 0610 M From Habana, T-S National News; 0615 T-S Reports and music; 0630 M The Jazz Place, T-S News Bulletin; 0635 S World of Stamps, T-A Reports and music; 0645 S RHC 40 Years; 0650 S Cuban music.

Radio Japan

0600 D News; 0610 S Weekend Square (Japanese life), A Pop Goes Asia; 0615 M-F Asian Top News (headlines from region's radio); 0625 M Unforgettable Musical Masterpieces, T Let's Learn Japanese, W Japan Music Log, H Brush Up Your Japanese, F Music Beat.

Radio New Zealand International

0600 D RNZ News; 0606 S Whenua (Maori magazine), M-F What's Going On? (arts & entertainment calendar), A Feature; 0630 M Letter from America (BBC), T-H Today in Parliament, F The Pacific Report, A In a Mellow Tone (soft sounds); 0645 M-F Storytime.

Radio for Peace International, Costa Rica

0600 S World of Radio, M Spiritual Awakening, T CounterSpin (media analysis), W Radio Nation ("The Nation" magazine), H Steppin' Out of Babylon, F A Public Affair, A WINGS (women's news); 0630 S RFPI Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary); 0635 T/H/A Earthwatch (ecology); 0640 T/H/A Earth & Sky (astronomy); 0645 T Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

Voice of Nigeria

0600 S This Week on VON, M Across the Ages, T Agenda for Peace, W Nigerian Newsletter, H West African Scene, F African Writers, A From the Rocks; 0615 S Listeners' Letters, M Nigeria & Politics, T Nigerian Scene, W Wheel of Progress, H World of the Arts, F Images of Nigeria, A Issues of the Moment; 0630 S/A Weekly Analysis, M-F World News; 0640 M-F Commentary & Press Review; 0645 M-F News about Nigeria.

WHRI, Indiana

5745 kHz.: 0630 S DXing with Cumbre.
7315 kHz.: 0604 A Turn Your Radio On; 0630 S World Harvest Country Style

WWCR, Tennessee

3210 kHz.: 0600 S The Big Backyard (Australian country music), M Spectrum (communications discussion); 0605 T-F Golden Age of Radio Theatre; 0630 S The Old Record Shop (vintage recordings).
5070 kHz.: 0600 M Ken's Country Classics; 0630 S World of Radio.

1000 UTC - Page 47 Freqs

BBC World Service (am)

1000 D World Briefing; 1020 S/A Sports Roundup; 1030 S Agenda (trends), M-F World Business Report, A Science in Action; 1045 M-F Sports Roundup.

BBC World Service (eu)

1000 D World Briefing; 1020 S/A Sports Roundup; 1030 S

Weekend, M-F World Business Report, A Science in Action; 1045 M-F Sports Roundup.

BBC World Service (me)

1000 D World Briefing; 1020 S/A Sports Roundup; 1030 S Agenda (trends), M-F World Learning (instructional series), A Science in Action.

BBC World Service (esaf)

1000 S News Summary, M-A World Briefing; 1005 S The Alternative (music); 1020 A Sports Roundup; 1030 S Composer of the Month, M Letter from America, T-F Analysis, A Science in Action; 1045 M-F Sports Roundup.

BBC World Service (wcaf)

1000 S News Briefing, A World Briefing; 1001 S Heart and Soul (religion); 1020 S The Alternative (music), A Sports Roundup; 1030 A Science in Action; 1045 A A Radio History of the World.

BBC World Service (eas)

1000 S News Summary, M-F World Briefing, A News; 1001 S Concert Hall; 1005 A Jazzmatazz; 1030 M-F World Business Report, A Greenfield Collection (classical music); 1045 M-F Sports Roundup.

Radio Australia

1000 D News; 1005 S The Buzz (technology issues), M-F Asia Pacific, A Pacific Review; 1030 S Rural Reporter, M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A In Conversation-Science

R. New Zealand Int.

1000 D News; 1005 S Mediawatch, M-F Late Edition (the day's news), A Deep Purple (relaxing music/nostalgia).

Radio for Peace International, Costa Rica

1000 S CounterSpin (media analysis), M Music Medicine, T A Woman's Voice, W A Public Affair, H Alternative Radio (political & social analysis), F This Way Out (gay/lesbian magazine), A Honoring Mother Earth: Indigenous Voices; 1030 S Freespeech Radio News (repeat of Fri. newscast), F Like It Is (African-American issues).

Voice of America (News Now)

1000 D World News; 1010 D Regional News; 1014 D USA News; 1018 D Sports; 1022 D Features; 1030 D World News; 1033 S On the Line (US foreign policy), A Best of 'Talk to America'; 1045 M-F Science, Medicine, Environment; 1049 M-F Business and Economic Report; 1053 M-F Music feature.

Radio Netherlands

1030 S/A News, M-F Newline; 1035 S Wide Angle, A Europe Unzipped; 1055 A Insight.

1100 UTC - Page 48 Freqs

BBC World Service (am) (eu)

1100 D World Briefing; 1120 D British News; 1130 S Arts in Action, M Letter from America, T/W/F/A Analysis, H From Our Own Correspondent; 1145 M-H Sports Roundup, F Football Extra.

[Special service to the Caribbean on 6195 & 15220 kHz.: 1105 M-F Caribbean Report; 1110 M-F Caribbean Sport; 1115 M-F Caribbean Magazine.]

BBC World Service (me)

1100 S World Briefing, M-A News; 1105 M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Wright Around the World (music requests); 1120 S British News; 1130 S Arts in Action, M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music.

BBC World Service (esaf)

1100 S-F World Briefing, A News; 1105 A Westway Omnibus; 1120 S-F British News; 1130 S Arts in Action, M-F World Business Report, A Greenfield Collection (classical music requests); 1145 M-H Sports Roundup, F Football Extra.

BBC World Service (wcaf)

1100 D World Briefing; 1120 D British News; 1130 S Postmark Africa, M-F World Business Report, A Inside Track (African sport); 1145 M-H Sports Roundup, A Football Extra.

BBC World Service (eas)

1100 S/A World Briefing, M-F News; 1105 M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); 1120 S/A British News; 1130 S Play of the Week, M Everywoman, T Focus on Faith, W Pick of the World (best of the BBC), H People and Places, F Essential Guide, A Science in Action.

HCJB, Ecuador

1100 S Let My People Think, M-F Insight for Living, A We Kids; 1128 M-F Money Minute; 1130 S Encounter, M-F Morning in the Mountains (Christian breakfast show w/Bible Minute 1134, Scriptural Reading 1142, Beyond the Call 1148), A Down Gilead Lane.

Radio Australia

1100 D News; 1105 S Correspondents' Report, M-A Asia Pacific (regional current affairs); 1130 S Bush Telegraph (rural life), M-F Regional Sports Report, A Fine Music Australia (classical); 1135 M-F Life Matters (personal and social issues).

Radio Japan

1100 D News; 1110 S Hello from Tokyo (listener contact), A Pop Goes Asia; 1115 M-F Asian Top News (headlines from region's radio); 1125 M Unforgettable Music Masterpieces, T Let's Learn Japanese, W Japan Music Log, H Brush Up Your Japanese, F Music Beat.

Radio Netherlands

1100 S Aural Tapestry (cultural threads, M Euroquest (Europe in context), T A Good Life (development issues), W Dutch Horizons, H Research File (science), F Documentary, A Roughly Speaking (youth culture); 1130 S Dutch Horizons, M Research File, T Music 52-15 (international music), W Documentary, H Talking It Over (interviews), F A Good Life, A Aural Tapestry; 1145 H From Sapphire to Loner (classical music).

Radio for Peace International, Costa Rica

1100 S TUC Radio, M Neumaier Report, T Earthspoon (War & Peace Foundation news & comment), W Making Contact (reports & interviews), H RFPI Mailbag, F Voices of Our World (Maryknoll program), A University Forum (interviews); 1115 M Living Enrichment Center; 1130 S Continent of Media, T-A Freespeech Radio News (Pacific Reporters Against Censorship daily newscast).

Radio Sweden

1130 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1145 M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

Radio New Zealand International

1100 D RNZ News; 1105 S Sportsworld, M-H Kim Hill (interviews), F Sports Story, A The World in Sport; 1130 F Top 5 (music), A NZ News; 1145 A Dateline Pacific.

WHRI, Indiana

6040 kHz.: 1100 M-F Music (Christian contemporary and gospel).
9495 kHz.: 1100 A Joe 2K; 1130 M-F Music (Christian contemporary and gospel), A DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: 1100 S Profiles; 1105 A This Week in Americana (antiques/collectibles).
15685 kHz.: 1100 T World of Radio, W Communications World, F The Big Backyard (Australian country music), A Profiles; 1110 A A View from Europe; 1115 A Eco Watch (ecology); 1130 A World of Radio.

1200 UTC - Page 48 Freqs

BBC World Service (am)(me)(wcaf)

1200 D Newshour
[Special service to the Caribbean on 6195 & 15220 kHz.: 1205 M-F Caribbean Business; 1210 M-F Caribbean Report]

BBC World Service (eu)

1200 D News; 1205 S The Alternative (music), M-F Outlook (magazine), A Wright Around the World (music requests);

Shortwave Guide



1230 S Global Business; 1245 M A Radio History of the World, T Heart and Soul, W Best of 'The Edge', H Body and Mind, F Patterns of Faith.

BBC World Service (esaf)

1200 S/A Newshour, M-F News; 1205 M-F Outlook (magazine); 1245 M A Radio History of the World, T Heart and Soul, W Best of 'The Edge', H Body and Mind, F Patterns of Faith.

BBC World Service (eas)

1200 S Play of the Week (cont'd. from 1130), M-A News; 1205 M-F Outlook (magazine), A Panel game or Quiz; 1230 S Agenda (trends), A Assignment; 1245 M Patterns of Faith, T A Radio History of the World, W Heart and Soul, H Best of 'The Edge', F Body and Mind.

HCJB, Ecuador

1200 S Moody Presents, M-F Morning in the Mountains (cont'd. from 1130 w/Latin American & International News); 1200 & 1230, Sports News; 1205, Insights; 1206, Mission Network News; 1224, Church Doctor; 1233, Guidelines for Living; 1245, The Gospel Truth; 1255, A Adventures in Odyssey; 1230 S Words to Live By, A Toonz!

Radio Australia

1200 D News; 1205 S Country Club (country music), M-H Late Night Live (discussion and interviews), F Sound Quality (innovative music), A The Spirit of Things (spiritual matters).

Radio Canada International

1200 M-F News; 1210 M-F This Morning (magazine).

Radio Netherlands

1200 S/A News, M-F Newline; 1205 S Sincerely Yours (listener letters), A Wide Angle.

Radio for Peace International, Costa Rica

1200 S World of Radio, M Spiritual Awakening, T CounterSpin (media analysis), W Radio Nation ("The Nation" magazine), H Steppin' Out of Babylon, F A Public Affair, A WINGS (women's news); 1230 S RFPI Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary); 1235 T/H/A Earthwatch (ecology); 1240 T/H/A Earth & Sky (astronomy); 1245 T Tropical Conservation Bureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

Radio Sweden

1230 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1245 M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana

6040 kHz.: 1200 A DXing with Cumbre; 1205 M-F Music (Christian contemporary and gospel).
15105 kHz.: 1205 M-F Music (Christian contemporary and gospel); 1230 S Joe 2K, A DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: 1205 A Rock the Universe (Christian rock music).
15685 kHz.: 1245 M Eco Watch (ecology).

YLE Radio Finland

1230 S Capitol Cafe (conversations), M-F Finland This Morning (magazine), A Finland This Week (review); 1245 A Starting Finnish (language course).

1300 UTC - Page 49 Freqs

BBC World Service (am)

1300 D News; 1305 S Jazmatazz, M-F Outlook (magazine), A Global Business; 1330 S In Praise of God, A People & Politics; 1345 M-F Off the Shelf (book readings).

BBC World Service (eu)

1300 S/A Newshour, M-F News; 1305 M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing; 1330 M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music.

BBC World Service (me)

1300 D News; 1305 S The Alternative (music), M Discovery (science), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Jazmatazz; 1330 S Global Business, M Essential Guide, T Everywoman, W Focus on Faith, H Pick of the World (best of the BBC), F People and Places.

BBC World Service (wcaf)

1300 D News; 1305 S Concert Hall, M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Jazmatazz; 1330 M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music, A Arts in Action.

BBC World Service (esaf)

1300 D News; 1305 S Concert Hall, M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Jazmatazz; 1330 M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music, A People and Politics.

BBC World Service (eas)

1300 D Newshour; 1350 M-F World Business Report.

Channel Africa

1300 S/A Channel Africa Extra (weekend variety magazine).

China Radio International

1300 D News; 1310 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1320 S In the Spotlight (cultural magazine), A Listeners' Garden; 1330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

1300 S Message of Truth, M-F Precept, A Toonz! (from 1230); 1313 M-F Getting the Message; 1315 M-F Proclaim; 1330 S Mountain Meditations, M-F Family Life Today, A Rock Solid.

Radio Australia

1300 D News; 1305 S Country Club (cont'd. from 1205), A The Science Snow; 1310 M-F Regional Sports Report; 1315 M-F The Planet (diverse music from around the world).

Radio Canada International

1300 D News; 1305 S The Sunday Edition, M-F This Morning (cont'd. from 1210), A The House (Canadian politics).

Radio for Peace International, Costa Rica

1300 S Making Contact, M Spiritual Awakening, T Disability Radio Worldwide, W World of Radio, -I Every Living Thing (nature), F Far Right Radio Review, A Continent of Media; 1330 S Alternative Radio (political/social analysis), T Steppin' Out of Babylon, W RFPI Mailbag, A World of Radio.

Radio Sweden

1330 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1345 M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana

6040 kHz.: 1307 S Music (Christian contemporary and gospel).
15105 kHz.: 1300 M-F World Harvest Live; 1315 S Music (Christian contemporary and gospel); 1345 A Music (Christian contemporary and gospel).

WWCR, Tennessee

15685 kHz.: 1315 A Ask WWCR (letters).

1400 UTC - Page 49 Freqs

BBC World Service (am)

1400 D News; 1405 S Talking Point (global phone-in), M Meridian-Masterpiece, T Meridian-Screen, W Merid-

ian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); 1430 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; 1445 W UK Album Chart, F Music X-Press.

BBC World Service (eu)(wcaf)

1400 D News; 1405 S Talking Point (global phone-in), M Discovery (science), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Sportsworld (live action); 1430 M Essential Guide, T Everywoman, W Focus on Faith, H Pick of the World (best of the BBC), F People and Places.

BBC World Service (me)(esaf)

1400 S/A News, M-F World Briefing; 1405 S Talking Point (global phone-in), A Sportsworld (live action); 1420 M-F World Business Report; 1430 M-F British News; 1445 M-H Sports Roundup, F Football Extra.

BBC World Service (eas)

1400 S/A News, M-F East Asia Today; 1405 S Talking Point (global phone-in), A Sportsworld (live action); 1430 M-F British News; 1445 M-H Sports Roundup, F Football Extra.

Channel Africa

1400 S/A Channel Africa Extra (cont'd from 1300).

China Radio International

1400 D News; 1410 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1420 S In the Spotlight (cultural magazine), A Listeners' Garden; 1430 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

1400 S Renewing Your Mind, M-F Haven, A Rock Solid (from 1330).

Radio Australia

1400 D News; 1405 S Books and Writing, M-F The Planet (cont'd. from 1315), A New Dimensions ("progressive" ideas).

Radio Canada International

1400 D News; 1405 S The Sunday Edition (cont'd. from 1310), M-F This Morning (cont'd. from 1210), A Vinyl Cafe; 1430 F C'est La Vie (life in French Canada); 1445 M-H Out Front (experimental radio).

Radio Japan

1400 D News; 1410 S Pop Goes Asia, A Weekend Square (Japanese life); 1415 M-F 44 Minutes (feature magazine).

Radio for Peace International, Costa Rica

1400 S Alternative Radio (from 1330), M New Dimensions, T University Forum (interviews), W Continent of Media, H WINGS (women's news), F Russian Ecological Radio Service, A RFPI Mailbag; 1430 S Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W TUC Radio, H Global Community Forum (interviews), F A Woman's Voice, A Disability Radio Worldwide.

WHRI, Indiana

6040 kHz.: 1400 M-F World Harvest Live; 1430 S/A DXing with Cumbre.

15105 kHz.: 1405 M-F Music (Christian contemporary and gospel); 1430 S Music (Christian contemporary and gospel).

Radio Netherlands

1430 S/A News, M-F Newline; 1435 S Wide Angle, A Europe Unzipped (Europe in context); 1455 A Insight (commentary).

IT'S BACK AND BETTER THAN EVER

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Shortwave Guide

1500 UTC - Page 50 Freqs

BBC World Service (am)

1500 D News; 1505 S Concert Hall, M One Planet (ecology), T Discovery (science), W Health Matters, H Science View, F Sports International, A Sportsworld (live action); 1530 M People & Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World (BBC's best).

BBC World Service (eu)

1500 S/A News, M-F World Briefing; 1505 S Concert Hall, A Sportsworld (live action); 1530 M-F British News; 1545 M/T/H Analysis, W From Our Own Correspondent, F Analysis or The New Europe.

BBC World Service (me)

1500 D News; 1505 S Concert Hall, M-F Outlook (magazine), A Sportsworld, 1545 M Patterns of Faith, T A Radio History of the World, W Heart and Soul (religion), H Best of 'The Edge' (youth culture), F Body and Mind (health).

BBC World Service (wcaf)(esaf)

1500 D News; 1501 S Play of the Week; 1505 M-F Focus on Africa, A Sportsworld; 1530 M-F World Learning (instructional series).

BBC World Service (eas)

1500 D News; 1505 S The Alternative (music), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); 1530 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; 1545 W UK Album Chart, F Music X-Press

China Radio International

1500 D News; 1510 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1520 S In the Spotlight (cultural magazine), A Listeners' Garden; 1530 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Radio Australia

1500 D News; 1505 S Encounter (religion in Australia), M-F Asia Pacific (regional current affairs), A Melisma (innovative music); 1530 M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor.

Radio Austria International

1530 D Report from Austria (magazine), 1535 S Radio E, A Week in Review; 1550 A Listener Letters.

Radio Canada International

1500 S/A News; 1505 S The Sunday Edition (cont'd. from 1310), A Quirks and Quarks (science).

Radio Netherlands

1500 S Aural Tapestry (cultural threads, M Euroquest (Europe in context), T A Good Life (development issues), W Dutch Horizons, H Research File (science), F Documentary, A Roughly Speaking (youth culture); 1530 S Dutch Horizons, M Research File, T Music 52-15 (international music), W Documentary, H Talking It Over (interviews), F A Good Life, A Aural Tapestry, 1545 H From Sapphire to Laser (classical music).

Radio for Peace International, Costa Rica

1500 S Far Right Radio Review (from 1430), M Voices of Our World (Maryknoll program), T Honoring Mother Earth: Indigenous Voices (from 1430), W Living Enrichment Center, H Global Community Forum (from 1430), F A Woman's Voice (from 1430), A Earthspan (War & Peace Foundation news & comment); 1530 S Blickwinkel (in German), M Perspective (UN program), T In the Moment, W Peace Forum, H Scope (UN program), F Tropical Conservation Newshour (rainforests), A Newmaier Report; 1545 S/M Hightower Report (commentary), T-A UN Today; 1550 S/M Earthwatch (ecology); 1555 S/M Earth & Sky (astronomy).

WHRI, Indiana

13760 kHz.: 1505 S World Harvest Country Style; M-F Music (Christian contemporary and gospel); 1530 S/A DXing with Cumbre.
15105 kHz.: 1500 S DXing with Cumbre; 1502 A 20 The Countdown Magazine (Christian rock music charts); 1505 M-F Music (Christian contemporary and gospel).
17650 kHz.: 1505 M-F Music (Christian contemporary and

gospel); 1515 S Music (Christian contemporary and gospel).

1600 UTC - Page 50 Freqs

BBC World Service (am)(eu)(eas)

1600 S/A News, M-F Europe Today; 1605 S/A Sportsworld (live action); 1630 M-F World Business Report; 1645 M-F Sports Roundup.

BBC World Service (me)

1600 D News; 1605 S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); 1630 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; 1645 W UK Album Chart, F Music X-Press.

BBC World Service (wcaf)(esaf)

1600 D News; 1605 S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); 1630 M/F Fast Track (African sport), T The Story of Africa, W Talkabout Africa, H Arbeat.

HCJB, Ecuador

1600 S Message of Truth, M-F Renewing Your Mind, A Words of Hope.

Radio Australia

1600 D News; 1605 S The National Interest (Australian politics), M Margaret Throsby (interview and music), T The Comfort Zone (Australian homes/gardens/food), W Verbatim (oral histories), H Hindsight (Australian history), F AWAYE! (Aboriginal culture), A Melisma (cont'd. from 1505); 1630 W Earshot (Australian voices).

Radio Netherlands

1600 S/A News, M-F Newslines; 1605 S Sincerely Yours (listener letters), A Wide Angle.

Radio for Peace International, Costa Rica

1600 S Music Medicine, M A Woman's Voice, T A Public Affair, W Alternative Radio (political & social analysis), H This Way Out (gay/lesbian magazine), F Honoring Mother Earth: Indigenous Voices, A CounterSpin (media analysis); 1630 H Like It Is (African-American issues), A Freespeech Radio News (repeat of Fri. newscast).

WHRI, Indiana

13760 kHz.: 1615 S Music (Christian contemporary and gospel).
15105 kHz.: 1600 A 20 The Countdown Magazine (Christian rock music charts); 1605 S-F Music (Christian contemporary and gospel).
17650 kHz.: 1600 A Music (Christian contemporary and gospel).

WWCR, Tennessee

12060 kHz.: 1630 A Keen on Jazz.
15685 kHz.: 1600 M-F World Wide Country Radio (country music).

1700 UTC - Page 51 Freqs

BBC World Service (eu)

1700 D News; 1701 S Play of the Week (radio theatre); 1705 M-F Outlook (magazine), A From Our Own Correspondent; 1730 A Agenda (trends); 1745 M Patterns of Faith, T A Radio History of the World, W Heart and Soul (religion), H Best of 'The Edge' (youth culture), F Body and Mind (health).

BBC World Service (me)

1700 S-F News, A World Briefing; 1701 S Play of the Week (radio theatre); 1705 M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); 1720 A British News; 1730 M Everywoman, T Focus on Faith, W Pick of the World (best of the BBC), H People and Places, F Essential Guide, A Westway Omnibus (drama serial).

BBC World Service (wcaf)(esaf)

1700 D News; 1705 D Focus on Africa; 1745 D Sports Roundup.

BBC World Service (sas)

1700 S/A World Briefing, M-F News; 1705 M Panel game or

Quiz, T The Alternative (music), W Greenfield Collection (classical music requests), H Jazzmatazz, F Composer of the Week; 1720 S/A British News; 1730 S Reporting Religion, M-F Off the Shelf (book readings), A World Business Review; 1745 D Sports Roundup.

Radio for Peace International, Costa Rica

1700 S Neumaier Report, M Earthspan (War & Peace Foundation news & comment), T Making Contact (reports & interviews), W RFPI Mailbag, H Voices of Our World (Maryknoll program), F University Forum (interviews), A TUC Radio; 1715 S Living Enrichment Center; 1730 M-F Freespeech Radio News (Pacifica Reporters Against Censorship daily newscast), A Continent of Media.

Voice of Russia

1700 D News; 1705 S Music & Musicians, M/H/S Moscow Mailbag, T/F Newmarket, W Science & Engineering; 1730 M-A News in Brief; 1732 M Kaleidoscope, T Yours for the Asking, W Moscow Yesterday & Today, H Russian Musical Portraits of 20th Century, F Folk Box, A Songs from Russia; 1746 T Music At Your Request, A You Write to Moscow; 1754 H Russia: People & Events.

1800 UTC - Page 51 Freqs

BBC World Service (eu)

1800 S/A World Briefing, M-F News; 1805 T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Omnibus (documentary); 1820 S/A British News;
1830 S Assignment, M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A World Business Review; 1845 W UK Album Chart, F Music X-Press, A Letter from America.

BBC World Service (me)(wcaf)

1800 D World Briefing; 1820 D British News; 1830 S Assignment, M-F World Business Report, A World Business Review; 1845 M/T/H/F Analysis, W From Our Own Correspondent, A Letter from America.

BBC World Service (esaf)

1800 S/A World Briefing, M-F News; 1805 M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); 1820 S/A British News; 1830 S Assignment, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A World Business Review; 1845 A Letter from America.

Radio for Peace International, Costa Rica

1800 S Spiritual Awakening, M CounterSpin (media analysis), T Radio Nation ("The Nation" magazine), W Steppin' Out of Babylon, H A Public Affair, F WINGS (women's news), A World of Radio; 1830 S One World—One Family (Bahai program), M/W/F Hightower Radio (commentary), A RFPI Mailbag; 1835 M/W/F Earthwatch (ecology); 1840 M/W/F Earth & Sky (astronomy); 1845 M Tropical Conservation Newsbureau (rainforests), W World Citizen's Weekly Commentary, F Women (UN program).

Voice of Russia

1800 D News; 1811 S Musical Portraits of 20th Century, M-F Commonwealth Update, A Science & Engineering; 1830 D News in Brief; 1832 S Christian Message from Moscow, M/W/F 20th Century: Footprints in History, T/H Russian history/culture, A This is Russia.

1900 UTC - Page 52 Freqs

BBC World Service (eu)

1900 S/A World Briefing, M-F News; 1905 M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); 1920 S/A Sports Roundup; 1930 S Science in Action, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A Westway Omnibus (drama serial).

BBC World Service (me)

1900 S/A News, M-F World Briefing; 1905 S Greenfield Collection (classical music requests), A Jazzmatazz; 1920 M-F Sports Roundup; 1930 S From Our Own Correspondent, M Body and Mind (health), T Patterns of Faith, W A Radio History of the World, H Heart and Soul (religion), F Best of 'The Edge' (youth culture), A Composer of the Month.

Shortwave Guide



BBC World Service (wcaf)

1900 D News; 1905 S From Our Own Correspondent, M-F Focus on Africa, A Westway Omnibus (drama serial); 1930 S Body and Mind (health), M/F Fast Track (African sport), T Arbeat, W Talkabout Africa, H Postmark Africa, A Greenfield Collection (classical music requests)

BBC World Service (esaf)

1900 S-F News, A World Briefing; 1905 S Wright Around the World (music requests), M-F Focus on Africa; 1920 A Sports Roundup; 1930 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A Science in Action.

Radio for Peace International, Costa Rica

1900 S Spiritual Awakening, M Disability Radio Worldwide, T World of Radio, W Every Living Thing (nature), H Far Right Radio Review, F Continent of Media, A Making Contact; 1930 M Steppin' Out of Babylon, T RFPI Mailbag, F World of Radio, A Alternative Radio (political/social analysis).

Voice of Russia

1900 D News; 1911 S Sunday Panorama, M-A News & Views; 1924 S Russia: People & Events; 1930 D News in Brief; 1932 S/T This is Russia, M Moscow Yesterday & Today, W Kaleidoscope, H Audio Book Club, F Russian by Radio, A Christian Message from Moscow.

2000 UTC - Page 53 Freqs

BBC World Service (eu)(me)

2000 D Newshour.

BBC World Service (wcaf)(esaf)

2000 D Newshour; 2050 D Sports Roundup.

Radio for Peace International, Costa Rica

2000 S New Dimensions, M University Forum (interviews), T Continent of Media, W WINGS (women's news), H Russian Ecological Radio Service, F RFPI Mailbag, A Alternative Radio (from 1930); 2030 M Honoring Mother Earth: Indigenous Voices, T TUC Radio, W Global Community Forum (interviews), H A Woman's Voice, F Disability Radio Worldwide, A Far Right Radio Review.

Voice of Russia

2000 D News; 2011 S Music & Musicians, M/H Science & Engineering, T/F Moscow Mailbag, W/A Newmarket; 2030 M-A News in Brief; 2032 M Songs from Russia, T Yours for the Asking, W Musical Portraits of 20th Century, H Folk Box, F Jazz Show, A Russian by Radio; 2046 M Your Write to Moscow, T Music At Your Request; 2054 W Russia: People & Events.

WBCQ, Maine

2000 H-S Radio Caroline.

2100 UTC - Page 53 Freqs

BBC World Service (am)

2100 D News; 2105 S Global Business, M-F World Business Report, A World Business Review; 2120 M-A British News; 2130 D Sports Roundup; 2145 S Reporting Religion, M/T/H/ F Analysis, W From Our Own Correspondent, A Letter from America.

[Special service to the Caribbean on 5975/11675/15390 kHz.: 2105 M-F Caribbean Report. Special service to the Falklands on 5975/11680 kHz.: 2130 T/F Calling the Falklands.]

BBC World Service (eu)

2100 D News; 2105 M-F World Business Report, A Jozmatazz; 2120 M-F British News; 2130 S Panel game or Quiz, M-F Sports Roundup, A Composer of the Month; 2145 M-F Off the Shelf (book readings).

BBC World Service (wcaf)

2100 D News; 2105 S Wright Around the World (music requests), M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science), A Science in Action; 2130 M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A People and Politics.

Radio Australia

2100 D News; 2105 F Feedback A Australia All Over; 2110 S-H AM (morning news magazine); 2130 S Educational

series, M Health Report, T Innovations, W Religion Report, H Rural Reporter, F Oz Sounds; 2145 A Asia Sunday.

Radio for Peace International, Costa Rica

2100 S Voices of Our World (Maryknoll program), M Honoring Mother Earth: Indigenous Voices (from 2030), T Living Enrichment Center, W Global Community Forum (from 2030), H A Woman's Voice (from 0230), F Earthspan (War & Peace Foundation news & comment), A Far Right Radio Review (from 2030); 2130 S Perspective (UN program), M In the Moment, T Peace Forum, W Scope (UN program), H Tropical Conservation Newshour (rainforests), F Neumaier Report, A Blickwinkel (in German); 2145 S/A Hightower Report (commentary), M-F UN Today; 2150 S/A Earthwatch (ecology); 2155 S/A Earth & Sky (astronomy).

2200 UTC - Page 54 Freqs

BBC World Service (am)

2200 D The World Today; 2230 S Agenda (trends), F People and Politics, A From Our Own Correspondent.

BBC World Service (wcaf)

2200 D News; 2205 S Panel game or Quiz, M-F Outlook (magazine), A Omnibus (documentary); 2230 S World of Music, A From Our Own Correspondent; 2245 M Patterns of Faith, T A Radio History of the World, W Heart and Soul (religion), H Best of 'The Edge' (youth culture), F Body and Mind (health).

Radio Australia

2200 D News; 2205 F Asia Pacific Weekend Edition, A Correspondents Report; 2210 S-H AM (morning news magazine); 2230 A Business Report; 2240 S Australian Music Show (rock), M Music Deli (international), T Blacktracker (Aboriginal contemporary), W Country Style, H Jazz Notes.

Radio Canada International

2200 S/A The World This Weekend, M-F The World at 6; 2230 S Inside Track (sports anthologies) M-F As It Happens (interviews with newsmakers), A Madly Off in All Directions (comedy).

Radio for Peace International, Costa Rica

2200 S Music Medicine, M A Woman's Voice, T A Public Affair, W Alternative Radio (political & social analysis), H This Way Out (gay/lesbian magazine), F Honoring Mother Earth: Indigenous Voices, A CounterSpin (media analysis); 2230 H Like It Is (African-American issues), A Freespeech Radio News (repeat of Fri. newscast).

Radio Vlaanderen International

2230 S Radio World, M-F News, A Music from Flanders; 2234 M-F Belgium Today; 2238 S Tourism in Flanders, M-F Press Review; 2243 M Focus on Europe, T Green Society (ecology), W/F Around the Arts, H Economics; 2244 S Brussels 1043 (letters); 2248 M Sports, W Around Town, H International Report, F Tourism in Flanders; 2254 S-F Soundbox (Flemish rock).

2300 UTC - Page 54 Freqs

BBC World Service (am)

2300 S World Briefing, M-F News, A News Summary; 2301 A Play of the Week (radio theatre); 2305 M-F Outlook (magazine); 2320 S Sports Roundup; 2330 S Greenfield Collection (classical music); 2345 M Patterns of Faith, T Plain English, W Heart & Soul (religion), H Best of 'The Edge' (youth culture), F Body & Mind (health).

BBC World Service (es)

2300 D The World Today; 2330 F Global Business, A Arts in Action.

China Radio International

2300 D News; 2310 S Report on Developing Countries, M-F Current Affairs, A Global Review; 2320 S In the Spotlight (cultural magazine), A Listeners' Garden; 2330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Radio Australia

2300 D News; 2305 F Lingua Franca (about language, A Ockham's Razor (science issue); 2310 S-H Asia Pacific (regional current affairs); 2320 F Short Story; 2330 S

Earthbeat (ecology), M The Buzz (technology issues), T Arts Talk, W Rural Reporter, H Media Report, F In Conversation-Science, A Innovations (new products).

Radio Canada International

2300 D CBC News; 2305 S Global Village (world music), M-F As It Happens (interviews with newsmakers) [began at 2230], A Quirks & Quarks (science); 2330 W Dispatches (world events through Canadian eyes).

Radio Netherlands

2330 S/A News; M-F Newslines; 2335 S Sincerely Yours (letters), A Europe Unzipped; 2355 A Insight (commentary).

Radio New Zealand International

2300 S-H World and Pacific News, F/A RNZ News; 2310 S-H Sports News, F Saturday Night with John Campbell, A Feature or series; 2315 S-H Pacific Weather; 2317 Kim Hill (interviews/current affairs).

Radio for Peace International, Costa Rica

2300 S Neumaier Report, M Earthspan (War & Peace Foundation news & comment), T Making Contact (reports & interviews), W RFPI Mailbag, H Voices of Our World (Maryknoll program), F University Forum (interviews), A TUC Radio; 2315 S Living Enrichment Center; 2330 M-F Freespeech Radio News (Pacific Reporters Against Censorship daily newscast), A Continent of Media.

WBCQ, Maine

7415 kHz.: 2300 S Le Show (humor/entertainment), F Scream of the Butterfly, A The Real Amateur Radio Show; 2330 W World of Radio, A Fred Flintstone Music Show. 17495 kHz.: 2300 A Marion's Attic (vintage recordings).

WHRI, Indiana

5745 kHz.: 2300 F DXing with Cumbre; 2330 A DXing with Cumbre.

7315 kHz.: 2300 F DXing with Cumbre; 2330 A DXing with Cumbre; 2335 F Music (Christian contemporary and gospel).

7580 kHz.: 2300 F 20 The Countdown Magazine (Christian contemporary music charts).

WWCR, Tennessee

3215 kHz.: 2330 S Ken's Country Classics
5070 kHz.: 2305 S Pat Boone Show.

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Bob Fraser, Cohasset, MA; Hans Johnson, WY/Ulis Fleming, MD /Cumbre DX/BBCM; BBC Michael Murray, UK; Adrian Sainsbury, R. New Zealand; Harold Sellers, DX Ontario; Hard Core DX; Radio Sweden/Media Scan; Usenet Newsgroups; World-wide DX Club.

All Frequencies MHz

GE Americom Satcom C3 - C-Band

131 degrees West longitude

1(V)	3720	Fox Family Channel, National Geographic Channel, Fox Sports World (Digital)
2(H)	3740	Learning Channel (VC2+)
3(V)	3760	In Demand PPV (Digital)
4(H)	3780	Lifetime - West (VC2+)
5(V)	3800	Hallmark Channel
6(H)	3820	Court TV/Northwest Cable News (Digital)
7(V)	3840	CSPAN-1 5.20 CSPAN Audio 1 - various short-wave stations 5.40 CSPAN Audio 2 - BBC World Service Radio
8(H)	3860	Style Network/Bloomberg Business Television (Digital)
9(V)	3880	Music Choice (Digital)
10(H)	3900	America's Store
11(V)	3920	Fox Sports (Digital)
12(H)	3940	History Channel - East (VC2+)
13(V)	3960	Weather Channel (VC2+) 7.78 Weather Channel various audio
14(H)	3980	NESN, Boston Catholic TV (Digital)
15(V)	4000	Viacom Services (Digital)
16(H)	4020	Showtime HDTV (Digital)
17(V)	4040	The Movie Channel - East (VC2+)
18(H)	4060	TV Land (Digital)
19(V)	4080	Viacom Services (Digital)
20(H)	4100	Product Information Network, Great American Country (Digital)
21(V)	4120	Comedy Central - East (VC2+)
22(H)	4140	Discovery Networks (Digital)
23(V)	4160	E! Entertainment Television (VC2+)
24(H)	4180	Oxygen Network (VC2+) 7.50 Various talk radio programs

Panamsat Galaxy 1R - C-Band

133 degrees West longitude

1(H)	3720	Comedy Central - West (VC2+)
2(V)	3740	Univision, Galavisión (Digital)
3(H)	3760	Encore (Digital)
4(V)	3780	Do It Yourself Network/TV Food Network (Digital)
5(H)	3800	Classic Arts Showcase
6(V)	3820	The National Network (TNN) - West (VC2+)
7(H)	3840	Disney Channel - West (VC2+)
8(V)	3860	Cartoon Network (VC2+)
9(H)	3880	ESPN/ESPN2 feeds (Digital)
10(V)	3900	MSNBC (VC2+)
11(H)	3920	Eternal Word Television Network (EWTN) 5.40, 7.38 WEWN - Worldwide Catholic Radio (English) 5.58 WEWN - Worldwide Catholic Radio (Spanish)
12(V)	3940	ShopNBC
13(H)	3960	Encore (Digital)
14(V)	3980	ESPN/ESPN2 feeds (Digital)
15(H)	4000	CNNfn, CNNsi, CNN en Español (Digital)
16(V)	4020	TNT - West, Airport Network, Turner South (Digital)
17(H)	4040	INSP - The New Inspirational Network (Digital)

5.58 Genesis Communications Radio Network
7.92 WNAJ-FM Waxhaw, NC - variety format

18(V)	4060	HBO/Cinemax (Digital)
19(H)	4080	Cinemax - East (VC2+)
20(V)	4100	Home and Garden Television network (VC2+)
21(H)	4120	USA Network - West (VC2+)
22(V)	4140	Good Life TV Network (VC2+)
23(H)	4160	HBO/Cinemax (Digital)
24(V)	4180	USA Cable Networks (Digital)

GE Americom Satcom C4 - C-Band

135 degrees West longitude

1(V)	3720	American Movie Classics (VC2+)
2(H)	3740	Infomercia TV
3(V)	3760	Nickelodeon - East (VC2+)
4(H)	3780	Univision/Galavisión (Digital)
5(V)	3800	Encore (Digital)/California Channel (Digital)
6(H)	3820	History Channel - West (VC2+)
7(V)	3840	Brava (VC2+)
8(H)	3860	TV Guide Channel (Digital)
9(V)	3880	QVC Network
10(H)	3900	Home Shopping Network
11(V)	3920	SpeedVision (VC2+)
12(H)	3940	techtv
13(V)	3960	Travel Channel (VC2+)
14(H)	3980	Direct 2U Network (Digital)
15(V)	4000	Animal Planet (VC2+)
16(H)	4020	Headend in the Sky (HITS) (Digital)
17(V)	4040	MTV - East (VC2+)
18(H)	4060	In Demand PPV (Digital)
19(V)	4080	CSPAN-2 (analog); CSPAN-3 (Digital)
20(H)	4100	Sundance Channel (VC2+)
21(V)	4120	Discovery Channel - East (VC2+)
22(H)	4140	Flix (VC2+)
23(V)	4160	VH-1 (VC2+)
24(H)	4180	Country Music TV (VC2+)

GE Americom GE-7 - C-Band

137 degrees West longitude

1(H)	3720	(none)
2(V)	3740	KMGH-TV Denver ABC (VC2+)
3(H)	3760	(none)
4(V)	3780	Data Transmissions
5(H)	3800	KDVR-TV Denver FOX (VC2+)
6(V)	3820	KCNC-TV Denver CBS (VC2+) 8.10 Cable Radio Network
7(H)	3840	ix - East (VC2+)
8(V)	3860	NBC (Digital)
9(H)	3880	(none)
10(V)	3900	(none)
11(H)	3920	(none)
12(V)	3940	(none)
13(H)	3960	(none)
14(V)	3980	KUSA-TV Denver NBC (VC2+)
15(H)	4000	(none)
16(V)	4020	(none)
17(H)	4040	(none)
18(V)	4060	Data Transmissions
19(H)	4080	FaxNet (VC2+)
20(V)	4100	(none)
21(H)	4120	(none)
22(V)	4140	(none)

23(H)	4160	KWGN-TV Denver WB (VC2+)
24(V)	4180	(none)

GE Americom GE-8 - C-Band

139 degrees West longitude

1(V)	3720	(none)
2(H)	3740	Data Transmissions
3(V)	3760	Data Transmissions/ SCPC Radio Transmissions
1404.60	55.40	Wyoming News Network/ Northern Ag Network
1400.50	59.50	Learfield Communications
1396.60	63.40	Kansas Info. Network/Kansas AgNet
1396.20	63.80	Learfield Communications
1395.90	64.10	Western Montana Radio Network/Red River Farm Network
1395.70	64.30	Learfield Communications
1386.40	73.60	Learfield Communications
1383.80	76.20	Liberty Works Radio Network
1382.10	77.90	Learfield Communications
4(H)	3780	Data Transmissions
5(V)	3800	Data Transmissions
6(H)	3820	Data Transmissions
7(V)	3840	Data Transmissions
8(H)	3860	Data Transmissions
9(V)	3880	Data Transmissions
10(H)	3900	Data Transmissions
11(V)	3920	Data Transmissions
12(H)	3940	Data Transmissions
13(V)	3960	Data Transmissions
14(H)	3980	Data Transmissions
15(V)	4000	Radio Distribution (Digital)
16(H)	4020	Data Transmissions
17(V)	4040	Data Transmissions
18(H)	4060	Data Transmissions
19(V)	4080	(none)
20(H)	4100	Data Transmissions
21(V)	4120	Radio Distribution (Digital)
22(H)	4140	Data Transmissions
23(V)	4160	ABC Radio Networks Distribution (Digital)
24(H)	4180	Alaskan Rural Communications Service (Digital)

Panamsat Brasilsat A1 - C-Band

144 degrees West longitude

1(H)	3720	(none)
2(V)	3740	(none)
3(H)	3760	(none)
4(V)	3780	(none)
5(H)	3800	(none)
6(V)	3820	(none)
7(H)	3840	(none)
8(V)	3860	(none)
9(H)	3880	(none)
10(V)	3900	(none)
11(H)	3920	(none)
12(V)	3940	(none)
13(H)	3960	(none)
14(V)	3980	(none)
15(H)	4000	(none)
16(V)	4020	(none)
17(H)	4040	(none)
18(V)	4060	(none)

19(H)	4080	(none)
20(V)	4100	(none)
21(H)	4120	(none)
22(V)	4140	(none)
23(H)	4160	(none)
24(V)	4180	(none)

GE Americom GE-6 - C-Band

72 degrees West longitude

1(V)	3720	Data Transmissions
2(H)	3740	(none)
3(V)	3760	(none)
4(H)	3780	(none)
5(V)	3800	(none)
6(H)	3820	(none)
7(V)	3840	(none)
8(H)	3860	(none)
9(V)	3880	(none)
10(H)	3900	(none)
11(V)	3920	(none)
12(H)	3940	(none)
13(V)	3960	(none)
14(H)	3980	(none)
15(V)	4000	(none)
16(H)	4020	(none)
17(V)	4040	(none)
18(H)	4060	(none)
19(V)	4080	(none)
20(H)	4100	(none)
21(V)	4120	(none)
22(H)	4140	(none)
23(V)	4160	(none)
24(H)	4180	La Cadena de Milagro

GE Americom GE-6 - Ku-Band

72 degrees West longitude

1(V)	11720	(none)
2(H)	11740	(none)
3(V)	11760	Data Transmissions
4(H)	11780	(none)
5(V)	11800	(none)
6(H)	11820	(none)
7(V)	11840	(none)
8(H)	11860	(none)
9(V)	11880	(none)
10(H)	11900	(none)
11(V)	11920	(none)
12(H)	11940	(none)
13(V)	11960	(none)
14(H)	11980	(none)
15(V)	12000	(none)
16(H)	12020	(none)
17(V)	12040	(none)
18(H)	12060	(none)
19(V)	12080	(none)
20(H)	12100	(none)
21(V)	12120	GE-6 ID Slot
22(H)	12140	(none)
23(V)	12160	(none)
24(H)	12180	Data Transmissions
25(V)	11535	South American beamed
26(H)	11535	South American beamed
27(V)	11655	South American beamed
28(H)	11655	South American beamed

See ad on page 59 for satellite equipment from Universal Electronics

Understanding Weather Satellites

Last month I provided an introduction to polar orbiting weather satellites (WXSATs), as part of a response to an e-mail that questioned my use of terminology without repeated explanation. This month I am continuing the same theme, but looking at geostationary WXSATs and the newly launched GOES-M.

◆ Geostationary WXSATs

Although the polar WXSATs – NOAA, Meteor and Resurs – have much to offer, there is something attractive about having a continuous source of imagery available. GOES satellites provide this. They are in geo-synchronous orbit – orbiting the equatorial plane of the Earth at a speed matching the Earth's rotation. This allows them to effectively remain continuously over one position on the surface. This geo-synchronous plane is about 35,800 km (22,300 miles) above Earth, and gives the satellites a full-disc view. Constant monitoring means that severe weather conditions – tornadoes, flash floods and hurricanes – should not normally develop unseen. GOES satellites monitor storm developments and track their movements.

For the amateur hobbyist interested in receiving transmissions from GOES satellites, there is plenty of scope. There are two basic image formats available, but for low cost reception, the easiest and cheapest image transmission format is WEFAX – a low resolution image that requires a Yagi (or dish) for the 1691 MHz signal, a suitable receiver (or receiver/decoder) and a computer with suitable programs. GOES transmits not only visible-light, infrared and water vapor images obtained from its own scanner, but also a selection of images obtained from other geostationary WXSATs.

As with most hobbies, joining a club is the

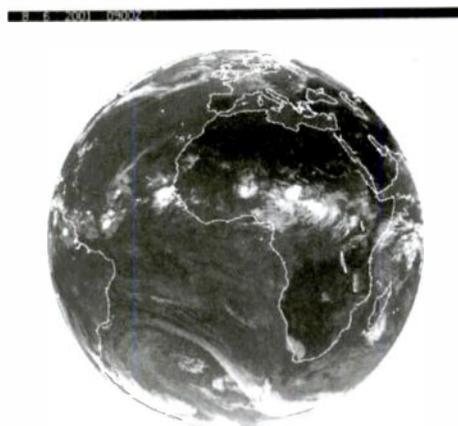


Fig 2: GOES-8 retransmission of Meteosat-7 image 0900UTC August 6, 2001

best way to get quick advice, and many WXSAT hobbyists join the local radio club or the Remote Imaging Group, the latter being an international group devoted to WXSAT reception: <http://www.rig.org.uk>

◆ GOES-M spacecraft launched

The latest advanced environmental satellite equipped with instruments to monitor Earth's weather and carrying a telescope to detect solar storms, soared into space aboard a Lockheed Martin Atlas IIA rocket on July 23, from Cape Canaveral Air Force Station in Florida. The satellite complements the currently operating GOES-8 and GOES-10 and will monitor hurricanes, severe thunderstorms, flash floods and other severe weather. It is the first of the GOES satellites equipped with a Solar X-ray Imager which will be used to forecast earth space weather due to solar activity.

Controllers successfully deployed the outer panel of the solar array, making the spacecraft power positive. It is a three-axis, internally stabilized weather spacecraft that has the dual capability of providing pictures while performing atmospheric sounding at the same time. In geostationary orbit, the spacecraft will be designated GOES-12.

During the first 17 days, NASA and the National Oceanic and Atmospheric Administration (NOAA) controllers perform several apogee motor firings and adjust maneuvers, culminating with the spacecraft arriving in a geosynchronous orbit 22,240 miles (35,796 km) above the Earth's equator at 90° west longitude. The spacecraft is controlled from NOAA's Satellite

Operations Control Center in Suitland, Md. The third and final apogee motor firing happens about six days after liftoff, lasting for approximately six minutes. Apogee is the point at which a spacecraft is farthest from the Earth, and at its minimum velocity. Apogee burns are designed to boost GOES-M from transfer orbit to geosynchronous orbit.

The primary objective of the GOES-M launch is to provide a fully capable spacecraft in on-orbit storage, which can be activated on short notice to assure continuity of services from a two-spacecraft constellation. The currently operational WXSATs are GOES-8 and GOES-10.

GOES-M was built and launched for NOAA under technical guidance and project management by the NASA Goddard Space Flight Center. GOES information and imagery are available on the World Wide Web at:

<http://www.goes.noaa.gov>
<http://goes2.gsfc.nasa.gov>
<http://rsd.gsfc.nasa.gov/goes/>

The images taken by the Solar X-ray Imager will be available in real time to the general public via the World Wide Web, through NOAA's National Geophysical Data Center in Boulder, Colo. When available, the images will be at: <http://www.ngdc.noaa.gov/stp/stp.html>

Imagery is transmitted 15-20 days after launch. Unlike the polar orbiters, the imager and transmitter are not activated in the first orbit or two.

Frequencies

NOAA-12 normally transmits APT on 137.50 MHz
NOAA-14 transmits APT on 137.62 MHz
NOAA-15 transmits APT on 137.50 MHz
NOAA-16 no longer transmits APT (HRPT service only)
NOAAs transmit beacon data on 137.77 or 136.77 MHz
Meteor 3-5 may transmit APT on 137.30 MHz when in sunlight
Resurs 1-4 transmits APT on 137.85 MHz
GOES-8 and GOES-10 use 1691 MHz for WEFAX



Fig 1: GOES-8 infrared image 1015UTC August 6, 2001 eastern continental USA (CONUS)

Universal Video Descrambler



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A Leaf Lookers Special Profile

We have finally arrived at my favorite part of the calendar here in the southeast United States. It's October and time for Mother Nature to paint her autumn landscape with hues of yellows, reds, and oranges on a background of evergreen trees. With the shorter days and cooler nights, millions of trees in the eastern deciduous forest respond in a display of color that is truly breathtaking. As we approach the peak of this colorful season, more than a million people will join us in viewing nature's wonders at this region's three biggest attractions.

So if you're headed this way, grab your scanner and keep a copy of this month's column in the car, as we profile the communications systems of the Blue Ridge Parkway and the two National Parks that bookend the 469 mile scenic highway – the Great Smoky Mountains and Shenandoah National Parks.

◆ Blue Ridge Parkway

Located in both Virginia and North Carolina, the Parkway follows the Appalachian Mountain chain and provides seemingly endless views of many parallel ranges connected by cross ranges and scattered hills. From Shenandoah National Park, the Parkway follows the Blue Ridge Mountains, eastern rampart of the Appalachians, for 355 miles. Then, for the remaining 114 miles, it skirts the southern end of the massive Black Mountains, weaves through the Craggies, the Pisgahs, and the Balsams, and ends in the Great Smokies.

The Park Superintendent offices are located in Asheville, North Carolina, call sign KID 744. Here is the detailed information on the Parkway communications system.

Traveler Information Service

530 kHz Gillespie Gap, NC
1610 kHz Mabry Hill, VA KID 773

VHF Communications System

167.175 Talkaround Channel 1
167.175/166.375 Channel 2
Private Line (PL) tones in use 110.9, 114.8, 123.0, and 141.3 Hz have been reported by monitors. When Parkway units use channel 1 talk around, PL tone 103.5 Hz has been observed.

District/Unit Information

Milepost	District	Radio Series Numbers
0-76.5	James River	100 units
76.5-144.3	Peaks/Volley	200 units
144.3-216.9	Rocky Knob	300 units
216.9-298.6	Bluffs	400 units
298.6-359.8	Gillespie Gap	500 units
359.8-470.0	Asheville	600 units

Base Stations - 167.175/166.375 MHz

Location	Callsign	Repeater Base Station Linked to
Asheville, NC – Parkway HQ	KID744	Mount Pisgah
Balsam Gap, NC	KIE773	Soco Gap
Benge, NC	KIE762	Doughton Mountain
Blowing Rock, NC – Campground	KIE757	Rich Mountain
Bluffs, NC – Campground	KIE761	Doughton Mountain
Camberland Knob, NC – Visitor Center	KIE756	Fisher Peak
Fancy Gap, VA	KIE771	Fisher Peak
Gillespie Gap, NC	KIE758	Mount Mitchell
Hump Back Rock, VA – Visitor Center	KID742	Rocky Mount
James River, VA – Maintenance	KIE752	Rocky Mount
Linnville Falls, NC – Ranger Residence/Campground	KIE733	Mount Mitchell
Love, VA – Sub-Maintenance	KIE767	Rocky Mount
Montebello, VA – Maintenance	KIE751	Rocky Mount
Mount Pisgah, NC – Campground	KID743	Mount Pisgah
Oteen, NC – Ranger Station	KIE772	Mount Mitchell
Peaks of Otter, VA – Campground/Maintenance	KIE763	Rocky Mount
Pine Spur, VA – Sub-Maintenance	KIE764	Poor Mountain
Roanoke, VA – Virginia HQ	KIE750	Poor Mountain
Rocky Knob, VA – Campground	KIE755	Buffalo Mountain
Soco Gap, NC – Maintenance	KIE774	Soco Gap
Vinton, VA – Maintenance	KIE775	Poor Mountain

Parkway Repeaters - 167.175/166.375 MHz

Buffalo Mountain, VA	KID756	Microwave Backbone Drop 1775 MHz
Doughton Mtn, NC	KID755	Microwave Backbone Drop 1716 MHz
Fisher Peak, VA	KIE760	Microwave Backbone Drop 1752 MHz
Mount Mitchell, NC	KIE759	Microwave Backbone Drop 1764 MHz
Mount Pisgah, NC	KID753	Microwave Backbone Drop 1716 MHz
Poor Mountain, VA	KIE754	Microwave Backbone Drop 1764 MHz
Rich Mountain, NC	KID754	Microwave Backbone Drop 1726 MHz
Rocky Mount, VA	KIE753	Microwave Backbone Drop 1726 MHz
Soco Gap, NC	KIE766	Microwave Backbone Drop 1716 MHz

Department of Transportation – Federal Highway Administration

Blue Ridge Parkway Road Construction Crews	
166.025 MHz	Simplex and duplex with 169.550 MHz
169.550 MHz	Simplex and duplex with 166.025 MHz

◆ The Great Smoky Mountains National Park

At the southern end of the Blue Ridge Parkway is one of America's favorite east coast destinations – The Great Smoky Mountains National Park. Founded on June 15, 1934, this national park, located in the states of North Carolina and Tennessee, encompasses 800 square miles of which 95 percent are forested. World renowned for the diversity of its plant and animal resources, the beauty of its ancient mountains, the quality of its remnants of Southern Appalachian mountain culture, and the depth and integrity of the wilderness sanctuary within its boundaries, it is one of the largest protected areas in the eastern United States.

Traveler Information Service (TIS)

530 kHz	Deep Creek	KID771
1610 kHz	Cades Cove	KIE722
	Catoloochee	KPC744
	Clingmans Dome	KIE730
	Cosby Campground	KIE732
	Elkmont	KIE731
	Greenbrier	KPB747
	Newfound Gap	KPC745
	Oconalufee	KIE718



A Smoky Mountain Ranger (photo credit Harry Baughn)



Ranger station antenna (photo credit Harry Baughn)

Look Rock, TN (Campground)	KIE707 (Look Rock Repeater)
Oconaluftee, NC (Ranger Station)	KIE705 (Clingmans Dome/Cowee Bald/Mount Sterling Repeaters)
Oconaluftee, NC (Job Corps Center)	KIE725 (Clingmans Dome/Cowee Bald/Mount Sterling Repeaters)
Smokemont, NC (Campground)	KIE715 (Clingmans Dome/Cowee Bald/Mount Sterling Repeaters)
Tremont, TN (Ranger Station)	KIE714 (Clingmans Dome/Cove Mountain/Look Rock Repeaters)
Twentymile, NC (Ranger Station)	KIE719 (Clingmans Dome/Stuck Stack Repeaters)

Park Repeaters

167.150/166.350 MHz
 The park's primary repeater site is located at radio tower at Clingmans Dome. A voting system of UHF links is used from remote repeater sites. All UHF links are carrier squelch output. Recently two new VHF link frequencies have been reported on 169.550 and 170.100 MHz. No further details are known about these links at presstime.

Clingmans Dome, NC	KIE726 (UHF Voting Repeater 415.125 to 408.475, 408.525, 408.625, 408.725, 408.775 MHz repeats 167.150 MHz)
Cove Mountain, NC	KIE729
Cowee Bald, NC	KID794
Mount Sterling, NC	KIE728

Satellite Receiver Repeaters to Clingmans Dome

Cove Mountain, NC	KIE729 (UHF Backbone Repeater 408.775/166.375, 415.125 MHz)
Cowee Bald, NC	KID794 (UHF Backbone Repeater 408.725/166.375, 415.125 MHz)
Look Rock, TN	KIE727 (UHF Backbone Repeater 408.475/166.350, 415.125 MHz)
Mount Sterling, NC	KIE728 (UHF Backbone Repeater 408.525/166.375, 415.125 MHz)
Stuck Stack, NC	KID795 (UHF Backbone Repeater 408.625/166.375, 415.125 MHz)

◆ **Shenandoah National Park**

The northern end of the Blue Ridge Parkway terminates at the Shenandoah National Park. This park lies astride a beautiful section of the Blue Ridge Mountains, which form the eastern rampart of the Appalachian Mountains between Pennsylvania and Georgia.

The Shenandoah River flows through the valley to the west, with Massanutten Mountain, 40 miles long, standing between the river's north and south forks. The rolling Piedmont country lies to the east of the park.

Skyline Drive, a 105-mile road that winds along the crest of the mountains through the length of the park, provides vistas of the spectacular landscape to east and west.

The park holds more than 500 miles of trails, including 101 miles of the Appalachian Trail. Trails may follow a ridge crest, or they may lead to high places with panoramic views or to waterfalls in deep canyons.

Travelers Information Service (TIS)

1610 kHz	Front Royal	KIE741
	Rock Fish Gap	KID711
	Skyland	KIE737
	Thornton Gap	KIE736

Park Frequencies

49.610 MHz	Maintenance Operations Mobiles
164.675 MHz	Ranger Mobiles
166.900/166.300 MHz (127.3 Hz)	Shenandoah Park Net-1 (Links to the stations below run to the Hogback Voting Repeater and Loft Mountain Backbone Repeater.)
167.150/164.575 MHz (127.3 Hz)	Shenandoah Park Net-2 (Link to the Big Meadows Repeater)
168.550 MHz	Scene of Action Mobiles
10.525 GHz	Radar Speedguns

Base Stations

Location	Callsign
Big Meadows (Campground Registration)	KIE743
Big Meadows (Maintenance Facility)	KKF784
Camp Hoover (Conference Center)	KIE738
Charlottesville (University of Va Hospital)	EMT personnel to Park Rangers, fixed station in 166.300 MHz
Dickey Ridge (Visitor Center)	KIE746
Front Royal (Entrance)	KIE742
Loft Mountain (Campground)	KKF786
Matthews Arm (Campground)	KIE749
Piney River (Maintenance)	KIE748
Pumpkin Hill (Park Headquarters)	KIE740
Rockfish Gap (Park Entrance)	KIE745
Sawmill Run (Ranger Station)	KIE744
Simmons Gap (Maintenance Office)	KIE747
Swift Run Gap (Park Entrance)	KKF785
Thornton Gap (Park Entrance)	KIE739

Park Repeaters

Big Meadows	Shenandoah Net-2
Big Mountain	Shenandoah Net-1 Satellite Voting Repeater 417.550/411.850 MHz
Fork Mountain	Shenandoah Net-1 UHF Backbone Repeater 417.275/411.850 MHz
	Shenandoah Net-2 UHF Backbone Repeater 416.075/412.075 MHz
Hogback	Shenandoah Net-1 UHF Voting Repeater 411.850 to 415.175, 417.550, 417.625 and 417.825 MHz
	Shenandoah Net-2 UHF Voting Repeater 412.075 to 416.075, 416.125, 417.275 and 417.725 MHz
Loft Mountain	Shenandoah Net-1 UHF Backbone Repeater 415.175/411.850 MHz
	Shenandoah Net-2 UHF Backbone Repeater 416.125/412.075 MHz
Mount Pony	Shenandoah Net-1 Satellite Receiver Repeater 417.625/411.850 MHz
Shenandoah NP	Shenandoah Net-1 Transportable Scene of Action Repeater 417.825/411.850 MHz
	Shenandoah Net-2 Transportable Scene of Action Repeater 417.725/164.575 MHz

And that does it for this month. Until next time 73 and good hunting.

Smokemont	KPC742
Sugarlands	KIE723
Tremont	KIE724
Twin Creeks	KIE793
167.150 Talkaround	Channel 1
167.150/166.350	Channel 2 (173.8 Hz)

Radio Numbers:

Park District	Radio Series Numbers
Little River District-Sugarlands Area	400 units
Oconaluftee Area	500 units
Cades Cove Area	600 units
Park Dispatch	700 (Gatlinburg)
Park Back Country Camping Desk	700B (Gatlinburg)

Base Stations - 167.150/166.350 MHz

Location	Repeater Base Station Callsign Linked to
Abrams Creek, TN (Ranger Station)	KIE716 (To Look Rock Repeater)
Big Creek, TN (Ranger Station)	KIE713 (Mount Sterling Repeater)
Cades Cove, TN (Ranger Station)	KIE706 (Cove Mountain/Look Rock Repeaters)
Cataloochee, NC (Ranger Station)	KIE703 (Mount Sterling Repeater)
Chilhowee, TN (Ranger Station)	KIE717 (Look Rock Repeater)
Cosby, TN (Ranger Station)	KIE702 (Mount Sterling Repeater)
Deep Creek, NC (Ranger Station)	KIE709 (Clingmans Dome/Cowee Bald Repeaters)
Elkmont, TN (Ranger Station)	KIE704 (Clingmans Dome/Cove Mountain Repeaters)
Gatlinburg, TN (Park Headquarters)	KIE700 (Clingmans Dome/Cove Mountain Repeaters)
Greenbrier, TN (Ranger Station)	KIE712 (Clingmans Dome/Cove Mountain/Mount Sterling Repeaters)



Map of the Great Smoky Mountains National Park (Courtesy of the National Park Service)

Palm Beach County Confusion

During last fall's contested presidential election, Palm Beach County in Florida was ground zero for the confusion and varied opinions of politics. Public safety radio systems in that county seem to be following the example of their election boards as yet another trunked radio system has been announced.

Palm Beach County is the largest county in Florida with a population of more than one million people and covers more than 2,500 square miles. A number of cities and towns in the county are part of the Municipal Public Safety Communications Consortium, Inc. (MPSCC), which in April selected a new public safety communications system for their members.

OpenSky

MPSCC selected a relatively new system called OpenSky from a company called M/A-COM based in Massachusetts. Under the terms of an 18 month, \$8 million agreement, M/A-COM will provide base stations, mobile and handheld radios, and support services for a digital voice and data network that will link several dozen municipalities within the county.

OpenSky appeared on the public safety radio scene in 1998 when the Orange County Transportation Authority (OCTA) in California chose M/A-COM to provide a digital trunking system for about 450 buses and other vehicles used by the agency.

A year later the state of Pennsylvania, under a number of deadlines and no small amount of lobbying, chose to implement a statewide communications network using the M/A-COM OpenSky system. This is by far the largest OpenSky network ever to be built, covering more than 45,000 square miles and supporting well over 25,000 users. Seven regional operating centers will link 250 radio tower sites to provide voice and data connectivity for more than 20 state agencies.

Last year the Pennsylvania counties of Cumberland (in August) and Lancaster (in December) voted to deploy OpenSky networks for their own local radio communication needs. Other counties are in the process of testing the system for suitability in their localities.

OpenSky Protocol

OpenSky radios operate within the FCC frequency allocations for trunked operations, with the normal 25 kHz channel spacing. Radios receive on frequencies between 851 MHz

and 870 MHz and in normal operation transmit between 806 MHz and 824 MHz. When the radio is operating in talk-around mode (direct radio-to-radio, without a repeater), it can transmit on any channel between 851 MHz and 870 MHz.

OpenSky divides the 25 kHz radio channel into two time slots. This time division multiple access (TDMA) method allows two simultaneous conversations to share one radio frequency channel. Since all transmissions are fully digital, OpenSky can carry both digitized voice and data traffic over the same link. Each conversation can be either digitized voice or a raw data link operating at 19,200 bits per second.

Voice traffic is compressed and encoded using the Advanced MultiBand Excitation (AMBE) from Digital Voice Systems, Inc., the same company that licenses the Improved MultiBand Excitation (IMBE) vocoder for APCO-25 radio systems.

Older analog radios will work with the new system, since OpenSky radios and base stations are able to operate in conventional analog FM mode with sub-audible tone squelch.

Internet Protocol

One of the biggest selling points for OpenSky is that their network is based on the IP (Internet Protocol) standards originally de-

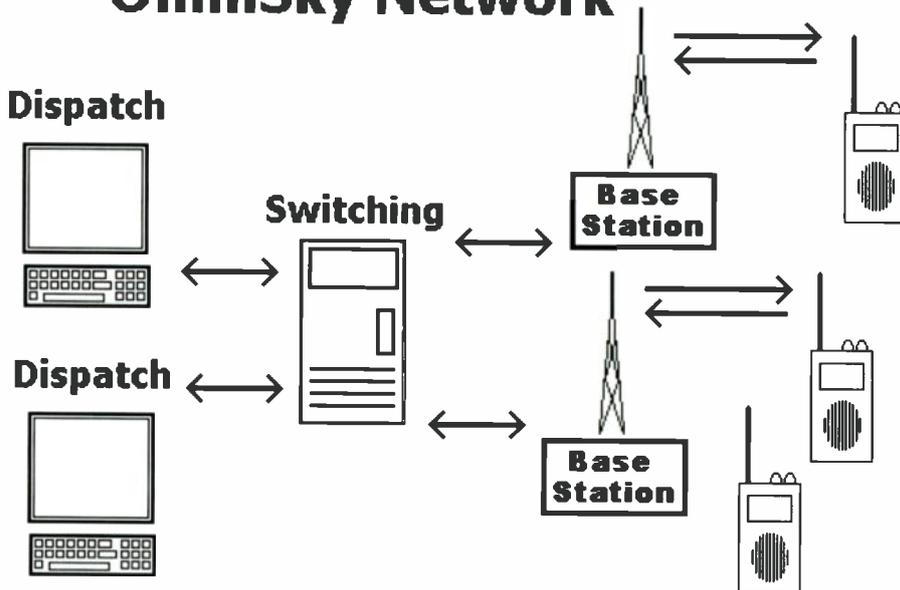
signed for the ARPANET (Advanced Research Projects Agency Network), the same standards now in widespread use in the Internet. Such an IP-based network allows the use of more common, less expensive infrastructure equipment and computer software.

Each OpenSky radio is an IP "node" in the network, with its own unique address. By using the Internet standard Transmission Control Protocol (TCP), end-to-end connections are available to each mobile user. OpenSky radios typically have an RS-232 serial interface, which provides a 19,200 bit-per-second data connection to a laptop or other external device. This provides the capability of using common Internet applications on mobile computers without a lot of additional investment.

Since most operations inside the radios are performed by software, programming can be done "over the air." Frequencies, talkgroups, and even the firmware that controls the radio can be changed and updated over the radio link. Base stations and radios also include on-line maintenance capabilities, allowing them to be checked and updated remotely from a network management center.

On the ground, all voice and data traffic is routed using IP. Voice messages are compressed and delivered using Voice over IP (VoIP) technology.

OmniSky Network



OpenSky and EDACS

Interestingly, OpenSky and EDACS (Enhanced Digital Access Communications System) are now owned by the same parent company.

Once upon a time, General Electric had an operation in Lynchburg, Virginia, which included a radio systems division. They were perpetually number two in sales behind Motorola. Ericsson bought the operation in 1989, but sales of public safety radio systems continued to lag.

In January of 2000, Ericsson sold the Private Radio Systems division to a Pittsburgh, Pennsylvania-based company called Com-Net, but retained 20 percent ownership. The new Com-Net Ericsson Critical Radio Systems continued to sell and maintain EDACS radio systems.

During this period, Com-Net Ericsson was awarded the contract for the Florida Statewide Law Enforcement Radio System. Motorola had won the contract, at the time the largest contract in land mobile radio history, and began installation in 1988, but in 12 years had spent \$110 million and was only 40 percent complete. A number of factors complicated the situation, but in the end a less expensive proposal to complete and maintain the system was awarded to Com-Net.

In April of this year Tyco International bought Com-Net Ericsson Critical Radio Systems and placed it under M/A-COM, which is part of Tyco Electronics in Harrisburg, Pennsylvania. This is the same M/A-COM that sells OmniSky systems.

Although M/A-COM is hoping that marketing and contracts experience from Com-Net Ericsson will help promote OpenSky products, existing EDACS and ProVoice (the follow-on to EDACS) systems continue to be sold.

◆ Clarksville, Tennessee

The city of Clarksville, Tennessee, northwest of Nashville near the Kentucky border, will spend more than \$3 million to replace their conventional 450 MHz radios with a new three-site, eight channel 800 MHz ProVoice system from M/A-COM. Initially the police department will take delivery of about 500 radios, with another 200 to be spread among the fire department's 10 stations. Public works and other city services will eventually migrate to the system.

Shelby County, in southwestern Tennessee, and the Saturn automobile assembly plant in Spring Hill have both used EDACS radio systems for many years.

◆ Oklahoma City, Oklahoma

In July of this year, the Oklahoma City Council approved M/A-COM as the preferred supplier of the city's new EDACS network, which will ultimately include all of the city departments.

◆ Palm Beach County, Florida

Saw your article in the August issue of *Monitoring Times* about Palm Beach County, FL, and thought I'd give you an update.

The Palm Beach County system is a Motorola SmartZone APCO-25 (IMBE) Astro/analog system with 4 cells:

Cell 1 = Palm Beach County with 28 frequencies (not 26) at 10 sites

Cell 2 = Boca Raton with 10 frequencies at 1 site

Cell 3 = Boynton Beach with 5 freqs at 1 site

Cell 4 = Delray Beach with 5 freqs at 1 site

Cells 2, 3, and 4 are using IMBE digital full time for Police and Fire, while Public Works is all analog. The control channel is the 3600 baud version, thus the Trunk Trackers will track it. On ALL SmartZone cells, talkgroups 16 to 8176 (Hex 001 to 1FF) are IMBE digital, while 8192 to 65520 (Hex 200 to FFF) are analog. On the county Cell (#1), 21 of the 28 transmitters are analog-only, while the remaining 7 transmitters are dual-mode (i.e. capable of both analog and IMBE digital). Palm Beach County will run all analog except OCB, SRT, and TAC units.

The County's VHF system is NOT completely gone yet – they are simulcasting between the trunked and VHF system, so either radio can be used for now. Eventually they will remove the simulcast.

County Fire-Rescue still must purchase their radio equipment and will not switch over until at least next year, then after that all Local Government (currently on lowband) will be switched.

Currently there is no way for Palm Beach County to talk to Martin and Miami-Dade County other than through the NPSPAC channels. Martin County uses an EF Johnson LTR Multi-Net 2 trunked system, while Miami-Dade uses an EDACS trunked system. There are currently no patch capabilities between the Palm Beach County system and Martin and Miami-Dade Counties, but a patch to Martin's system is planned, as well as a patch to the conventional systems of Hendry, Glades, and Okeechobee Counties.

Broward County uses a Motorola system so it is simply a matter of entering their system into the Palm Beach County radios, although currently no Palm Beach Sheriff's Office radios have ANY Broward talkgroups in them now, only future-use talkgroups for patching to Broward. Boca is the only agency with Broward talkgroups programmed into them. Also, NONE of the agencies on this system have any state talkgroups in them.

CELL 1 - PALM BEACH COUNTY

Analog: 856.3375, 857.3125, 857.3375, 858.3375, 859.3125, 859.3375, 860.3375, 866.1000, 866.1250, 866.3250, 866.3500, 866.6000, 866.6250, 866.7500, 866.8250, 867.1000, 867.3250

Control: 867.3750, 867.5750, 867.7625, 868.7250

Digital: 856.3125, 858.3125, 860.3125, 868.2250, 868.3750, 868.6500, 868.7000

Three additional frequencies are licensed but not in use: 866.850, 867.350, 867.400.

Simulcast talkgroups:

26704 CH 1 - 154.845

26768 CH 2 - 154.725

26928 CH 3 - 154.815

26832 CH 4 - 154.785

27216 CH 5 - 154.650

Dispatch District 3 North

Dispatch District 1 Central

Dispatch District 5 West

Dispatch District 4 South

Inquiry 1

NOTE: All frequencies in Cells 2, 3, and 4 are dual-mode digital and analog capable.

CELL 2 - CITY OF BOCA RATON

Analog: 852.5625, 852.5875, 852.6125, 853.6375, 853.6625, 853.7875

Control: 853.8125, 854.5875, 854.6625, 854.6875

CELL 3 - CITY OF BOYNTON BEACH

Analog: 856.2875

Control: 857.2875, 858.2875, 859.2875, 860.2875

CELL 4 - CITY OF DELRAY BEACH

CC Plan 3

Analog: 866.3750

Control: 866.7750, 867.0750, 867.6750, 868.1500

The talkgroup layout is pretty clear, except for inter-agency communications. None of the inter-agency talkgroups are in the same channel location between all of the agencies (like Broward County with "System 14"). For example, if a Delray Police unit wanted to talk to a Palm Beach Sheriff's Office unit on Global Common 1 (talkgroup 64016 decimal, FA1 hex), the Delray unit would switch to Zone C, channel 13; but the Palm Beach Sheriff's Office unit would switch to Zone 8, channel 7. Another example, Boca Raton and Delray Beach both have the 5 "Metro" talkgroups, but Palm Beach Sheriff's Office and Boynton do not.

– Brian

◆ State of Michigan

Just to let you know I enjoy your column. And just to give you a little information on the State Police radio system. Phase 3 will be taken over by the State Police radio technicians on August 24 and installation of phase 4 will start with pre-work September 1. Installation starts in the Upper Peninsula on October 1 and with mild weather will finish the 80 tower sites by January 1. By the way, there is talk that the data link will not be installed.

– Gary

That's all for this month. More information is available on my website at <http://www.signalharbor.com>, including information on manual updates for the Bearcat 245XLT. As always, I welcome your electronic mail sent to dan@signalharbor.com. Until next month, happy monitoring!

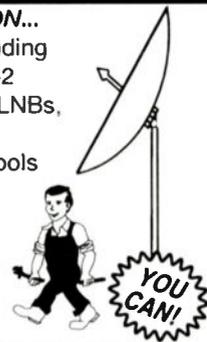
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Airship Aviation

Welcome aboard and fasten your seatbelts! Today we are going to look at Goodyear Tire and Rubber's Airships and their air/ground communications. Also, a review of AirNav's new ACARS Decoding software, and other goodies as well.

Most everyone reading these words has had a glimpse of a Goodyear Blimp (or airships, as they are called today), at least on television. There wasn't a single year when I lived in Indianapolis that at least one wasn't seen for the 500 Mile Race in May. Other events it has covered for its audiences include the World Cup, the 1996 Summer Olympics in Atlanta, the Kentucky Derby, the Super Bowl, the Rose Bowl and parade, America's Cup Yacht Races, and many more.

For more than 75 years, Goodyear Airships have adorned the skies as very visible corporate symbols of the tire and rubber company that began operations in 1898. Today, these graceful giants log over 400,000 air miles per year, traveling across the United States, Europe, and South America as Goodyear's Global "Aerial Ambassadors."

The airship tradition began in 1925 when Goodyear built its first helium-filled public relations airship, the *Pilgrim*. The tire company painted its name on the side and began barnstorming the United States. Humble beginnings to an illustrious history. Over the years, Goodyear built more than 300 airships, more than any other company in the world. Akron, Ohio, the company's world headquarters, was the center of airship manufacturing for several decades.

During World War II, many of the Goodyear-built airships provided the U.S. Navy with a unique aerial surveillance capability. Often used as convoy escorts, the airships were able to look down on the ocean surface and spot a rising submarine and radio its position to the convoy's surface ships ... in essence acting as an early warning system. Modern surveillance technology eventually eclipsed the advantages of the airship fleet, and in 1962, the Navy discontinued the program.

Today, the Goodyear Tire and Rubber Company no longer mass-produces airships. In the United States it operates three well-recognized airships: the *Spirit of Goodyear*, based in Akron, Ohio; the *Eagle*, based in Carson, California; and the *Stars and Stripes*, in Pompano Beach, Florida. Under Goodyear Chairman Sam Gibara, the fleet has been expanded from the three North American airship operations to five airships world wide: *Spirit of Europe*, operating on the European continent, and *The Spirit of The Americas* flying over the North and South American continents.

All Goodyear airships are FAA-Certified for IFR flying, day or night. They carry two King 360-channel navcom radios, the usual light plane instruments, digital radar for keeping an eye on thunderstorms, transponder for radar identification, and a couple of instruments peculiar to airships: manometers for watching envelope pressure and a helium temperature gauge. All Goodyear airships carry GPS navigation receivers for precise navigation.

Goodyear trains its own pilots. The usual complement is seventeen crewmen (riggers, engine mechanics, ground handlers, and electronic technicians), five pilots, and a public relations manager. Crewmen also share driving chores in the bus and truck, and they take turns standing watch over the ship, which is never, ever left alone.

Most flights, whether with passengers or cross country, are at 1,000 - 1,500 feet. Goodyear likes to keep the ship close to the

ground so that people can see it more easily. It has a maximum altitude, depending on the variables of the atmosphere, of about 5,000 feet. Beyond that height, the air gets thinner and the helium expands, causing automatic safety valves to open.

Goodyear has its own, specially-designed TV equipment for use in the airships. The equipment is kept with the crew for installation just prior to a given event. The camera is a small Wescam, mounted in a vibration-free gimbal mount. The lens is an enormous Fujinon 44:1 zoom. The camera's image is transmitted to the ground by microwave, where a microwave dish antenna and feeder pick it up and feed it to the network. The airship signal can be put on the air live or taped for replay. Goodyear pilots fly the airship and the company supplies the TV equipment and technicians to the networks.

Thanks to Scott Baughman of Goodyear Airship Operations for permission to use the above information. You're welcome to pay their website a visit at <http://www.goodyear.com/us/blimp>.

◆ Readers' Corner

Kevin O'Rourke (CARMA- Chicago Area Radio Monitor Association and ComAirScan member) contributes the following information for the Goodyear Airships' frequencies in the Chicago area: 151.625 MHz (151.4) is what they've heard for comms between the GY Airship and its ground team. It seems to be used for comms with the crew at the mooring site (sta-

tus/location reports, ETA back to the mooring site, etc.) The three UHF splitters (465.9125, 465.9375, 465.9625) seem to be used primarily for technical coordination with the GY microwave receive crew at the sporting event, etc., for which they are providing aerial images. 132.000 MHz is their company frequency that is used for contact with their hangars when in-range. He adds that he's not sure if the license for a company channel would allow them to use it nationwide or just for within so many miles of a specified point. (*I'm not sure myself, but I have heard it used in various*



Photo Credit: The Goodyear Tire & Rubber Company, Akron, Ohio

parts of the country - jh).

Another member of CARMA reports that the KEDZI marker (248 kHz, 75.00 kHz) for Midway A is located on the southeast corner of 83rd Place and Washtenaw, which is in a residential neighborhood in Chicago. He also says that there is an old tower there, which doesn't look as if it's being used, but the Yagi is quite visible.

◆ AirNav's ACARS Decoding Software

In a feature on ACARS decoders in the August issue of *MT*, we talked about what was available along those lines. The AirNav Systems' ACARS decoding software hadn't been available then, or I would have included it in the review of products. Shortly thereafter, I was informed about AirNav's entry into the decoding market. Of course, I had to try it out right away and found it to be the best decoding software available today.

Of course, to begin receiving decoded messages you will need a VHF aero band receiver and an audio cable (available at Radio Shack) to connect your receiver to the line-in or mic on your computer's sound card. That's it - no muss, no fuss, no bother, and no hardware to mess with. There is very little adjusting of the sound level, as some ACARS decoders require. This software works best when the volume control is turned up approximately halfway. Computer requirements are as follows: Windows 95, 98, ME, NT, 2000, XT, and a sound card.

The features included in the software package are: Real-time ACARS decoding, real-time information on the decoded aircraft (registration, type, company), the ability to manually change decoded data, and report generation in TXT format.

Interesting innovations include a feature that shows you photos of the aircraft whose message has been decoded, the inclusion of plane details in the TXT log, and an editable aircraft database. Last, but not least - AirNav ACARS Decoder is compatible with AirNav 3.1.

There's only one slight glitch with the software, and that's a tendency for Windows to hang up when exiting the program. However, I've been assured by Andre Brandao, the software developer, that this is being addressed and will be taken care of as soon as possible.

The software can be purchased on line for \$39.95 (<http://www.airnavsystems.com>), or you can call your order in to their eCommerce service RegSoft (USA and Canada: 877-734-7638; fax 800-886-6030; International: 770-319-2718; fax 208-279-3837)

◆ AirNav Systems Bring You Live Weather!

Another new feature from AirNav Systems is the ability to see live aviation weather (METAR Weather Reports) on your computer screen for a large number of cities, listed by ICAO Code. Since the explanation of how the code is broken down happens to be rather lengthy, we won't go into detail here. Suffice to say that it is very interesting to learn to understand what these codes mean, as well as how to read and interpret them.

Frequencies from the FAA

ABQ - Albuquerque International

Sunport Airport, NM

ATIS: 119.0/257.700

Albuquerque Approach/Departure:

123.900, 124.400, 127.400, 134.800, 235.500, 263.150, 317.600, 354.100, 126.300 (Approach only)

Clearance Delivery:

119.2/385.600

Albuquerque Ground:

121.900/348.600

Albuquerque Tower:

118.300/351.900

UNICOM:

122.950

CLE - Cleveland-Hopkins International Airport, OH

ATIS:

127.850

Cleveland Approach:

124.00, 360.600, 123.850, 126.550

Clearance Delivery:

125.050

Cleveland Departure

118.150 (054-233), 128.250 (243-053)

Class B:

124.000 (W), 125.350 (ENE), 128.250 (SE), 360.600

Cleveland Ground:

121.700, 124.500

Metering:

124.500

Ramp Control:

129.175

Cleveland Tower:

120.900, 257.800

STL - Lambert - St. Louis International Airport, MO

ATIS:

119.925, 120.450, 277.200

St. Louis Approach:

125.150 (N/E), 126.500 (S/W), 324.100 (S/W), 360.600 (N/E), 123.700

Air National Guard Operations:

297.900

Clearance Delivery:

363.100

Class B:

124.200 (NE), 126.700 (S/W), 254.300 (S/W), 388.000 (N/E)

St. Louis Departure:

118.950 (S/W), 119.150 (N/E), 289.100 (S/W), 335.500 (N/E)

St. Louis Ground:

121.900, 348.600, 121.650

St. Louis Tower:

118.500 (South), 120.050 (North), 257.700 (South), 284.600 (North)

Pre-Taxi Clearance:

119.500, 363.100

UNICOM:

122.950

DEN - Denver Int'l Airport, CO

ATIS:

125.600 (Arr), 134.025 (Dep)

Denver Approach:

119.300 (North), 120.350 (South), 307.300 (North), 381.500 (South)

Clearance Delivery:

118.75

Class B airspace:

134.850 (North), 251.125 (North), 126.100 (West), 128.250 (East), 128.450 (South), 251.075 (South), 360.750 (West), 371.950 (East)

Denver Departure:

127.050 (North), 363.250 (North)

Final Control:

120.800

Denver Ground:

121.850, 127.500, 377.100, 380.300

Denver Tower:

124.300, 133.300, 35.300, 239.275, 322.450, 351.950

UNICOM:

122.950

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Bits and Pieces

• Most radio these days is rather homogenized. Rock, "lite," country, talk; that's about all you hear anywhere. There are a few blatant exceptions. Bob Fraser in Massachusetts forwarded a program schedule from one of them, WJIB-740 Cambridge. WJIB's nominal format is easy listening. (Rare enough these days!) But they also carry two hours of Radio France Internationale, in French, at 7am weekdays. Sunday programs include several hours of religious services, followed by an 11am talk show about radio. This show features several well-known names in radio history and DXing; if you're within range, you need to check it out. This show is followed by Radio Netherlands' "Euroquest" (in English), then four hours of Greek- and Italian-language programs. After some more easy listening, three hours of Allston-Brighton Free Radio is carried. ABRF has its own low-power Part 15 stations on 1630 and 1670 kHz, but WJIB gives some of their programs wider coverage.

Bob also commented on hearing WDDZ-550 Pawtucket, which recently began carrying Radio Disney and switched calls from WICE. The only ID Bob is hearing is "Radio Disney 550," much like their WMKI-1260 Boston whose ID is "Radio Disney 1260." I have heard full callsign IDs on Radio Disney stations, but they do indeed simply say "Radio Disney" most of the time.

• Two readers wrote about the picture of the WWTO-TV antenna that appeared in the July column. Patrick Griffith in Denver notes that WWTO's antenna is directional, concentrating the station's power towards Chicago to the northeast, and Peoria to the southwest. He believes that mounting the antenna on that side of the tower allows this directional pattern to be obtained without interference from the metal tower. Patrick also suspects the station wants to save the top of the tower for its digital antenna.

David Dunkelberger from Virginia also suggested that a directional pattern was involved. Sometimes, the tower is intentionally put in the way to reduce interference to an adjacent channel. And in some cases, the design of the antenna may actually depend on being mounted to the side of the tower. More importantly, according to Dave, is that additional bracing is possible for a side-mounted antenna. These antennas are very heavy, especially when the wind is blowing on them. It is possible the tower

and antenna are simply not strong enough to support top mounting.

• Dale Lamm in Canton, Ohio, logged five Texas FM stations on sporadic-E on May 31. The opening occurred during his 5pm commute home from work; he used a factory GM car radio. These stations are roughly 1,000 miles from Canton. At one point, the skip was so intense that KWRD overrode his local WMMS-FM. A list of Dale's loggings is in the sidebar.

Dale Lamm's Canton, Ohio FM DX		
Brownwood, TX	KPSM	99.3
Denton, TX	KHCK	99.1
Fort Worth, TX	KSCS	96.3
Highland Village, TX	KWRD	100.7
Winfield, TX	KALK	97.7

• We now have our first report of a LPFM station by a DXer. Glenn Hauser reported on the Internet hearing KLGB-LP 94.3 Enid, Oklahoma testing. Glenn lives in Enid so it wasn't a fantastic DX catch, but someone will report one of these at a good distance soon enough.

• There's a new AM station on the air in Dresden, Germany. Mega Radio is now operating on 1431 kHz. North American AM stations are downright puny by European standards; Mega Radio will be combining the outputs of two 125 kW transmitters to get 250 kilowatts of power. And even that is relatively low; there are many 1,000 kW stations in Europe, and even a few of 2,000 kW power.

• I recently returned from a two-week vacation in the western part of North America. In Canada, I noticed signs along the highways announcing the frequencies of local radio stations. The sign in the picture was located near Hosmer, British Columbia, (and the frequencies on the sign were accurate) The signs in Manitoba were a bit more amusing, announcing stations that no longer exist, like CKRC-630. AM stations are disappearing rapidly in central and western Canada; Lethbridge, Alberta (population 63,000) no longer has any local AM stations. However, AM stations really "get out" on the plains, and Lethbridge gets excellent reception from Calgary's five stations.

• There's been a growing trend in

radio to play just music and commercials, and nothing else. This works well for listeners who tune in for the music, but it brings up a bit of a dilemma for the record companies. If the station isn't telling listeners what records it just played, how do the listeners buy the records they like? Record store Sam Goody's, in conjunction with Epic Records, has found one answer. They're paying WKTU-103.5 New York to air brief announcements identifying some of the Epic records they play, and telling listeners they can buy those records at Goody's. This process sounds a bit like the "payola" scandals of the 1960s, but in this case the fact the announcements are paid for is not kept secret, and the station claims it isn't playing the Epic records any more frequently than they would without the payments. (Thanks to Robert Thomas for the NYC *Daily News* item)

• Another *Daily News* item forwarded by Robert notes the disappearance of many live broadcasts from the Internet. Unions representing commercial announcers insisted on additional session fees if the commercials they worked on were carried on the 'Net. Since stations make little if any extra advertising revenue by Internet broadcasting, most simply shut down their Internet broadcasts. Many have since returned after installing equipment to strip commercials from the Internet feed.

Have you heard one of the new LPFM stations? Write me at Box 98, Brasstown NC 28902-0098, or by email to w9wi@w9wi.com. Good DX!



You won't have any trouble identifying the local stations with signs like this around!

Hear Pirates via Java Radio?

Kelly Lindman, the Webmaster of Javaradio at Lindman IT AB in Sweden, reminds us that his web site at <http://www.javaradio.com> remains connected to a variety of receivers around the world. You can tune these receivers, and then listen to what may be coming in locally. The concept is potentially useful for hearing pirates and clandestines that are not audible at your own location, but that could be coming in with decent signals elsewhere on the planet.

This service is little known, but it is well worth a try. It's an opportunity to take a European DXpedition without leaving your house.

◆ Clandestine Targets

If you're looking for some interesting clandestine logs, some stations have been hot DX news lately. **Radio Kavkaz** in Chechnya has been widely heard around 1630 UTC on 7143 kHz. **Radio Free Vietnam** is an interesting new catch on 15235 kHz around 1400 UTC. **New Star Broadcasting Corporation**, featuring coded numbers at times, is being heard on 13750 kHz around 1100 and 1200 UTC. Rich D'Angelo even coaxed a courtesy reply from Radio Taipei International about this station.

◆ What We Are Hearing

MT readers heard all of these stations this month. Almost all of them used 6955 kHz, but it pays to tune around about 5 kHz on either side of this standard North American pirate frequency.

Blind Faith Radio- Just about every month, Dr. Napalm's classic rock productions appear on shortwave. (Uses blindfaithradio@yahoo.com e-mail)

KIPM- Alan Maxwell's marathon weird dramas are creative, but are an acquired taste. Recent shows outlined how undead zombies have taken over pirate radio. (Elkorn)

KRMI- Note the Michigan theme on the QSL we

see here. (Uses KRMI6955@hotmail.com e-mail)

Mystery Science Radio- If you don't like rock music, their pop is a change of pace among pirates. (None, asks for loggings in *The ACE*)

Paragon Radio- This new blues, jazz, and poetry station says that it is targeted to "older listeners." Are all Stan Kenton fans old men? (None)

Partial India Radio- A parody of All India Radio, this one features Harold Krishna with jokes about DXers. (Providence)

Psyco Radio- Lately they have been emphasizing parodies of shortwave radio listeners and stations. Spelling of the station name remains in some doubt. (Now using psycoradiohd@yahoo.com e-mail)

Radio Metallica Worldwide- The superpowered Dr. Tomado has reappeared after a long absence, but it is hard to tell if this has been new programming or old taped relays. (Blue Ridge Summit)

Radio Bingo- The bingo game over the radio for pirate listeners has branched out; see *United Patriot Militia Bingo* below. (Merlin)

Radio KAOS- It's not clear if this rock music station is a reactivation, but the call letters have a long history in pirate radio. (None)

Radio Neptune- All of their shows are advertised as their "Universal Service." Has anybody heard them with a different service? (Blue Ridge Summit)

Rock N'Roll Radio- Their format is obvious. They have an apparent connection with the *Voice of the Angry Bastard*. (Try Belfast)

Solid Rock Radio- Dr. Love has been a pioneer in the use of internet audio feeds by pirates. You can check him out at http://www.solidrockradio.net/listen_live.htm on the web. (Belfast)

United Patriot Militia Bingo- Their funny parody of UPR offered \$1,000 and a set of fatigues to the bingo winner. They asked for donations to the militia so that they could replace a broken bingo ball machine. (Merlin)

United Patriot Radio- Steve Anderson's militia movement clandestine continues activity on 6900 kHz after dark. It may not be on every day, but when it is, it's been heard worldwide. Sometimes they are on as early as 0000 UTC, but 0200 UTC is a better time to check. (Somerset, but does not QSL)

Voice of Captain Ron Shortwave- He normally programs rock music, but Captain Ron is becoming a more prominent part of the pirate broadcasting scene. (Uses captainron6955@hotmail.com e-mail)

Voice of the Angry Bastard- Despite their dissonant station ID, their programming normally consists of music. (Belfast)

WHYP- James Brownard, the original operator of North East, PA's medium wave station, lives on in this pirate's parodies. (Uses whyp1530@yahoo.com e-mail)

WKUE- Somebody has pulled old tapes of *Laughing Bill's* classic pirate shows out of the vault. (Try Belfast)

WMFQ- If you hear them and write to them, ask them where your QSL is. Just don't tell them what you plan to do with it. (Providence)

◆ Reports and QSLs

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. This finances postage for a souvenir QSL to your mailbox. Send your letters to these addresses: PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 69, Elkorn, NE 68022; 245 Elrod Martin Road, Somerset, KY 42503; and PO Box 293, Merlin, Ontario N0P 1W0, Canada.

A few pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. Reports to the *Free Radio Network* (FRN) go to <http://www.frn.net/> on the web. *Free Radio Weekly* loggings go via niel@ican.net e-mail. Sample copies of *The ACE* are \$2 via the Belfast maildrop.

◆ Thanks

Your input is always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address atop the column. We thank all of our contributors: Gabriel Ivan Barrera, Argentina; Artie Bigley, Columbus, OH; Jerry Coatsworth, Merlin, Ontario; Ross Comeau, Andover, MA; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Bill Finn, Philadelphia, PA; Harold Frodge, Midland, MI; William T. Hassig, Mount Prospect, IL; Harald Kuhl, Germany; Chris Lobdell, Stoneham, MA; Dr. Love, Belfast, NY; Greg Majewski, Oakdale, CT; Bill McClintock, Minneapolis, MN; Alan P. Sasiga, Winona, MN; Gary Neal, Sugar Land, TX; Pat Nobel, Eugene, OR; Michael Prindle, New Suffolk, NY; Lee Reynolds, Lempster, NH; Bud Ranger, North Olmsted, OH; Martin Schoech, Merseburg, Germany; Tom Severt, Frontenac, KS; Bud Stacey, Setsuma, AL; Enrique A. Wembagher, Buenos Aires, Argentina; Niel Wolfish, Toronto, Ontario; and Joe Wood, Gray, TN.



Besides Beacons...

In the last issue, we discussed what it takes to get started in longwave listening. We covered the basics of receiving equipment and began discussing the signals you can hear on the band. At that time, our slant was toward beacons – a popular pursuit for many. This month, we'll explore a few of the other signals you can hear during your tour of the basement band.

A logical place to begin is at the bottom of the band. From 300 Hz to about 10 kHz is considered the realm of "natural Radio." This is where you can hear Tweaks, Dawn Chorus, Whistlers, and other sounds generated by nature itself. A word of caution is in order here: Some folks find this part of the band so intriguing, that they don't lose interest for months, or even years!

The equipment for natural radio reception can be extremely simple. Although the signals consist of radio energy, they occur at frequencies normally associated with sound, and therefore can be heard on a receiver that resembles an audio amplifier with an antenna attached. In actual practice, a stock audio amplifier with a longwire antenna will pick up too much 60 Hz hum from power lines to be of much use. A far better solution is to use a receiver that filters out the 60 Hz frequency range and concentrates on the "prime" natural radio band.

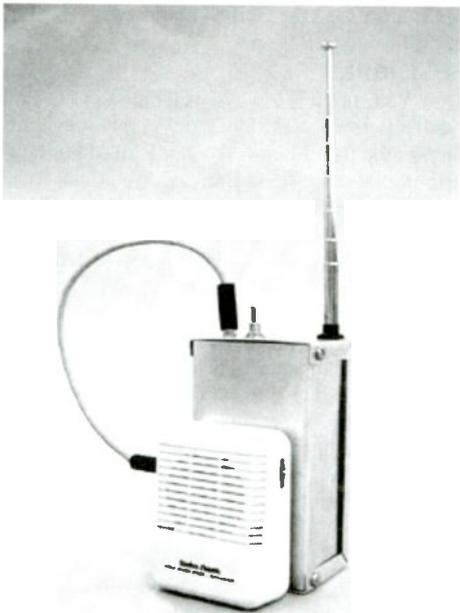


Figure 1. The BBB-4 natural radio receiver can be built from Radio Shack parts.

Fortunately, such a receiver is easy to build from junk box components. Plans for Stephen P. McGreevy's BBB-4 receiver were presented in the March and April 2000 issues of this column. See Figure 1 for a picture of the finished receiver. Reprints for the two-part article are available from *Monitoring Times* at \$3 each. You'll also find much more information on natural radio at Stephen McGreevy's excellent web site: <http://www.triax.com/vlfradio/>.

Moving up the band just a bit, you may encounter the CW signals of historic station SAQ on 17.2 kHz, at the Telemuseum in Grimeton, Sweden. This station is one of the last Alexanderson Alternators in existence, and is fired up from time to time by museum volunteers. SAQ employs an electro-mechanical method of generating radio signals, and in 1924 it was considered a great advancement in radio technology. For more information on SAQ, visit <http://www.telemuseum.se/Grimeton/default.html>.

At 60 kHz, you'll hear the strong, pulsed carrier from time station WWVB, sister station to well-known HF station WWV. You will not hear voice on WWVB. The time signals are in a binary coded decimal (BCD) format intended for reception and display by specialized equipment. Several manufacturers now make timepieces, for example, that lock into WWVB signal and provide extremely accurate time. Labs and electric utilities also use WWVB for precise frequency calibration.

From 24 kHz to 150 kHz, you're likely to hear the warbling signals of several RTTY stations. These stations are located at major military installations, and provide one-way encrypted transmission to submerged submarines. On rare occasions, you may hear straight keyed-carrier CW from these stations, though I've never been lucky enough to snag one.

136 kHz is a frequency worth checking. Many countries (mostly European) have approved the frequency as a ham band. A similar proposal has been in process in the US for over 3 years, but as of this writing, no action has been taken by the FCC. There are, however, a few experimental stations operating by permit that you may be able to hear. If you're near Virginia, try for the AMRAD experimental station WA2XTF. You can learn more about 136 kHz on AMRAD's website at <http://www.amrad.org>.

150 kHz is the start of the European broadcast band (150-285 kHz). These stations frequently operate at high power (500,000 watts

or more) and are fairly easy to hear on the East Coast of North America. The key is to try listening at times when there is a complete path of darkness between you and the transmitting station. This will be from your local dusk until about 1a.m. Some kingpins to try for are 162 kHz-Allouis, France; 183 kHz-SaarLouis, Germany; 198 kHz-Droitwich (BBC); and 252 kHz-Dublin, Ireland.

From 160 to 190 kHz is the license-free "lowfer" band, where US citizens may operate a 1-watt transmitter with a maximum antenna length of 50 feet (15 meters). Despite these restrictions, Lowfers are achieving remarkable ranges, with 400 miles or more becoming almost common. Although CW still dominates here, a number of digital modes are gaining ground and will likely surpass CW in the next few years. Weak signal modes such as QRSS, BPSK, WOLF and PSK31 are at the forefront of this movement, and the necessary software can be downloaded at little or no cost via the Internet.

For more information on Lowfers, visit the Longwave Club of America's website at <http://www.lwca.org>. A good source for information on lowfer digital modes and other technical topics is Lyle Koehler's site at <http://www.computerpro.com/~lyle/>.

As we discussed last month, you will find numerous navigation beacons operating from 190 to 535 kHz. Some of the "experts" wrote these stations off as ancient relics 10 years ago, but they are still serving faithfully and providing an important backup to more sophisticated methods of navigation. Again, the LWC's website is an excellent place to learn more about the hobby of beacon DXing.

At the top end of the band—518 kHz—is the home of NAVTEX, a marine teleprinter network carrying weather, safety and navigation bulletins for serious boaters and commercial shipping interests. Landlubbers can tune in with nothing more than a stable receiver, an RTTY decoder, and their PC. Either SITOR or AMTOR Mode B can be used to tune in these interesting signals.

This ends our brief tour of the longwave band. There are few other places in the radio spectrum where you can hear such a variety of services over a span of just 500 kHz! Enjoy your exploration and be sure to send your loggings to *Below 500 kHz* for possible use in a future column. You can send them via e-mail at lowband@gateway.net or by regular mail.

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Easy PSK31 Ops with RIGblaster

You folks may have figured out by now that I am a bit of an odd duck. This applies to most aspects of my life, and especially so to amateur radio. Allow me to explain: I am known for being quite the computer geek – usually in possession of the most “bleeding edge” fire-breathing personal computer on the planet at any given moment. However, when it comes to interfacing this said computer with the ham radio hobby I tend to be a bit of a Luddite.

Now I come by this position quite honestly. You see, in the early days of personal computing it took a rather brave soul to interface what was then very, very, *very* expensive (and equally fragile) personal computer to ham gear with its high voltage potentials and stray RF currents. There was a lot of uncharted ground, and those of us with thin wallets and non-technical backgrounds were perfectly happy to sit on the sidelines and let those with stouter hearts and purses chase the computer/transceiver interface dream. Is it any wonder that, even today, running cables between my computers and my radios gives me the Boo Boo Jeebies?

It is for this reason it took me almost eight years to warm up to the “Packet Radio” mode of operation. (By then most of the guild was off the lily for packet, but I still had a lot of fun.) I doodled around with RTTY and keyboard Morse, but the typed digital modes just never floated my boat...until now.

PSK31 has been around for a couple of years now and it is really taking off as a mode that may well represent the future of amateur radio. In the most basic terms the mode uses

software to turn a computer’s sound card into a full service Phase Shifted Keying interface. Its ability to utilize low power levels and very tiny chunks of bandwidth (about 31.25 bps, hence PSK31) to still put a signal out through noisy conditions makes this a watershed mode. A lot of my friends have been talking up PSK31, and I was finally ready to jump into the fray.

But now we’re once again up against Uncle Skip’s phobic behavior, aren’t we? This super neat mode requires hooking a computer to ham gear. My nervous tick was returning just reading about PSK31.

Further, unless you are using a rig that has the various connections for PSK31 built in (only a few of the newest transceivers are set up to do this out of the box), there is still a lot of fuss and bother to get everything set up. Too much like work for many people. I expect more than a few folks have shied away from this new mode for no more reason than that they needed to unplug their microphones when setting up for PSK31 and then replug the mike in when returning to phone operations.

❖ No Excuses

Well, the folks at West Mountain Radio anticipated Uncle Skip’s (and other’s) recalcitrance. For folks like us, they designed and distribute the RIGblaster.

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Now the only excuses for not moving into the PSK31 world are truly phobic in nature and not based on reality in any way, shape, or form.

But let’s back up a few steps to give you an idea why the RIGblaster makes PSK31 (and a few other modes) so easy.

PSK31 requires that you take the audio output from your transceiver and feed it to the Line Input of your computer’s sound card to receive the signals to be translated by the PSK31 software. Easy enough in most cases, and if all you planned to do was listen, you could pick up an audio cable at your local electronics or audio store and you’d be off to the races using any one of a dozen freeware software resources available over the Internet.

Ahh... but can you see where this is going? We’re hams! We don’t just listen... We transmit. Now you need to feed a well-managed audio signal from your computer’s Line Out jack on its sound card back into your rig’s mike jack. And then, while PSK31 can be operated with VOX, the preferred set-up is a PTT keying circuit that works in conjunction with one of your computer’s RS232 COM ports. Further, since even the best of computers is known for putting out a bit of stray interference and RF can creep out of even the best tuned and grounded rig, a modicum of line isolation would be nice.

Make no mistake... you could cobble together the circuits out of a well-stocked junk box with a bit of searching around the Net and a little know-how and experience. What the West Mountain Radio folks have done is resolved all those little concerns by way of a sophisticated and elegant, single board solution. Further, their unique design allows the user to keep his or her microphone connected at all times and readily available for voice mode operation without the need to pull plugs and move cabling.

Not all rigs are created equal...especially when it comes to microphone inputs. For this reason the standard RIGblaster can be ordered with jacks to fit 8 pin, 4 pin or the newer RJ45 “telephone” style connectors. I ran with the 8 pin unit to set up my Elecraft K2 for digital mode operation.

The RIGblaster is built around a very pro-



professional circuit layout on a high quality fiberglass/soldermasked PC board. This is all built into a sturdy 1.5" H x 5.5" W x 5.75" D, powder-coated case. The unit weighs about 9 oz. without the "wall wart" power supply. (Note: the unit's DC power requirements are a nominal 13.8 volts so it can be set up to operate off of most 12 VDC power supply systems that can manage its 80 mA power consumption). The quality of the unit's jacks and switches are first rate. Also, all the hardware is stainless steel. This all makes for an accessory device that is both rugged and attractive.

I wish I could say that the RIGblaster was a "Plug and Play" device, but that simply cannot be the case given the variety of transmitters and microphones available to the amateur radio community. The one task of note for the user is to configure a series of jumpers depending on his particular radio's (and mike's) needs. This is a place where you definitely need to read the manual.

You will want to have your transceiver's manual as well as the RIGblaster's manual at hand when making this configuration happen. I cannot stress this too greatly because some newer equipment applies voltage to some of the mike pins. Sending this voltage down the wrong wire can ruin your whole day, not to mention possibly some equipment. Be careful.

Even Old Uncle Skip had to double-check his work at this stage. This is because the Elecraft K2 can be configured for various microphones during the building stage. I had used a Yaesu mike with a non-standard pin configuration. Only a couple of well-marked schematics got me through. (Remember, when building or modifying gear, your notebook is your best friend in the whole world.)

◆ On the Air

Once I had the mike configuration done and the RIGblaster's case all buttoned up, it was a simple matter to run the two stereo audio cables and RS232 cable between my rig (and RIGblaster) and my computer's sound card. A short cable goes from the RIGblaster to the Microphone jack of the transceiver itself.

With a few recommended tests to verify the "pass through" of the mike and the "power up" keying of the RIGblaster's PTT circuit, I was ready to hit the airwaves...almost.

Here I ran into a problem that was quickly resolved by a glance at the West Mountain Radio website's FAQ section, followed up by a call to the West Mountain Radio Tech Support Department. (I try to test all aspects of a product.) I was initially setting up the system using a laptop computer with its operating system configured to set its COM ports in a "high" state on power-up. (Note: This is a "quirk" of Windows NT and Windows 2000 related to preventing the software from turning off needed but unused devices on start up.) This had the effect of keying the rig when the transceiver should have been in the un-keyed, receive mode. A simple batch file sorted out this problem. Notably the problem did not exist with the COM ports on the primary computer I was going to be using with the device. Still, it was good to see

that the support was there when I needed it.

Now I was all set. I put the supplied CD ROM of software into my computer's drive and became a kid in a candy store. The disk contains over 65 freeware, shareware and discounted commercial software packages designed to allow your computer's sound card to perform not only PSK31 functions but MFSK16, MT63, Hellschreiber, SSTV, RTTY, AMTOR, PACTOR, PACKET, APRS, CW, Contest Voice Keying, High Speed CW Meteor Scatter, FM Repeater Announcements, and Simplex or Duplex Repeater Control. In other words, while PSK31 may be what gets you initially excited about this device, you will find dozens of other ways to use it to your advantage.

The disk comes with "Digipan," the currently preferred PSK31 software, known for its unique audio "waterfall" display that makes you feel like you're a sonar operator on a super secret submarine mission. No sooner did I have the program loaded than I was happily copying PSK31 text from all over on 14.070 MHz. I got a little overly excited and didn't take the time to read the directions for the program. Had I stopped and taken a deep breath and read a few paragraphs, I would have discovered that I needed to set the COM port of choice in the software to get things keying as they should.

The trickiest part of actually getting your signal out there is setting the audio levels so that you put out sufficient "juice" without overdriving and distorting. Even in the digital world, the importance of a "clean fist" cannot be stressed too greatly. However, between your rig's audio controls, your sound card's audio level settings and the RIGblaster's own audio gain adjustment, you can get things dialed in with no trouble.

The addition of the RIGblaster unit to the shack here at N2EI has made all the difference in the world. I no longer shy away from digital operations. I don't mind a couple of cables running to and from my computer. What next? Hmmm. How about getting the whole shebang to work along with a contest quality logging program? Or maybe getting things to play along with transceiver control software running off of a second COM port?

Stick around folks...this is going to be a lot of fun!

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How about a change of pace for our next restoration project? This time, instead of working with a consumer radio, we'll rehab and fire up a World War II surplus "command set" aircraft receiver.

Arguably, the command sets are the best-known surplus communications equipment to come out of World War II (and the Korean conflict), and were the most widely used by SWLs and hams.

These receivers and transmitters were called "command sets" because they provided communication between the flight leader and the other planes in his formation. The components of the series were lightweight and compact, and were used, in various configurations, in virtually all military fighter planes. They appeared on the surplus market in vast numbers after World War II, and during that glut, one could buy a receiver or transmitter for less than ten dollars — sometimes *a lot* less.

The units in the system are absolutely utilitarian in design, with no concessions whatever to aesthetics. They are strangely attractive in their ugliness. However the real beauty of these radios lies *inside*, with the jewel-like construction of their parts and the meticulous tidiness of their wiring. During the mid-1940s and the 1950s, a generation of hams fell in love with these sets. Their easy availability enabled many a beginner with limited resources to put an effective sta-

tion on the air. Experienced hams loved them too, and many were used as stand-by sets or stuffed into trunks of cars for mobile service.

◆ The Command Set Receivers

Each receiver (and transmitter) in the series covered one specific frequency range. The commonly used receivers covered, respectively, 190-550 kHz (used for beacon reception and other navigation purposes), 3-6 MHz, and 7-9.1 MHz. The latter two sets were the ones used for interplane communications. Much rarer were a broadcast band model (520-1500 kHz) and one covering the 1.5-3 MHz marine frequency band.

The Army Air Force nomenclature for the group of command set components, including receivers, transmitters, various control boxes, antenna coupling units, etc. was "SCR274-N;" the Navy called the group "ARC-5." The individual receivers in the group were designated as follows (Army and Navy models are virtually identical electronically.):

	SCR274-N	ARC-5
190-550 kHz	BC-453	R-23, R-23A
520-1500 kHz	BC-946	R-24
1.5-3 MHz	- - -	R-25
3-6 MHz	BC-454	R-26
6-9.1 MHz	BC-455	R-27

When you are browsing for these sets at a

radio meet, you may find Navy command sets that do not carry ARC5 or R-XX identification. My R-23A has both, but my R-25 shows only a Navy stock or serial number "CCT-46104." The Army sets always bear a BC-xxx label, unless it has been removed by a civilian user. I'm not an expert on military nomenclature, but I can assure you that if your Navy find looks like a command set, it *is* a command set of the model designated above for the frequency range marked on its dial.

Of the commonly available command sets (BC-453 thru BC-455 or equivalent Navy models), I think only the BC-453/R23/R23A beacon/navigation models have much potential interest for monitoring hobbyists. Of course military radio collectors will be interested in collecting all models in mint condition. The 3-6 and 6-9.1 MHz models, used for plane-to-plane communications, were intentionally made with broad selectivity to facilitate easy tuning under difficult battle conditions and — though sensitive enough — offer only lackluster performance in normal usage. At any rate, good receivers in the 3-9.1 MHz range are easy to come by while those in the 190-550 kHz range are a little more rare.

◆ Finding a BC-453 or Equivalent

If you should decide to restore a BC-453 beacon receiver, or equivalent Navy set, along with me, you'll find it the easiest of the command receivers to uncover at radio meets. According to one very reliable source, over 450,000 of these radios were made, as compared with about 200,000 each of the BC-454 and BC455 (including Navy equivalents).

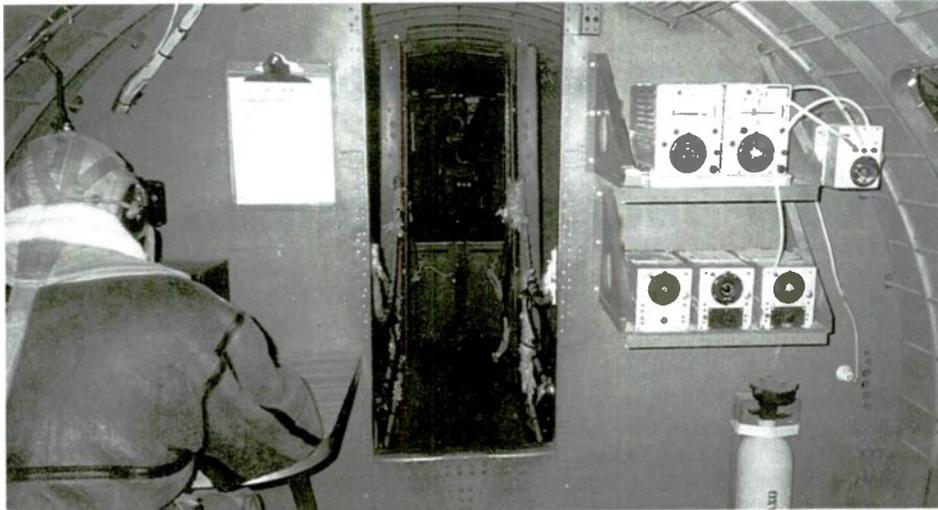
Furthermore, the latter were in greater demand by hams because they covered the popular 40- and 80-meter amateur bands. Many more of them were snapped up and sometimes subjected to destructive conversions that would make them undesirable to a collector or listener today. However, the beacon sets did have some ham value too, in a very interesting application called "The Q-5-er" that we'll discuss later.

Before you actually purchase your flea market find, look it over carefully! First check out the oblong metal plate under the tuning dial. If it has only a fixed handle on it, like a draw pull (used for pulling the set out of its rack mount in the plane), you may have come across a rare unmodified unit. If it has a switch or two and a volume control mounted on it, someone has probably been there before you.

But not to worry! These sets were designed for remote control via control boxes located at various positions on the plane. The system did



Command sets provided the plane-to-plane communications in formations of warbirds like these B17-F Flying fortresses. Photo from USAF Museum Archives.



A typical SCR274-N installation (at right) in a B17 radio compartment. Transmitters and antenna coupling unit above; receivers below. Photo courtesy Bill Fizette.

include a local control panel that could be installed in place of the "drawer pull" panel (I've never seen one of these), so all of the control connections are available in a little well behind the panel. Most users removed the blank panel, drilled out the "drawer pull," and installed the necessary controls in its place.

The previous user may have done you the favor of leaving his version of a local tuning knob in the set. Otherwise, you will find only the male end of a spline shaft (just to the right of the lower part of the tuning dial). This was for a cable (like a speedometer cable) that connected the tuning shaft to a crank handle-and-dial assembly on the remote control box. It's not hard to jury-rig a knob for local control, so don't be concerned if there isn't one in place.

You may also find that the power/control connector on the rear chassis apron, normally an array of tip jacks mounted in a mica-insulated assembly, has been replaced by a male Amphenol connector (looks like an old-fashioned tube base). This is how the previous owner got power into the radio, and it can only help you as long as you are not a purist and the work was done neatly. Of course, you will never be able to install the receiver in a (now rare) standard receiver rack if

this has been done — but most folks have been happy to use the sets free-standing.

The little "cut-out" at the back of the cabinet, containing a 3-pin male connector and four shock-mounted studs, was for mounting the dynamotor that powered the set from the plane's 24-volt d.c. supply. I doubt that you will find a dynamotor there, but the previous owner may have installed an a.c. power supply in this area — sometimes building it onto a base plate salvaged from a dynamotor so that it could be plugged in and snapped into place on the original shock mounts.

Remove the five snaps that retain the top cover and look inside the tube compartment for further signs of modification. You may find that the 12A6 audio output tube has been replaced with a different type to provide a little more audio oomph — not necessarily a discouraging sign. But some folks rewired for an oscillator/mixer tube other than the standard 12K8. That is a much more iffy change and I'd recommend taking a pass on such a set.

Of course it's unlikely that you will be able to remove the cabinet bottom plate and look inside unless you have a very patient seller. There are about a zillion small screws holding it in place.

But if all else looks ok, you are probably safe in taking a chance on the set. Chances are, when you get the radio home, you'll find that the only change under there was a slight rewiring of the filament circuit from 24-volt to 12-volt operation (more on this later). 24-volt transformers were not as easy to come by during the heyday of these radios as they are now.

Bottom line: the set you find will almost certainly be modified for civilian use. But command receivers were among the easiest surplus radios to get into service, requiring little more than the instal-

lation of a few controls and application of power to get running. Most users were satisfied with the results and stopped at that point. If you see no obvious signs of butchery, your find is probably ok.

◆ The Game Plan

My collection includes both a BC-453 and an R-23A. I've had them for a long time but never opened them up. They are *apparently* unmodified except for the addition of the front-panel controls. I plan to rehab both of them in this series of articles. It isn't much harder to do two than one, and that way I'll uncover any differences that may possibly come up between the Army and Navy models. I'll also be able to report on the modifications made by two different prior users — which will give you more background for dealing with changes you may find in your own set, should you acquire one.

The R-23A does have one feature not on the BC-453. There are a couple of extra antenna binding posts wired to a low-impedance link on the antenna coil. These are intended to accept the output of a loop antenna. A remotely-actuated switch, controlled through a cable attached to a spline shaft similar to the tuning shaft, selects either the loop antenna or a conventional single-wire antenna wired directly to the antenna coil as in the BC-453.

I haven't run into an ARC5/R23, except in equipment lists; perhaps you will find one of these. Logic dictates that it must be an exact equivalent of the BC-453 (conventional antenna input only). See you next time when we'll begin to dig into these radios!

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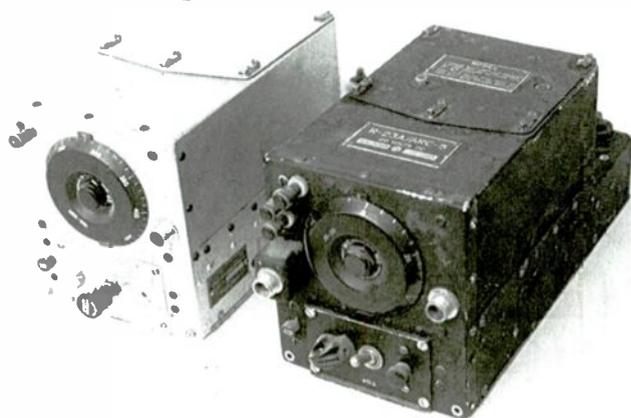
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The BC-453 (left) and R-23A from my collection. Note extra antenna posts and remote-actuated antenna changeover switch at upper left corner of the R-23A front panel (see text).

Some Easy, Low-Budget Antennas

In this column we've recently discussed a wide variety of antennas used across the radio-frequency spectrum. And we found that there are some impressive antenna designs available. But it would be a shame if that survey left readers with the impression that you must have a well-designed antenna to tap into the fun of monitoring the airwaves. That's just not so! Although the various antenna designs available each have something to offer, you can get on the air very nicely with extremely simple antennas which cost little or nothing. And you can find a whole lot of exciting listening coming in on your receiver as a result.

◆ Are These "Good" Antennas?

A considerable time back Bob Grove reported in *Monitoring Times* that the U. S. Navy had studied HF reception, and had come to the conclusion that often a six-foot-long wire was sufficient for good reception on the HF band. Certainly many of us have used a simple-wire antenna no longer than 20 or 30 feet, and had considerable success.

And Kurt N. Sturba is famous (or perhaps infamous) for his no-nonsense discussions of what can be done with minimal antennas. Kurt has even gone to such extremes as demonstrating the feasibility of using a metal grocery cart, or metal lawn chair as an antenna for working world-wide DX via ham radio.

A *Monitoring Times* reader, Terry Atwood, WA5ARJ, recently sent me a report of success in using two reclining lawn chairs on the roof of

a home, connected as a dipole antenna (fig. 1), and fed with open-wire feed line (ladder line). As is typical when using such antennas for two-way communication, Terry used an antenna tuner between the transceiver and the ladder-line. Terry also passed along a novel antenna design learned from old-timers: cutting a gap though a metal rain gutter, and feeding the gutter at the gap as a dipole the same way as the lawn chairs were fed.

At VHF and higher frequencies, monitoring enthusiasts often make temporary antennas using a piece of coat hanger, or other stiff wire inserted into the antenna socket of their receivers. They sometimes find that these make-shift antennas satisfy their needs well enough that they are left in service. And those telescoping whips that accompany many scanners and portable all-band rigs are not really much for size, but most of us have gotten a lot of service from them on bands ranging from LF to UHF.

Are any of the antennas just described actually good antennas? It would be easy to say "No," but I could answer "Yes" from the perspective that they are good because they get the necessary job done at minimum cost and effort. The point is that simple and inexpensive can also be effective in some situations. If you're just wanting to enjoy some fun radio, then an antenna such as one of those described above may be all that you really need.

◆ On The Other Hand:

Of course there will be situations where you have more specific goals for your communi-

cation; goals like wanting your antenna to give better reception from a particular direction, to reduce noise and/or interference, or have increased gain in weak-signal VHF-UHF work.

Better performance can be had in many situations with specific antenna designs chosen with the particular application in mind. Sometimes particular directional patterns, height of the antenna above ground, or antenna-gain level are important. Just don't let those facts dominate your thinking so that you lose touch with the success that is possible with simple and inexpensive antennas.

◆ Some More Practical Examples

A decent HF receiving antenna can often be had by stringing a random length of insulated wire along the ceiling of a room, or in an attic. Some success can be expected even when laying a wire on the floor, or even putting a wire on the ceiling in a basement room. If your wire is only a few feet long, then a tuner, or tuner with preamp, may help reception.

Try running a wire from the antenna input connector on your receiver to just about any metallic object that is not connected to the power line. Window frames, flag poles, balcony railings, aluminum porch awnings, metal bed frames, and the like have all been reported as supporting useful reception, and sometimes successful transmitting, too. Running a longer, random-length wire outside to a support such as a tree or building may be better. Once we start putting the

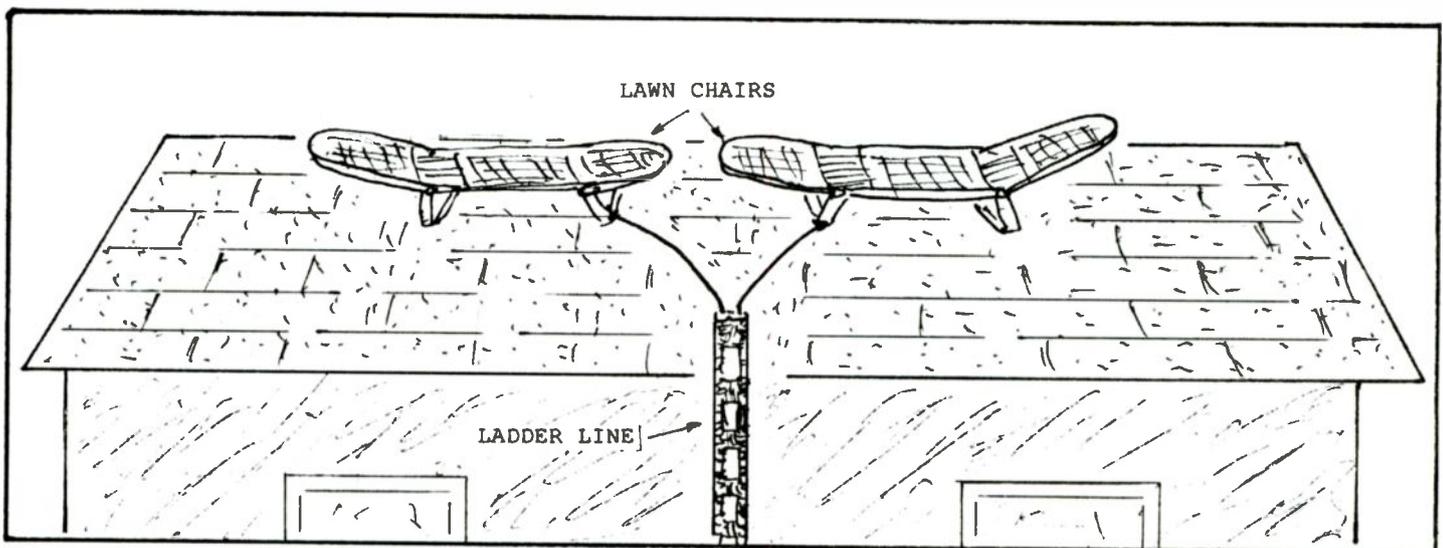


Fig. 1. A lawn-chair antenna reported to give reception comparable to a dipole on the higher HF bands.

This Month's Interesting Antenna-Related Web site:

This web site describes a book to help you make some simple, low-cost antennas. They aren't as simple as those described in this month's column, but they're relatively simple and easy to make.

<http://www.radio-ware.com/books/brpwa.htm>

Send in your suggestions for inclusion here as an interesting antenna-related web site to: clemsmall@hotmail.com.

wires outside we should remember to never use the antenna when there is weather likely to produce lightning, and disconnect and ground the antenna when it is not in use. Stay well away from power lines, too.

As mentioned earlier, simple wire whips are often useful at VHF and UHF wavelengths. Specific antenna lengths may have more of an effect at VHF than at HF and lower, so varying the length used sometimes helps. If you use a TV rabbit-ears antenna then adjusting the length to suit the frequency is relatively easy.

❖ **Some Reasons Why:**

When radio waves encounter a conductor (wire, metal lawn chair, etc.) then RF current is caused to flow in that conductor. The conductor needn't be resonant (i.e., needn't be tuned to the frequency of the radio wave it receives), it needn't have a specific directional reception pattern, and it needn't have a high level of antenna gain. If we

can lead some of the RF current the conductor receives to the input of our receiver, and if that current is sufficiently high, then we will have successful reception of the signal.

In point of fact, much of the listening we do is to stations with reasonably strong signals. With such signals antenna gain and directionality are not too important, and a simple piece of wire or large piece of metal may get the job done.

If receiving weak signals when noise is low (as, for instance, on VHF and higher frequencies), then such things as antenna resonance and gain become more important. With the relatively higher noise levels on HF, increasing antenna gain often doesn't improve reception. For this reason the simple antennas discussed above often measure up fairly well for HF reception when compared to more elegant designs.

Of course, when needed, directivity can help reduce received-noise and interference from directions off the antenna's main lobe (direction of main responsiveness). And vertical directivity makes a difference in how well nearby or distant signals are received.

❖ **And So:**

If your monitoring or two-way communications requirements are not too demanding, you may find some extremely simple solutions to your antenna needs. As your requirements become more demanding, then you may find that a somewhat more complex design may be needed to get the job done.

RADIO RIDDLES

Last Month:

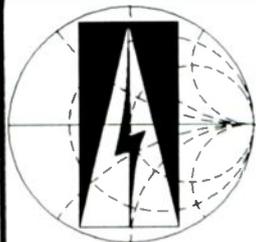
I said: "There are many antenna designs, home-brewed and commercial, available to support our HF reception. Yet we sometimes hear that a simple antenna, such as a random-length wire, supports reception just as well on HF as do our best efforts at a complex home-brew skywire, or any of those expensive commercial antennas. Can this be so? What about at VHF, UHF and microwave frequencies?"

Obviously this month's column has been directed to this question.

This Month:

So now that we've said that even a 6-foot wire can often do as well as a sophisticated antenna design for receiving HF, let's think of some antennas that can outperform such a simple wire antenna at times, and why they are able to do that.

You'll find an answer for this month's riddle, another interesting, antenna-related web site, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.



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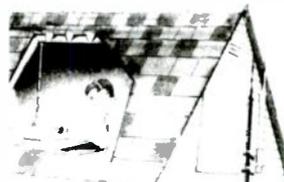
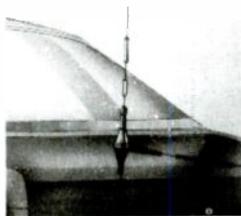
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Tracking the Trendsetters

I remarked to my wife that most passenger cars are starting to look the same to me. Lincolns, which used to be distinctive, now resemble other Fords, which look like Chevrolets. The Toyotas look like Nissans, which look like Hyundais, etc. Once in a while, manufacturers offer something different, like the Chrysler PT Cruiser or the reworked Volkswagen bug, for example.

Scanners are no different. A few more channels and a couple of features are added to this year's PRO or BC models which "morph" into next year's models. When a strikingly different model is introduced, it could set a new trend that other manufacturers will follow or be a "white elephant," which none will copy. Combination CB transceiver / VHF monitors, like the 1971 Lafayette Telsat 50 and 150 are examples of the latter.



Figure 1. Sonar FR-105 monitor receiver

As John Catalano follows the broader evolution of radio theory in his feature story, this month's column follows the scanners which were markedly different from earlier models and which started new trends in the scanner hobby.

◆ It Scans

For years, VHF/UHF listeners had to make do with tunable monitor receivers and single channel-at-a-time monitors (fig. 1). You had to use multiple receivers or sit and tune them back and forth if you wanted to monitor more than one frequency. All that changed in 1968, when Electra Bearcat introduced the landmark BC-L, BC-H, and BC-U models (fig. 2). The BC series scanned a series of crystal-controlled channels sequentially.

Scanning was an important innovation, though the BC series did not feature individual channel lockout. That capability became avail-



Figure 2. Electra Bearcat BC-L, first generation scanner.

able in later models, e.g., the Regency TMR and Sonar FR-2528 (fig. 3).

◆ From Crystal to Keypad

Local Radio Shack stores and CB dealers stocked some crystals, but hobbyists were forced to order less common crystals and wait two weeks or longer until they arrived. Crystal scanners were good for monitoring local activity but ill suited for travel out of the area due to their inflexibility.



Figure 3. Sonar FR-2528 scanner with channel lockouts

Manufacturers offered programmable scanners in the mid 1970s as an alternative to buying crystals. The Regency WHAMO-10, SBE Optiscan and Sears clones replaced crystals with proprietary metal combs and cards. Hobbyists could obtain crystals from several companies and often use them in different models, but the single source combs and cards proved unpopular. Comb and card programmability were innovations, but they were dead ends. You can still order scanner crystals today, but you can't find replacement combs and cards!



Figure 4. Tennelec Memoryscan MS2, code programmable scanner.

Code programmable models could be programmed from the front panel using a cryptic binary code, but required no consumables. Examples include the Bearcat BC-101, Radio Shack (GRE) COMP-100, and Tennelec MS-2 (fig. 4). They were less expensive to operate, but required that owners use a code book to translate frequencies into binary codes before programming. These models were flexible enough to take along on vacation, though you had to bring both a code book and *Police Call Radio Guide!*

Why not make programming a scanner as simple as using a Touch-Tone (tm) telephone?

The 1976 Electra BC-210 (fig. 5), Tennelec MCP-1, and Regency ACT-16K were the first keyboard programmable scanners which made programming easy. Frequencies were programmed directly through the keypad, without requiring translation. The frequencies were portrayed clearly using another innovation – a numeric display. Direct frequency entry and numeric display are features that remain standards 25 years later.

◆ Portable Progress

Most portable scanners of the 1970s were crystal controlled. They were manufactured in Japan and differed chiefly in the number of channels and the bands they tuned. The portable scanner marketplace advanced in 1981, when Electra/Bearcat developed the 16 channel Bearcat 100 (fig. 6). It was the first portable scanner with direct numeric programming and frequency display.



Figure 5. Electra/Bearcat BC210

◆ Alpha Display

Electra's BC-350 was another 1981 trendsetter. It permitted users to assign an 8-character alphanumeric label, e.g., "SHERIFF1", to a channel. Though the high priced BC-350 wasn't popular, alpha labeling took hold and is available in today's higher end models.

◆ Computer Assisted Scanning

The 1983 Electra Compuscan 2100 was the first widely marketed computer-controlled scanner. Electra furnished the software and the customer had to provide a Commodore 64 personal computer. The computer was vital to the Compuscan's operation and didn't provide a mere downloading function. Computer controlled scanning is more popular than ever today.

◆ Mobile Phone Monitoring

Radio hobbyists could monitor the old style VHF and UHF mobile radiotelephones long before the advent of cellular telephones. Listening was legal back then and required only an FM receiver capable of tuning the 152 and 454 MHz bands.

Figure 6. *Electra/Bearcat 100*

When the older IMTS phone system was replaced with 870 MHz cellular systems, hobbyists first listened by using a UHF scanner connected to an outboard 800 MHz converter, like a Hamtronics CVR.

Uniden bought the Bearcat scanner line from Electra in 1984 and introduced the BC800XLT. It was the first popular scanner able to tune cellular telephone signals in the 870 MHz range. The Electronic Communications Privacy Act legislation outlawed sales of cell capable scanners shortly thereafter.

❖ **Wide Frequency Coverage**

The 1986-vintage Radio Shack PRO-2004 (fig. 7) was one of the first scanners to employ triple up conversion circuitry and provide wide frequency coverage. Military air buffs could use the PRO-2004 to listen in the 225 - 400 MHz spectrum using direct frequency programming and frequency display rather than relying on a cumbersome converter/scanner combination.

The PRO-2004 also let hobbyists explore point-to-point links and radio control signals in the 72 - 76 band, inland waterway communications near 219 MHz, and ham repeaters in the 220 - 225 MHz region.

❖ **It Trunks**

Local government and business scanning



Figure 7. *Radio Shack PRO-2004 provided wide frequency coverage*

became more complicated in the 1990s as conventional repeater systems gave way to trunked systems. The Uniden BC-235XLT was the first scanner that could follow conversations in a trunked radio system.

Within three years, Optoelectronics and GRE followed suit by offering trunk-tracking scanners. Trunk tracking is sure to play an important role in future scanning products.

❖ **Accessories**

I've concentrated on trendsetting scanner radios, but there are scanning accessories that were seminal to our hobby. The early Newtronics (Hustler) DCX discone antenna set the stage for today's popular discones from ICOM, Comet, and Radio Shack.

Optoelectronics must be given credit for their innovations in frequency counters, most notably the Scout, and other models that were particularly well suited for scannists. Their Reaction Tune feature can tune a scanner instantly to the frequency "caught" by the counter. AOR and Yaesu are now offering a similar capability in the DJ-X2000T and VR-120 portable scanners.

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

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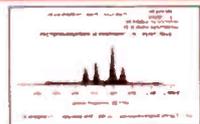
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Son of Propman & DXLOG

Anyone who has read this column for past years knows the intrinsic disdain I have for propagation prediction programs. But on reflection, I believe the source of my irritation is the gospel-like treatment that many users ascribe to the results. Even the best prediction program is based on models of the ionosphere and its dynamics under the influence of a number of complex earth and sun processes. These processes rely on the creation, transport and interaction of charged particles, each of which is similarly based on "models." These models allow scientists to approximate actual processes.

The key word here is *approximate*. A fact that shocks most people is that less than ten (10) basic physical problems have been solved by modern science without using approximations, in other words, exactly without chance of error.

OK. Now that you have been warned of the dangers of "blind belief" in mathematical predictions, we can discuss the latest version of Propman, Propman 2000 by Rockwell Collins. Seven years ago when I first used Propman, I considered it the best radio propagation program I had used. Now we'll look at Rockwell's updated Propman 2000.

◆ System Requirements

Although prediction programs are by nature mathematically intense, the screen presentations are static. Therefore you should not be surprised Propman 2000's modest CPU requirements of a 486/100 MHz. A similarly modest RAM requirement of 32 MB is nothing out of the norm. Hard

drive usage can be a bit high. So you should have 20 MB of hard drive free for the program and saved parameters. In order to display its very colorful graphs a graphics card with a minimum of 800 X 600 and 256 colors is required. A CD ROM drive is also needed since the program comes on a CD-ROM.

Propman 2000 will work under Windows 95, 98 and NT operating systems. Following this dedication to Microsoft, Propman 2000 requires the use of MS Internet Explorer 4.0 (or greater) in order to access the latest space and weather data via the Internet. Netscape browser users will find this a frustrating aspect of Propman 2000 (How about us Netscape users, Mr. Rockwell?)

◆ Installing & Setup

Installation is so fast and simple that you will be running the program within minutes of dropping in the CD ROM. Once installed the program will run without the need for the CD. This is always a plus to me, since I have a habit of "misplacing" my CD-ROMs.

Figure One shows the Tri-Panel business end of Propman 2000. The upper area of the screen is where the user inputs radio system specifics (antenna gain, receiver antenna takeoff angle, transmit power), sun spot number (SSN), and propagation path type. Another user parameter is "Path Usage." It has long been known that the type of signal may have a major effect on the propagation results. This parameter allows the user to select between analogue and digital, and further refine it for data or voice.

The receiver's electrical noise environment is a critical factor. This parameter can be set to a number of conditions: ru-

ral, industrial or city.

Finally, we can configure the program to track ham frequencies, SWL broadcast frequencies, or customize it to our own frequency list. This is done by clicking the "123" box under "Options."

If you have MS Explorer you can have the program dial onto the web and update sun spot numbers and other geophysical data.

◆ At Your Service

Now that the program has been loaded with up-to-date data it's ready to use. Let's assume that we wish to predict the best frequency range to listen to BBC London, from our Boston, MA, location. Propman 2000 is pre-loaded with locations all over the world. This can be accessed by a left click on the small box next to the transmitter (Xmt) and receiver (Rcv).

The three graphs are then configured to give us all the propagation details we might need. The top left box can display one of three different representations of "Best for Given Time." For example, by clicking the box directly under "Help" the graph in Figure 2 will be displayed. The "Best Frequency vs. Time" graph is perfect for seeing how the "best" frequency changes during the day.

We can see how the predicted best frequency for the London-Boston circuit moves up from 9 MHz at 0230 UTC to 19 MHz at 1700 UTC. This, of course, is a function of ionospheric activity caused by continued exposure to solar radiation during the day. Each of the other graphical presentations gives us the same information using different methods and details.

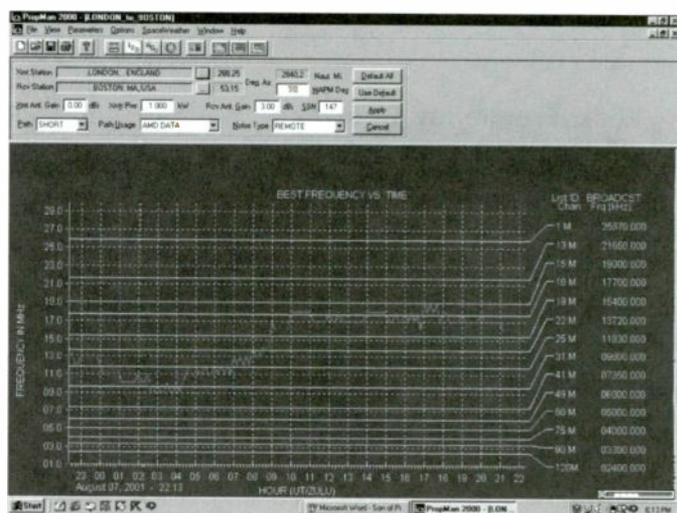


Figure 2 - Best Frequency vs Time Propman Graph

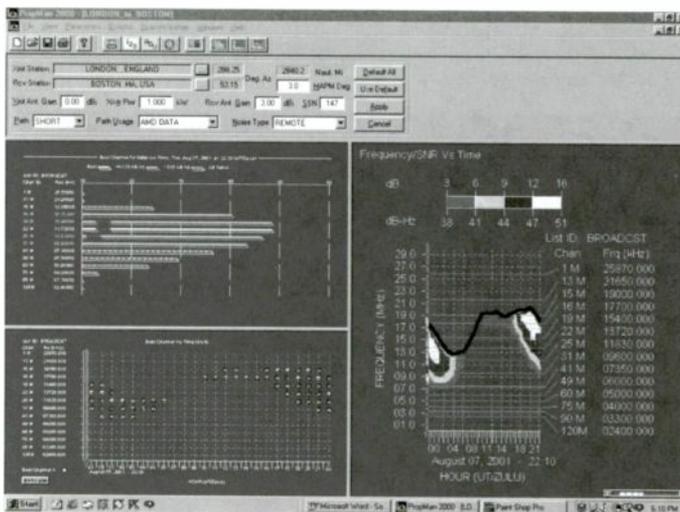


Figure 1 - Propman 2000 Tri-Graph Composite Screen

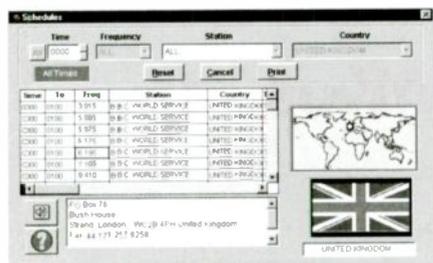


Figure 3 – DXLOG 3.0 Schedules Screen

◆ So Is It Better?

With the addition of Internet access, multiple graphical representations, real time updating of graphs and a new graphical interface, Propman 2000 has made the best better! Information about Propman 2000 is available from the company's website at <http://www.collins.rockwell.com/government-systems/business-area/comm/tactical/propman> or call them at (319) 295-5100.

◆ DXLOG Version 3.0

Another program that has recently had a new version release is DXLOG. I first used this schedule and logbook program in 1999 and was impressed with its usefulness to SWLers, especially given its simplicity of operation. Version 3.0 retains all of the initial features and adds some new ones. System requirements are modest: Pentium CPU, 10MB hard drive space, sound card for interval signal, 4x CD ROM drive, VGA monitor and Internet access.

◆ Where Did It Go?

DXLOG comes on a CD-ROM and installed quickly, and without any problems. But when I looked on the Desktop, or the Start Pro-

gram menu, it was nowhere to be found! I had to go into My Computer, then to my harddrive and finally to a directory named Dxlog30. I suggest you make a shortcut to the large file (1.039 KB) called "dxlog".

◆ Accessing SWL Station Schedules

After some eye candy, an animated spinning globe, DXLOG 3.0 displays the simple pull-down menus screen (along top) shown in Figure 3.

In the center of Figure 3 we can see the opened Schedules feature. DXLOG comes with a pre-loaded database of shortwave broadcast stations, including station name, country, times, frequencies, target locations and QSL address. You can search the schedule database by country or station name at a defined time. An "all times" function allows you to display all frequencies associated with the search station, regardless of the time of transmission.

A very nice touch is the ability to hear the interval signal of the chosen SWL broadcast station by clicking the speaker icon on the lower left part of the screen. Unfortunately, not all stations have pre-recorded interval signals.

The user can add new stations to the database via one of the drop down menus. Alternatively, registered users get free Schedule database updates for one year. After the first year the annual update fee is a very reasonable \$5.

◆ Logging with DXLOG

Although DXLOG does not include computer control of receivers, it does make intercept logging easy to input and recall. All it takes is a click of the Logging menu at the top of the main screen and the log appears. See Figure 4.

All log entries are via an easy to use "fill-in the blanks" sheet accessed from the Add command on the Loggings display.

Two additional database fields are available for each logging; Program Details and Remarks. These fields are very useful for saving additional free form station information. Figure 4 shows the most recent logging made of BBC World Service. Below it a previous station logging of HCJB; and above it are problems!

◆ Oops!

Remember the "fill-in-the-blanks" logging pages? Strange things happen when this page is not filled out correctly, as attested to by the three lines of gibberish above the BBC entry in Figure 4. The Delete or Edit functions did not have any effect on these rogue entries. This happened to me a number of times while I was becoming familiar with DXLOG. In each case, my only recourse was to delete and re-install the program, or live with the lines of garbage. This problem is annoying, but not a showstopper.

◆ Don't Forget the Internet

Another useful feature of DXLOG 3.0 is a comprehensive list of Internet websites for shortwave stations, clubs, equipment manufacturers and publications (even *Monitoring Times*). If you are connected to the Internet, all it takes is clicking on the Internet dropdown menu and then clicking on the item of interest. You will be automatically transported to their site ... if their site has not recently changed. It's another thoughtful idea incorporated into DXLOG 3.0 in addition to prepared QSL reports.

If you don't need receiver control, at \$24.95 DXLOG 3.0 is a nice addition to your SWL software collection. Check <http://www.hawham.fws1.com/dxlog.htm> for the latest price and details.

Hope you enjoy the autumn season as much as we do in the Northeast USA. Beware of leaf peepers!

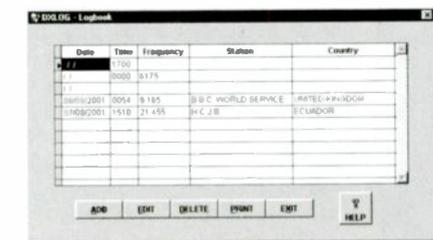


Figure 4 – Logging Screen of DXLOG 3.0

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Mobile SWL Alternatives - II

By Ken Reitz, KS4ZR

Nearly all of us spend enough time in our cars each day to become tired of the radio fare on offer from our local AM and FM radio stations. An entire industry is devoted to helping us pass this unavoidable time pleasantly. While many people are satisfied with cassette decks or CD changers, *MT* readers are often looking for something more – a way to practice their hobby while en route.

◆ Three More Alternatives

The idea to use a portable shortwave radio in the car was explored in the last month's *MT*. Now, let's take a look at three more mobile listening alternatives ranging in price from \$30 to \$1,000. The most convenient to use are the in-dash, after-market AM/FM/SW radios made by Becker and Sony (see sidebar and review). Because the mobile SW market has traditionally been small in the U.S. these radios were nearly impossible to buy, but, thanks to the Internet, they are now readily available from overseas sources.

The next alternative is to install your home SWL radio in your car. Most serious communications receivers which tune the whole HF spectrum are designed, like ham gear, to operate on 12 volts. Drake, Icom, Kenwood, Yaesu and similar receivers are made to work in a mobile environment. They come with, or have available, power cords for use directly from a car battery and often include a mobile mounting bracket. The latter is important because many auto insurance policies require mobile radios to be permanently mounted in order to be covered for property theft claims.

These radios typically cost from \$600 to over a \$1,000, and careful consideration has to be given to the wisdom of installing such an expensive radio in your car just to listen to the shortwave bands.

The final way is to use a converter which, in essence, goes between your antenna and your existing in-dash radio and allows the radio to tune the shortwave bands. These units vary from the \$28 Ramsey Electronics kit (\$15 extra for a case) to the \$140 LFB 4 band converter made in Brazil. The immediate advantages are that converters are small, inexpensive (compared to communications receivers) and don't appear to be anything anyone would want to steal.

◆ Of Noise and Antennas

Regardless of which you choose, successful mobile SWL depends on successful noise suppression.

Mobile HF amateur radio operating is so difficult that most hams have never even tried it. Those who have tackled the task with success are often looked on as anointed with special gifts not available to the unwashed. So, it's to the amateur radio community SWLers will have to look for solutions to noise and antenna problems. The good news is that virtually all RFI noise can be eliminated even to the point of being able to tune in weak SW stations. However, it's not an easy task and you'll have to ask yourself just how badly you want to listen to shortwave in your vehicle.

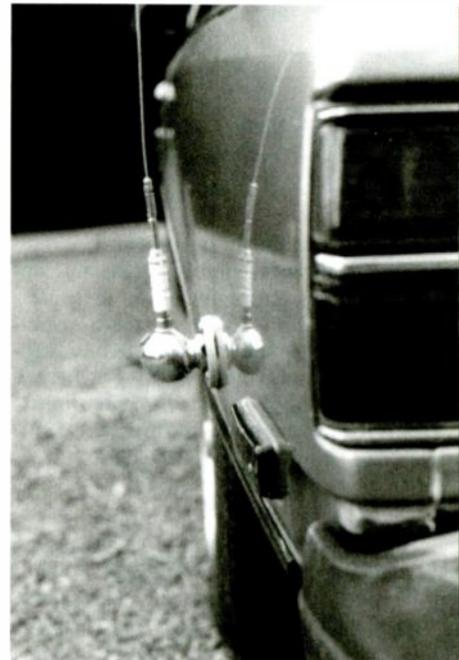
The definitive work on eliminating mobile noise sources is found in the Jan/Feb 2000 issue of *QEX*, the ARRL's technical journal. Entitled "Automotive RFI Elimination" and written by Stuart G. Downs, P.E., WA6PDP, this detailed analysis of where noise originates and how it can be completely eliminated is not an easy read, but it shows and explains in detail how this is done (See sources below). Downs puts the problem in a nutshell: "Essentially, we drive around with spark-gap transmitters under our hoods, connected to ignition-wire antennas!" As you'll discover in his article there's no magic involved, but it is a lot of work.

Another great source for noise suppression techniques is the <http://www.k2bj.com> web site. Here you'll find a step-by-step tutorial in how to determine the source of your RFI. Also reproduced on the site is the ARRL "Noise Troubleshooter" chart (see below) which quickly directs you to the source of your problem.

Most cars sold today have antennas which are about 30-inches long. This works well for the FM band and provides adequate tuning of AM stations in an urban or suburban environment. What's called for is a separate HF antenna located as far away from the engine as possible.



1. Ball mount antenna provides base for a variety of useful mobile antennas. Here a ten meter whip is mounted which also provides good coverage of the higher frequency SW bands.



2) Same ball mount with a 5/8-wave, two meter whip. Replace with a 102" steel whip for enhanced SW coverage.

I made a cheap Radio Shack mobile SWL antenna using their ball mount and a 102-inch stainless steel whip. I ran a length of RG/8 coax from the mount to the radio (it's best to use the large heavily shielded RG/8). Total cost was about \$30. There is another mobile SWL antenna available from DWM Communications (see sources) which slips over the window glass and is held in place by cranking up the window. It comes with connectors to fit any portable shortwave radio. Price is \$40 plus \$7 shipping.

The task of the radio enthusiast is not helped by modern auto designers. Access to behind-the-scenes areas like dashboards and firewalls is discouraged if not outright prevented by design. In addition, few are ready to take a drill to the roof or fender of their \$25,000 car just to improve radio reception. No wonder most hams stick to 2 meter repeaters and mag-mount antennas.

◆ Tuning In the Real World

One hot day in early August I decided to give mobile SWL a try and, for test purposes, I tried a variety of radios and converters. First, I installed my Kenwood TS-140S amateur radio transceiver in my car. This model, as with most

modern ham transceivers, features continuous coverage of the HF spectrum with essentially the same characteristics as its receive-only counterpart.

With the unit connected directly to the battery and the SWL antenna on the rear left fender I turned the set on and tuned around. I was not surprised to find reception less than what I was used to in the house. I found that the typical powerhouse broadcasters such as Deutsche Welle, Radio España, Radio Canada International, China Radio International and several others came in at S9 on the S meter. However, when I started up the car I found that I had a noise level of S6. But, the extra 3 S-units of gain was more than enough to make listening possible.

Next, I connected the receiver to the car's AM/FM antenna (located on the right rear fender). Results were much less satisfactory with

S meter reading typically 2 S-units lower. That meant that most stations were only 1 S-unit over the noise level. When road noise and wind noise from open windows were added to the mix, listening was not easy. When typical SW fading occurred, signals dipped into the noise for significant periods of the fade.

However, it also shows that, once the noise problem is addressed, there's more than enough signal for shortwave listening.

◆ Next month

We'll talk more about shortwave converters and take a closer look at two models - the Ramsey and LFB - that we were actually able to test. Then we'll compare all the mobile shortwave solutions and also take a peek at options that may be available in the near future.

Review of the Sony Mobile SW Receiver

By Alan Fuhrman

For many years I have wanted to take shortwave listening with me on the road.

But rather than mounting a general coverage receiver or portable somewhere in my already cluttered vehicle, I preferred to find an in-dash radio already equipped for shortwave reception. Unfortunately, in the United States, just such a radio is almost unheard of. Finally, I found that Sony built just such a radio for the European and Asian markets. They also provided it with a switch that allows it to operate in either the European or American frequency and modulation formats.

The XR-C5600X is an in-dash MW, FM and SW radio with cassette player. Included in the package is an infrared remote control, the installation mounting frame and wiring harness. There is a detachable front panel and provisions to support an external Sony CD changer, turn signal post mounted control pod and an external power amplifier. Although Sony has discontinued the XR-C5600X and replaced it with the XR-CA620X, the frequency coverage, features and looks are almost identical. Therefore, I presume that the following review would also apply to the replacement.

◆ Online Ordering

The radio was purchased from Jacky's Ltd., an electronics and appliance retailer located in Dubai, United Arab Emirates. Jacky's has a retailing presence on the web at <http://www.Jackys.com>. Their site details the cost in American Dollars of the item. Freight and customs fees are calculated during ordering. The decision to purchase this radio from such a distant location did not come without some deliberation. I even consulted the rec.radio.shortwave.usenet group for input. (Which was quite positive.)

When I finally made my online purchase, everything was handled in a reassuring manner. In a few hours, I was sent an e-mail indicating that the order was processed along with the air-freight tracking number. Four business days later, the package was delivered to my door in perfect condition. The total purchase and freight cost of my XR-C5600X was \$210. According to a customer comment on Jacky's website, delivered price for the Sony XR-CA620X is \$225.

◆ Installation

Some preparation is required before an installation of any type. In fact, even before you order the radio, it is a very good idea to consult an experienced installer at a local automotive stereo dealership about any problems or special circumstances that may be involved with installing an after market stereo into your vehicle's dash. It may be necessary to purchase an installation kit to allow the radio to fit the unique dashboard environments of today's cars. I'd suggest using a wiring adapter kit that permits the installer to connect to the vehicle's own speakers, power and accessories. Finally, if you have negligible experience in stereo installation or, don't have some of the tools required, paying a professional to do the job is suggested.



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My personal experience with installing the radio into the dash of a 1995 Ford van went fairly well. The evening prior, I crimped and soldered Molex type connectors to the wire harness and the external speakers that I was going to use. During the installation process, I needed to enlist the help of a stereo installation technician to help me remove the Ford radio with his extraction tool. He then gave me a short lesson on how the radio mounted into the included mounting frame.

Electrically, I took some liberties by wiring to an "always live" source for both the switched and memory backup power requirements. Things then went well; the radio snapped into place within the frame, I attached the trim and secured the dash back to normal. The final result can be seen in the photographs. One should expect to invest a total of at least six hours to complete the preparation and installation.

◆ Performance

Now with the radio in the dash the fun part could begin. Briefly stated, the XR-C5600X performed beyond my expectations. On MW, where I once had static and noise from the vehicle's computer, I received distant stations loud and clear. The selectivity was amazing, too. I was able to receive WIBW on 580 kHz from a distance of 230 miles. While only 15 miles away, KWTO was broadcasting at 560 kHz with 5000 watts. FM reception and cassette and performance are similar to any other high performance automobile stereo.

Shortwave performance has been a really pleasant experience. Notwithstanding the 31" automobile antenna, I can receive, with clarity, any of the frontline shortwave broadcasters that may be directed towards North America, such as Radio Australia, Radio Canada Intl., BBC, DW, RN and HCJB. At night, many of the less powerful signals are loud and clear. Keep in mind, this is not a \$1000 general coverage receiver with a large antenna; but it would compare well to a high end portable. Sony was able to deliver some superior audio quality, too. After growing up accustomed to general coverage receivers with narrow audio response, I learned that, in fact, many of the shortwave broadcasters have richer audio than do the domestic mediumwave broadcasters.

I am pleased as well, that besides the two negligible gaps from 7,735 kHz to 9,500 kHz and from 10,140 kHz to 11,575 kHz, coverage from 2,940 kHz to 18,135 kHz is continuous. Many of today's shortwave broadcasters do not operate within the traditional broadcast bands, and a converter or tuner that allowed only for reception within some specific broadcast bands would be missing much of the picture.

The main feature that I object to relates to the tuning method. Rather than allowing for a manual tuning method, Sony employs a search type scan that can be interrupted only by the presence of a sufficient signal or by rocking the tuning switch in 5 kHz steps. This is fine when hunting for a non-specific station, but if tuning a particular frequency or browsing is desired, this so called "Best Tuning Method" can be a nuisance.

I hope this review has made readers aware that having shortwave reception along for the ride isn't just a novelty, it's a viable complement to the local AM and FM affiliates. Mobile shortwave reception certainly provides the motorist with a varied and enlightening perspective to news, talk and entertainment while on the road.

About the reviewer: Alan Fuhrman has been a Telecommunications Electronic Technician for 17 years. His primary responsibilities concern digital microwave and medium capacity transmission networks. Shortwave listening has been a source of information and entertainment since he was 10 years old. Alan is located in Springfield, Missouri. afuhrman@axs.net

Find out more about products and articles mentioned here:

In-Dash After Market Shortwave Radios

- Sony XR-CA620X and Sony XR-4950X
- Jacky's Electronics (Dubai) <http://www.jackys.com>; Attn: Mr. Andrew Xavier, P.O.Box: 13743, Dubai, Airport Road, UAE. Tel: 971-4-2821822, Fax: 971-4-2821474 Becker Mexico 2340
- C. Crane http://www.ccrane.com/becker_mexico.asp; 800-522-8863; C. Crane Company, Inc., 1001 Main Street, Fortuna, CA 95540-2008
- Primenet.com <http://www.primenet.com/~odemer/rcmd.htm>; 818-846-2819, -6324 Fax; Walter Odemer Co., Inc., 1516 W. Magnolia Blvd., Burbank, CA 91506

In-Dash Shortwave Radio Reviews

- Becker Mexico 2340
- *Monitoring Times* (February '97)
- ANARC (<http://www.anarc.org/naswa/issues/0597/equip0597.html>)
- Sony XR-C5100 (predecessor to the XR-CA620X and XR-4950X)
- Radio Netherlands Receiver Shopping List (<http://www.rnw.nl/realradio/xr-c5100.html>)

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ARRL: "Solving Ignition Noise RFI" <http://www.arrl.org/tis/info/rfiignit.html>; 225 Main Street, Newington, CT 06111-1494; 860-594-0200, -0259(fax).

"Automotive RFI Elimination" Stuart Downs WA6PDP in PDF at above ARRL website

"Your Mobile Companion" Roger Burch WF4N ARRL Publications \$12

"ARRL RFI Book" ARRL Publications \$20

"The Mobile DXer" Dave Mangels AC6WO CQ Communications \$13; <http://www.cq-amateur-radio.com>; CQ Communications, Inc. - 25 Newbridge Rd., Hicksville, New York 11801; (516) 681-2922

"Noise Suppression Techniques" K2BJ.com <http://www.k2bj.com/Pages/Noise/PowerSup.htm>

"Do You Hear Noise When...?" chart excerpted from the 1995 edition of the ARRL publication "Your Mobile Companion" by Roger Burch, WF4N <http://www.k2bj.com/Pages/Noise/tshootr.htm>

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Cobra's SNAP microTALK FRS-120

Family Radio Service handtalkies are on the verge of becoming a commodity item. You can buy them in virtually any discount store at well under \$50 a pair. Office supply stores carry them. So do outdoor stores and toy stores.

A friend just came back from a cruise to the Bahamas, and he said the cruise ship was doing a land-rush business in renting FRS radios to people so they could keep track of their kids on the ship. A while back, somebody sent me a note that a major PC magazine's staffers were using FRS rigs for intra-office communications. A small voice in the back of my head keeps telling me that, as the cost of manufacturing FRS radios continues to drop, sooner or later they'll start giving them away with Happy Meals. We'll see.

The reason for the popularity of FRS is simple: these tiny radios work darned well for the intended purpose, short range communications. They're clear, they don't suffer from long range skip (like CB), and you don't have to be Einstein to operate one. Because the range is no more than two miles, you can convoy down the road with FRS radios and rarely run into another conversation.

Limited to 1/2 watt FM, FRS operates on 14 frequencies:

Chan	MHz		
1	462.5625	8	467.5625
2	462.5875	9	467.5875
3	462.6125	10	467.6125
4	462.6375	11	467.6375
5	462.6625	12	467.6625
6	462.6875	13	467.6875
7	462.7125	14	467.7125

When anything starts to become really popular, sooner or later some manufacturer will start to think: "What can we do to make our products really distinctive?"

So it didn't come as a complete surprise to me when I received a news release from Cobra Electronics announcing that its SNAP microTALK FRS radios were now available at Best Buy, Circuit City, Sears, K-Mart and a bunch of office superstores. What sets these FRS radios apart from the crowd is that they feature snap-on/snap-off (SNAP – get it?) faceplates available in more than 30 "eye-catching colors and patterns to make it possible for the user to change the look . . . at a moment's notice."

The Cobra folks aren't kidding about this. They sent along a small four-color pamphlet that

shows some of the faceplates that are available: the usual plain colors, a bunch of metallic colors, and patterns. Wow, what patterns: flames, blue swirls, cow spots, zebra stripes, camouflage, leopard skin, football, baseball, soccer, skate boarder, and U.S. flag, to name a few.

Cobra sent me a blister pack as an example. Inside were two FRS-120 radios equipped with black faceplates, but there were also a red faceplate and a blue faceplate included as well. Suggested retail price of the pack is \$89.95. Each radio is a touch over 4 inches tall, about 2-1/4 inches wide, and about an inch deep (less antenna and belt chip).

On the front panel, there is a liquid crystal display for the channel number, UP and DOWN buttons for changing channels, and a button for activating the CALL function (plus, of course, provision for the interchangeable SNAP faceplates). On top of the FRS-120 is a 2-3/4 inch flexible antenna, a port for plugging in a speaker/microphone, and an ON/OFF/volume knob. On the left side of the case, there is a push to talk button and another button for defeating the auto-squelch.

On the right side of the case, a wrist strap is attached. And on the back panel, there is a detachable belt clip and a hatch for inserting three AA batteries that power the FRS-120. That's it. This radio is designed to be simplicity itself. There is no continuous tone-coded squelch sys-

tem (CTCSS), no dual watch, no scanning – just plain old, turn it on, select a channel, and talk.

I think this is a smart design call on Cobra's part. Most FRS users I know want "simple and easy to use," and the overall concept of this radio is right on the mark.

In the first pair of FRS-120s that I tested, the SNAP faceplates interfered with the operation of the front panel buttons. I spoke to Cobra engineers, and they had never heard of this problem. (The cure is to press firmly on the SNAP panel and gently push it toward the bottom of the radio. The buttons pop through the holes completely, and operation returns to normal.) With the second pair of radios, the SNAP panels popped on and off with no problem. So perhaps the problem I experience with the first pair was a rare fluke.

When I took these radios out on my standard test course, I found that the reliable range of the SNAP microTALK FRS-120 was only about 1/2 to 2/3 of the range that I had found when I tested Cobra's excellent microTALK FRS 310 WX. (To be fair, the suggested retail price on the microTALK FRS 310 WX was \$159.95 at the time it was tested.)

The bottom line is this: the SNAP microTALK FRS-120 offers adequate performance at less than \$90 a pair, and the interchangeable faceplates – a cute idea – offer a novel way to express yourself.





Electromagnetic Radiation Detectors

By Bob Grove

A great deal of hype about bug detectors has produced an endless cornucopia of minimally-useful devices, often called “magic wands” by professional countermeasures technicians. But properly administered, there are legitimate applications for electromagnetic radiation (EMR) detectors – just so long as they aren’t *too* sensitive at power-line frequencies.

While they may be arguably useful for finding hidden wireless microphones and video cameras as well as other clandestine transmitters, they actually do a better job of screening for electromagnetic radiation from cell phones, microwave ovens, computers, and other electrically-operated devices. They also falsely trigger on metallic masses that reflect or conduct electromagnetic emissions from other sources; that can be their downfall, creating doubt in the mind of the user.

The latest contrivances are the PLUS GUARD from NCG Company, and the EMR Detector from WiNRADiO. As you can see from the photos, both devices are palm-sized and easily carried. The primary differences are:

The pacemaker-sized Plus Guard is sensationalized as a bug detector; their web site is laden with news reports of people victimized by hidden surveillance devices.

The Plus Guard has a single pushbutton switch to activate it. It’s kind of stiff, but it works. Less convenient, though, is the fact that it requires the interchanging of two screw-in, wire whips, 8 inches and 3-1/2 inches long; an attempt at near-impedance matching for better sensitivity at different frequency bands. Admittedly, this scheme does work. It is powered by two replaceable CR2032 button cells (included).

When the Plus Guard approaches a signal-emitting device, additional LEDs illuminate, first an orange one, then a red one accompanied by a quiet, pulsing “beep.”

The flattened-egg-shaped EMR from WiNRADiO is more conservatively advertised as an “RF (radio frequency) sniffer;” it is entirely self-contained, and requires the purchase of two mini-12 volt batteries. Unlike the spring-clip holder provided with the Plus Guard, the

smallest of the field of three devices we’ve tested. The MicroAlert measures 1-1/2”W x 2-1/4”H x 3/4”D and responds to signals between 100 kHz and 3000 MHz (3 GHz). As the signal is approached, a “chirp” is heard from the internal transducer; the stronger the signal, the faster the repetitive chirp, until it becomes a steady tone.

One application readily accommodated by the MicroAlert, since it can be left on in a continuous monitoring mode, is a worn environmental electromagnetic radiation detector. If a transmitting device comes near you, the device should sound. For this function, it can be slipped inconspicuously into a pocket, or worn on a belt (attachable clip included).

The MicroAlert can be adjusted for sensitivity, and its inexpensive #2032 lithium coin cell should last 3 years before replacement is necessary.

So Which is Best?

The Plus Guard is recommended by the manufacturer for radio frequencies from the low megahertz range up past 1 GHz, while the EMR is touted to respond best to frequencies from 60 Hz AC up through several hundred megahertz. The MicroAlert shows its best response from 100 kHz to 3 GHz.

We decided to test the units side by side, measuring the maximum distance a low-intensity field could be detected. We alternately experimented with both antennas on the Plus Guard – the longer wire antenna is best below about 400 MHz or so, with the short wire preferred at 900 MHz and above; the EMR and MicroAlert have no external antennas. To interpret the table, the farther the distance, the better the sensitivity.



The Plus Guard and EMR Detector, side by side.

EMR comes with a small wrist lanyard.

As an electromagnetic source is approached, the EMR shows a red LED that grows in intensity, accompanied by a siren-like wail that rises in pitch. It has a separate high/low/off sensitivity switch.

And One Venerable Contender

On the market much longer has been AlphaLab’s “MicroAlert,” realistically advertised as a “Radio/Microwave Alarm,” the

SOURCE AND FREQUENCY	PLUS GUARD	EMR DETECTOR	MICROALERT
LCD computer screen, 5 kHz(?)	1 inch	8 inches	1 inch
CRT computer screen, 17 kHz(?)	(not tested)	16 inches	8 inches
Test oscillator, 1 MHz	2 inches	10 inches	(not tested)
Test oscillator, 10 MHz	3 inches	12 inches	6 inches
Test oscillator, 30 MHz	16 inches	18 inches	8 inches
5-watt 150 MHz transmitter	75 feet	75 feet	20 feet
Cordless phone handset, 915 MHz	(not tested)	3 feet	9 feet
Cordless phone base, 915 MHz	6 feet	5-1/2 feet	11 feet
Frigidaire microwave, 2.45 GHz	30 feet	3 feet	30 feet

The Bottom Line

A quick look at the table shows that performance varies considerably for different frequency ranges. Since this chart embraces the vast majority of surreptitious listening devices – virtually all of them with the possible exception of military and federal government espionage applications (you don’t *really* think they’re

Review continued on next page

What's NEW

Tell them you saw it in Monitoring Times

Virginia Frequency Directory On CD-ROM

Among private frequency collectors, none is more comprehensive than the files of John Wilson, W4UVV. His periodically-released *W4UVV Virginia Frequency Directory* on CD-ROM is always an eye opener.

Containing some 100,000 listings for the commonwealth of Virginia, a hotbed of activity, selected listings for North Carolina, Maryland, and D.C. are included. Federal, military, business, press, public safety, marine, aviation, railroads, and utilities are found in this mammoth collection.

Files are sorted by frequency, service, user name, city, county, call sign, and geographical coordinates. Some 15,000 listings show assigned and possible use frequencies by service codes. These data fields include input/output frequencies, call sign, service code, user name, city, county, latitude, longitude, antenna height, repeater operation, base operation, number of mobiles, number of portables, power, CTCSS tones, channel identifier, and user remarks.

For Windows users, all files are resident in MS-EXCEL, with two-sided printing available using Clickbook2000 (not included). MS-DOS users may elect to use the resident DBASE3+ and .TXT formats.

The CD-ROM database is available for \$75 plus \$5 shipping from John Wilson (W4UVV), 6413 Bull Hill Road, Prince George, VA 23875; phone (804) 862-1262 or email jwilson9@erols.com.

Quebec Frequency Directory on CD-ROM

The latest, bilingual (French/English) *Annuaire de Frequence* for the province of Quebec is now available. Now including nearly 13,000 frequencies of all services including the new Surete du Quebec, there are also radio modifications files in both .TXT and .BMP formats.

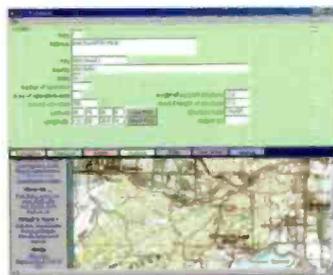
Frequency listings also include service, location, user name, and CTCSS tones as applicable or known. Other files contain notes on designing antennas, feedline hints, ten codes, ACARS reception, lists of amateur repeater frequencies, scrambling and decoding, and more.

For ordering, contact the author, Gilles Thibodeau, by email at ve2kg@globetrotter.net.

FCC Database Program

The Freq Of Nature website has just released a Federal Communications Commission Database file program to make it easier to navigate the

FCC's raw data files. Freq Of Nature is a scanning-related website by Tracy Justus, author of the database program. This program uses four of the sixteen Land Mobile Private FCC databases to keep the searchable data to one CD, although the other FCC databases will be included in a delimited text file format on another CD in case you



wish to search the information using other database utilities.

Although you can get the same information directly, the FCC's online database query program is cumbersome to use: it doesn't display the information from one simple-to-use screen, you have to drill down to find your information, and you can't access the information offline.

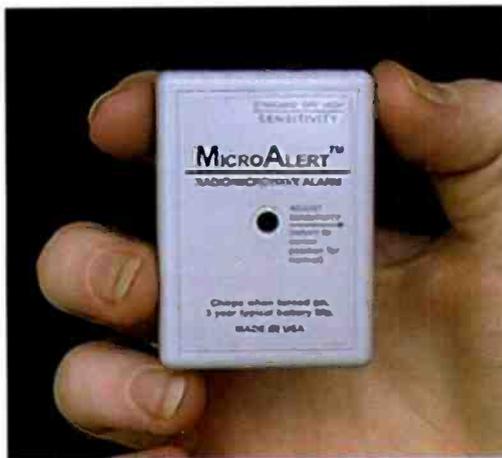
The Freq Of Nature original release is the August 2001 edition, which includes a three-ring binder with documentation and CD sleeves. All subsequent releases will only include documentation on disk to be printed out.

The cost of the FCC database program is \$29 (including shipping) for locations within the continental U.S. After the initial purchase, users will have free access to new FCC data the first of each month. Software upgrades will also be free off the website. One nifty feature of the FCC database program is the ability to pull up and display a map showing the transmitter location of the chosen frequency if it's used while online.

For sample screens and a lot of good Southern California scanning information, plus several database and scanner control programs available for download, visit <http://www.freqofnature.com>. To order, use your credit card and the secure e-commerce engine off the website, or email fccdatabase@freqofnature.com to enquire about payment via check or money order. Tell 'em MT sent you!

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to mtditor@grove-ent.com.

Review Continued



The MicroAlert

listening to you, do you?!), it would be a toss-up as to which instrument would be the best choice. Maybe all of them!

But if you are looking not only for VHF bugs, but microwave lis-

tening devices and wireless video cameras, the MicroAlert has a substantial edge.

Finally, if all you really want is a simple RF sniffer to detect nearby emissions from a few kilohertz up to nearly 1 GHz, the EMR works just fine.

...But There's a Catch

Using an amplified, broadband RF sniffer is akin to attaching an antenna to a crystal set with no tuning: You hear everything! Without frequency-adjustable selectivity, you don't know whether you're hearing a valid emission from a tiny,

low-powered bug behind the wall, or whether you're picking up electrical noise from a power line, or re-radiation from a telephone wire caused by a nearby CB, AM or FM broadcaster, TV station, or what.

So it's a Catch 22 situation: The Plus Guard has higher wideband sensitivity, but virtually everywhere I went it responded to something; and while the EMR seemed to be more discriminating in whether it was picking up actual radiation from the emitting device, it didn't have the wideband sensitivity that would assure detection of the newer, microwave listening and watching devices; and finally, the MicroAlert did a good job generally, but has a more uniform ("flat") response without the peak sensitivity at mid-VHF shown by the other two devices.

If you go with the Plus Guard, you'll become paranoid; if you go

with the EMR, you'll always wonder if you might have missed something. That's why the pros use a spectrum analyzer.

The Plus Guard is available for \$49.95 plus shipping from NCG Company, 1275 N. Grove St., Anaheim, CA 92806-2114; ph. (800) 962-2611 or visit their web site at <http://www.theplusguard.com>.

The EMR is available from \$49.95 plus shipping from WinRADiO Communications, 15 Stamford Road, Oakleigh 3166, Australia; inquire by email to sales@winradio.com, or visit their web site at <http://www.winradio.com/home/erd.htm>.

The MicroAlert is available for \$88 including shipping from AlphaLab, Inc., 1280 South 300 West, Salt Lake City, UT 84101; phone (801) 487-9492 or visit their web site at http://www.trifield.com/microwave_detector.htm

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- Don Nauer

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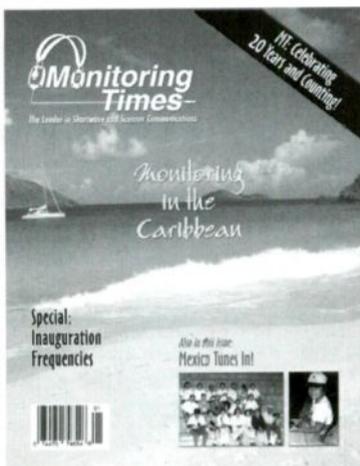
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How the 24/7, Up-Grade, Hi-Tech, Roll-Out Life Ended

Guest Editorial by Ken Reitz

We've picked up in the 21st Century where we left off in the last, where the march of technology is more like a dead run. This head-long rush, like the stream of plasma from a solar flare, goes straight through every fiber of our everyday life. We snap up the latest electronic devices nearly without thinking and even the simplest product is cluttered with excess.

For nearly 100 years the personal telephone served generations in its same basic form until it was magically transformed in the 1960s by *TouchTone* dialing which many of us still pay extra for each month. Now, in addition, we pay extra for *Call Waiting*, to tell us there's someone else vying for our attention. We pay extra for *CallerID* so we can tell who it is. And we pay extra for electronic *VoiceMail* to pick up for us, in case we don't want to talk to whoever has been IDed.

We have television coming at us from every source. We still get "free" over-the-air TV, and we pay for VCR and DVD rentals, we pay for cable and satellite TV, and pay extra for Pay-Per-View (and we're still going to the movies in record numbers paying record ticket prices!). Now we pay an ISP to get streaming video on the Internet. Hundreds of channels are spewing a relentless onslaught of repackaged programming of literally anything recorded over the last 50 years, all interrupted with a never-ending line-up of commercials for products and services hardly anybody really needs. And we pay for it all.

In an amazing turn of events the recording industry has simultaneously reached new highs *and* lows. Compact Disc technology has brought unequalled clarity and durability of reproduction, at the same time combined with an explosion of new recordings not worth listening to. Our choice of music channels has multiplied from the grandfatherly AM/FM radio to the 100 disc CD changer, to the 100 channel satellite car radio, to MP3 downloading into special PC interfaces. Now, new devices have wormed their way into daily use like Palm Pilots®, Mini Disc players, and Memory Sticks with more brain power than half of Congress, and we snap them up at 350 bucks a pop! Before we get the shrink wrap off these marvels we see the ads for the new versions with twice the features, even though we don't know how to use half the features on the ones we've just bought.

What bothers me is: Where is all this heading? Ten years ago we were all happily starting down the digital superhighway and somewhere along the way it turned into one of those giant water slides at an amusement park. There's no way to get off and in the end we're all going to get soaked. The trouble is, all this "buzz" costs extra and it has found its way into our checkbooks and established itself as monthly necessities just like the mortgage and the heating bill.

And, as we step to the cash register it's all starting to add up. The average telephone service "up-grade" for TouchTone, Call Waiting, CallerID, VoiceMail is an extra \$20/month (ka-ching!). Got a cell phone? Add another \$30-50/month depending on your plan (ka-ching!). Got cable or satellite TV? Add another \$50/month (ka-ching!). Got an ISP? Add another \$20/month (ka-ching!). Got a DSL connection? Add another \$40/month (ka-ching!). Watch Pay-Per-View or rent video tapes or DVDs? Add another \$20/month (ka-ching!). Want satellite radio for your car? Add another \$10-13/month (ka-ching!). Got a home security system? Add another \$30-50/month (ka-ching!). We're living in an electronic house of cards and I think I hear a wind kicking up.

There was a report released in December 2000 on digital terrestrial broadcast services which found that High Definition TV set sales reached the half million mark. But, it also found that most of those sets were being set up with high-end DVD players, that consumers were not buying the 8-VSB HDTV set tops which, when connected to the set, would allow viewers to watch over-the-air HDTV. The upshot, according to the report, was that nobody was actually watching the 165 U.S. digital TV stations that were on the air. Well, what do you know? Has anyone told the FCC? Has anyone told those stations? Has the public actually found an electronic gadget they're unwilling to buy? Can it be that the slap-happy '90s - where otherwise sober investors drank deep from the elixir of High-Technology and lost all reason - is truly over?

The savvy Wall Street gurus are stepping all over themselves trying to talk us into a recession. I say: Great! But, what I can't wait to know is: When the crunch comes, what are we going to give up first?

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