

Scanning - Shortwave - Ham Radio
Equipment - Computers - Antique Radio



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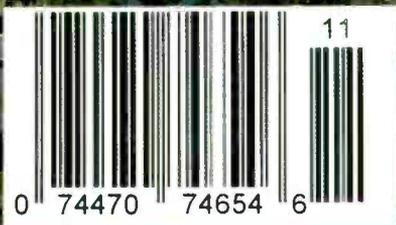


Katrina

Disaster on the Gulf

Also in this issue:

Tuning in ATL, World's Busiest Airport
MT Reviews the Eton E1XM Radio



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For more information, please visit our website and judge for yourself why the extensive WINRADIO product range is in a class of its own.

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Cover Story

Disaster on the Gulf

By Larry Van Horn

When Hurricane Katrina hit the Gulf coast August 28, the wave of destruction left not only houses and businesses in ruin, but also the communications infrastructure. Those of us outside the affected area were frantic to find friends and relatives and couldn't. But even worse, survivors and rescuers had no way to call for help or to coordinate rescues.

New technologies like the internet and digital trunk systems were both boon and bane following Katrina. Shortwave ham radio – often the first communications link to the outside world – experienced the worst disruption from solar storms in months. It was a communications nightmare.

Even so, there were communications, and *MT* was listening. Though the 2005 hurricane season is almost over, officially, we present an across-the-spectrum look at information gleaned over three weeks of intense monitoring we hope never to have to do again.

Cover photos courtesy FEMA.

C O N T E N T S

Tuning in the World's Busiest Airport 14

By Larry Van Horn

Happy Thanksgiving! If you're like a good percentage of the American public, November will find you flying home for the holiday, and chances are good you'll be changing planes in Atlanta's Hartsfield-Jackson International Airport! We recommend you bring along your scanner in your carry-on luggage for some very active, entertaining, and sometimes informative scanner traffic. For best results, preprogram your scanner for the channels of interest, using *MT's* comprehensive list of air and ground frequencies, including Delta's own trunk system.

The Continued (R)evolution of Podcasting 17

By Jesse Finkelstein

Who needs a radio? asks the author. Internet broadcasting and podcasting are filling the need for the alternative, creative, culturally diverse music and programs we used to find on the radio. What's podcasting, you reply? All will be explained ... In fact, we'll even tell you how to do it!

Reviews:

It's been a long wait, but the hobby can let out its collective breath now, because the Eton E1XM is now here and meets most expectations. The first portable radio to combine AM, FM, SW, and XM satellite radio, the radio's features and performance earn it 3-3/4 stars on *MT's* scale of 5. (See page 70)

Bob Grove reviews the updated ZC185 Zap Checker and an unusual piece of test equipment – the Mastech Ms8209 Universal Multimeter. The handheld Multimeter reports sound,

light, humidity, temperature, and electrical measurements. (See page 69)

Software updates are released much more frequently than hardware, so John Catalano checks on several of his favorite programs for new developments – Spectrum Lab, R2Plus, Shortwave Log, RadioMax, MixW, and HamScope, as well as new software developments for the computer-hosted radics RF Space SDR-14 and Flex Radio SDR-1000. (Page 72)



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- _ Cell-phone charger output jack 3.5mm (various cell phone plug tips included)
- _ Built-in 2 white LED light source and one flashing red LED
- _ Dimensions: 6-1/2"W x 6"H x 2-1/2"D
- _ Weight: 1 lb. 3 oz.
- _ Power Source: Built-In Rechargeable Ni-MH Battery Pack; 3 AA Batteries (not included); Crank power alone; AC Adapter (not included); AC Adapter recharges built-in Ni-MH battery pack



FR200 \$40* Crank it Up

Without the need for batteries, this self-powered 2-in-1 radio and flashlight helps you stay informed and prepared for emergencies.

- _ AM/FM/Shortwave Radio Reception
- _ Built-in power generator recharges the internal rechargeable Ni-MH battery (Included)

- _ Built-in white LED light source
- _ 12 international bands
- _ Dimensions: 6-1/2"W x 5-3/4"H x 2-1/4"D
- _ Weight: 1 lb. 2 oz.
- _ Power Source: Built-In Rechargeable Ni-MH Battery Pack; 3 AA Batteries (not included); Crank power alone; AC Adapter (not included); AC Adapter recharges built-in Ni-MH battery pack
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FR300 \$50*

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This all-in-one unit offers functionality and versatility that makes it ideal for emergencies.

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 1. The built-in rechargeable Ni-MH battery that takes charge from the dynamo crank and from an AC adapter (AC adapter not included);
 2. 3 AA batteries (Not included)
 3. The AC adapter alone (AC adapter not included)
 4. The dynamo crank alone, even with no battery pack installed
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- _ Weather alert
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S350 Deluxe \$150*

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S350 \$100*

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The Communications Blame Game

By Larry Van Horn, N5FPW

As I watched the nearly continuous coverage by the national news networks of the hurricane Katrina disaster on the Mississippi Gulf coast and southeast parishes of Louisiana, the winds had barely quit howling before politicians were on TV waving their fingers and placing blame for failed communications and slow government response.

But, as is the norm in Washington D.C., the blame is not being channeled in the right direction, and, as is usually the case, the politicians are missing the mark entirely.

In the March 2004 issue of *Monitoring Times*, I wrote an editorial on *Interoperability: Being Responsible*. I won't quote that entire article here, but let me hit some of the highlights to help put this all in perspective:

"It always seems to take a major disaster to highlight radio incompatibility issues that plague this nation's public safety community. This was dramatically highlighted on September 11, 2001, during the terrorist attacks in New York, Washington, and Western Pennsylvania. The battle cry of the public safety officials involved in these disasters was they could not communicate with any other agencies due to a lack of radio compatibility.

"However, despite this heavy interest and the promise of agencies being able to communicate with each other using the P25 protocol, we still see new digital systems in portions of this country switching to non-P25 compliant communications systems. Are the taxpayers of these jurisdictions being well served and their taxes well spent? In a word, no!

"So which public safety agencies in the United States aren't on the P25 bandwagon? Who cannot talk to the Feds and other vital agencies on their radio systems in times of disaster or when their citizens are under attack?"

Here is an updated list of my non-P25 Dishonor Roll from the central Gulf coast:

Owner - Non P25 System Type

Acadia Parish Public Safety, LA - LTR

Ascension Parish Fire Departments, LA - LTR

Avoyelles Parish Public Safety, LA - EDACS

Harrison County/Biloxi/Gulfport Public Safety, MS - ProVoice Regular

Iberia Parish, LA - LTR

Iberville Parish Fire/Rescue, LA - EDACS (Parish law enforcement uses Motorola)

Jefferson Davis Parish, LA - 800 & UHF LTR

New Orleans Public Safety, LA - ProVoice Regular

Pointe Coupee Parish Public Safety, LA - ProVoice Regular

St Martin Parish Public Safety, LA - ProVoice Regular
St Tammany Parish Public Safety, LA - ProVoice Regular
Terrebonne Parish Consolidated Government, LA - LTR

The disabled City of New Orleans network couldn't interface with the state of Louisiana trunk system, which was almost fully operational within hours of the center making landfall. Instead, the New Orleans first responders had to use two 800 MHz nationwide simplex mutual aid channels in order to communicate after the storm. Their \$26 million non-P25 compliant system was knocked out and could not be supplemented by the state trunk system.

And why could the state not help? Because the city uses an 800 MHz ProVoice EDACS public safety trunk system that is not compatible with the state's wide area 800 MHz Motorola trunk system.

To illustrate how serious this issue is in the New Orleans area, the city's trunk system is not even compatible with any other trunk system in Orleans or neighboring Jefferson Parish. The Orleans Parish Sheriff, New Orleans Port Authority (responsible for law enforcement on the Crescent City Connection bridge across the Mississippi River), and the Regional Transit Authority buses and police all use an 800 MHz Motorola analog system!

In Jefferson Parish, the various city and parish law enforcement agencies system use an 800 MHz Motorola mixed mode (P25 compliant) trunk system. The Kenner Public Safety trunk system, where the New Orleans International Airport is located, and Plaquemines Parish to the south use an 800 MHz Motorola analog trunk system.

Are you beginning to get the picture?

Spectrum is Not the Issue

Former Sept. 11 commission Chairman Tom Kean says the lack of radio spectrum for interoperable communications between first responders in Louisiana "cost lives," as it did at the World Trade Center.

"On the ground, the people that get there first can't talk to each other because the radio communications don't work," Kean told a CNN reporter. "They haven't got enough of what's called spectrum."

Uh, excuse me, Mr. Kean. Before you make any more statements about the situation on the ground, you might want to do a little homework. I see plenty of 800 MHz spectrum left in the New Orleans metro area. What you have failed

to identify is the real reason New Orleans and St. Tammany Parish could not talk to their neighbors: incompatible trunk systems and loss of electrical power to the existing systems.

Kean said a bill in Congress to provide more spectrum was stalled. "Nothing has been happening, and again, people on the ground – police, fire, medical personnel – couldn't talk to each other. That's outrageous and it's a scandal and I think it cost lives," he concluded.

Yes, Mr. Kean, the lack of communications probably did cost lives and it is a scandal, but not for the reasons you gave in your statement to the press. The idea that death and human suffering can be attributed to "lack of spectrum" is ridiculous. Don't confuse New Orleans with the situation in New York City: If City of New Orleans officials had had all the spectrum in the world, nothing could have compensated for the fact they are using a trunk system that is not compatible with their neighbors' and the failure of the electrical power grid.

The 700 MHz Bill of Goods

Unfortunately, the so-called experts and lawmakers have been sold a lousy bill of goods on communications issues by the radio equipment manufacturers and their lobbyists in Washington D.C. They have pushed for the new "magic band" that will rescue us from all the problems of a terrorist attack or natural disaster – the proposed 700 MHz interoperable public safety band. So, it is time to set the record straight and let me make this as clear as I can, so even a Senator or Congressman can understand it.

"It's the interoperability of the various systems, stupid, not the spectrum space!" And that's what the P25 protocol was designed to correct and what New Orleans chose to ignore.

Congress's answer? More legislation and spending more taxpayer money. Here is a sample of some of the insanity inside from inside the beltway after the storm hit the Gulf Coast:

"We have not kept the promise we made 10 years ago," said Rep. Jane Harman, D-Calif., calling the situation "a black eye" and "an embarrassment" for lawmakers. She and Rep. Curt Weldon, R-Penn., have written to Speaker of the House Rep. Denny Hastert, R-Ill., to ask for a suspension of the normal rules of debate so that a bill to enforce a deadline for handing the relevant frequencies (TV channels 60-69; 700 MHz PS band) to first responders can be passed...

In the Senate, a similar measure, sponsored by John McCain, R-Ariz. and Joe Lieberman, D-Conn., is currently before the Commerce, Science and Transportation Committee. Spokesman Amy Call said Senate Majority Leader Bill Frist, R-Tenn, was working with Commerce Committee Chairman Sen. Ted Stevens, R-Alaska, to try and get that bill to the floor soon, too. "The Leader saw first-hand on the ground the challenges, and is working with several members about further fixes in this area."

In a nationally published article, Shaun Waterman, UPI Homeland and National Security editor, offers his readers this remarkable statement: "The parts of the spectrum identified by the 1995 Public Safety Wireless Advisory Committee report are in the high 700-MHz range – which experts say is ideal for use by emergency services because signals sent over these

frequencies can penetrate walls and travel long distances."

Mr. Waterman, I have some land in southeast Louisiana I would like to sell you! 700 MHz signals do not travel long distances. Look around at the number of 800 MHz cell phone towers you need to get good coverage in your area. Pretty much the same problem exists at 700 MHz. The infrastructure to put 700 MHz repeater systems to cover every part of this country will cost the taxpayers billions of dollars. Add to that the fact that every user would need a new radio to cover 700 MHz, and it becomes obvious this is going to be a very impractical solution which most of the U.S. will probably never buy into nor implement.

Don't Fund Non-compliant Systems

So, while the American people sit through another round of heated Congressional hearings, with everyone blaming everyone else, how about we get a word into this debate about getting rid of the *real* problem – these non-P25 compliant systems? It is time for the citizens of the local public safety agencies to demand that we get rid of systems which hinder, not help, the rescue effort, and put the words "public safety" back into the communications systems we use to preserve and protect.

First responders told one reporter, "in a situation of prolonged crisis like the one in Louisiana – the time before and after the towers go down and the power goes off is as important as any other."

And they are exactly right. If New Orleans had a compatible trunk system in place like the rest of its neighbors, radios could have been reprogrammed to share surviving infrastructure within signal distance. That could have restored communications through a repeater system, instead of forcing the entire city's first responders onto two short-range 800 MHz simplex channels. (We also wonder why the EDACS ProVoice system had no back-up generator-powered portable repeater equipment ... but that's a separate issue.)

I urge each of you who have one of these "death trap" communications systems in your community to demand that they be scrapped and a robust, interoperable system put in its place. In fact, *we should not spend one more dime of federal money for any system which is not 100 percent P25 compatible.*

Bottom line, in the shadow of the 9/11 disaster, you and I, the taxpayers of this country, have spent millions through our elected officials on communications systems and networks that, to put it plainly, failed to fulfill their primary missions. And the sad part is, our elected officials are too busy running their mouths to see what the real problems are.

Personally, I am tired of throwing money into a bottomless pit. While Congress is looking to find someone to blame, they only have to look in a mirror. If hearings are held, I hope this time they will listen to some communications experts with the courage to tell the truth about interoperability and the 700 MHz myth. Congress wields the power over our tax dollars, so it is up to them to see that those dollars are spent more wisely on compatible communications systems. Then perhaps we won't see another communications disaster like the one spawned by Hurricane Katrina along the Gulf Coast of the United States.

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\$50-\$99.99	\$8.95
\$100-\$399.99	\$12.95
\$400-\$899.99	\$16.95
\$900-\$1499.99	\$20.95
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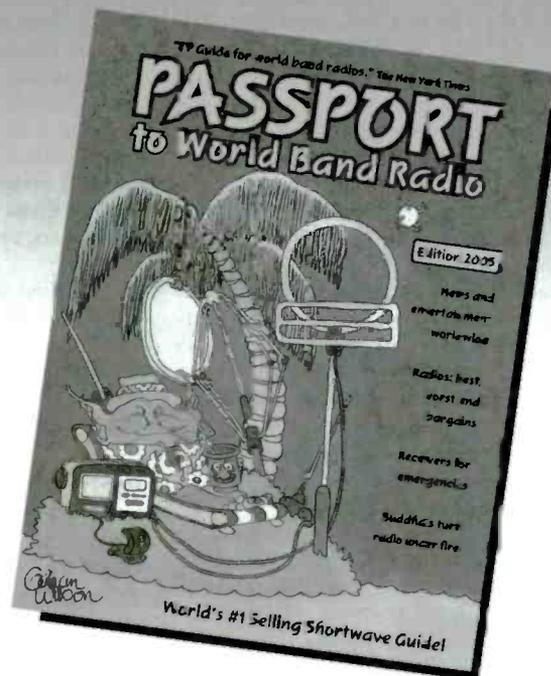
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Disaster on the Gulf – Monitoring Hurricane Katrina

****Special to Monitoring Times magazine****

By Larry Van Horn, N5FPW, MT Assistant Editor

Photography courtesy FEMA

It was a hot, muggy August night in the Big Easy. As I watched the Weather Channel, I could see the face of a monster hurricane on the weather satellite photos they were showing. It was then that I realized that it was going to be hard to dodge this behemoth of Mother Nature.

At 2 a.m. in the morning, the Weather Channel forecasters aired that it had made a turn and was heading towards the City of New Orleans. I immediately ran down the hallway waking my family up and telling them it was time to get out. I gave them one hour to get dressed and decide which of our worldly possessions, besides the family pet, we would take with us in our small car. At that moment those possessions did not mean much to me; I just wanted to get my family to safety and out of harm's way.

Not only did we not have a lot of room, but we were running out of time. Soon all three major routes out of the city would be clogged with bumper to bumper traffic heading out of the city.

We hit the road, heading east on the Interstate 10 twin spans fleeing the city and ended up in Mobile, Alabama, to wait and ride out the storm. And this is not just hyperbole: that was the longest 48 hours of my life, worrying about what we would come back to, if anything.

Finally, when the all clear was sounded, we returned to New Orleans. You can imagine our relief when we turned onto our street and into our driveway to find everything as we left it, except for some limbs down in the yard.

But that was August of 1992, and the category three hurricane that spared the Crescent City of New Orleans that year was Andrew.

Flip the calendar forward to the end of August and the year 2005. Weather satellite im-

ages again showed the face of another monster – Hurricane Katrina.

This time I did not have to make a life or death decision, but hundreds of thousands of residents in her path did. And this time the Big Easy would not dodge another bullet. Katrina slammed her category three winds into the central Gulf Coast with force and fury and fulfilled the fears engendered 13 years ago by Hurricane Andrew.

My first thoughts were for our family and friends along the Gulf Coast and their well being. And since I am a radio enthusiast, I immediately turned to our well-equipped radio room and the internet to search for news from the affected area.

Technology Rules

We did not have the technology in place 13 years ago we have today. In particular, the internet has played a major role in helping radio hobbyists get information about conditions on the ground in the disaster zone. Fortunately, I also have a suite of excellent radio related databases and enough equipment to monitor a wide variety of communications throughout the radio spectrum, in addition to the internet.

One of the first and best internet sites I visited after the storm was Lindsey Blanton's RadioReference.com website. Lindsey had put up a Wiki page (http://www.radioreference.com/wiki/index.php/Hurricane_Katrina) devoted to hurricane related communications. Here you could find frequencies, call signs, links to streaming scanner audio from the local area, and broadcast media websites streaming vital information to the rest of the country.

Also, early on, the emergency management station for Louisiana, WWL-AM 870 kHz, returned to the air after a brief outage. AM broadcast listeners know that, after many a Gulf hurricane, this 50,000 watt giant propagates well after their local sunset until local sunrise and is the place to be on the AM radio dial. They are heard in 42 states during the evening, night and early morning hours. For the most part, their coverage of the Katrina was excellent. Any time a hurricane threatens the Gulf of Mexico, I recommend you tune the Big 870 for news you won't hear anywhere else.

In less than a week, WWL radio, as well as other broadcasters in the area, were streaming their audio and video (from the TV outlets) on the internet. This also filled in a lot of holes in the coverage from the national media and put a local face on the enormous disaster which had taken place throughout the Louisiana, Mississippi and Alabama coast.

Some of the better links included:

870 kHz WWL-AM New Orleans
<http://www.wwlvtv.com>
Channel 4 WWL-TV CBS New Orleans
<http://www.wwlvtv.com>
Channel 6 WDSU-TV NBC New Orleans
<http://www.wdsu.com/index.html>
Channel 26 WGNO-TV ABC Channel 26
New Orleans/WBRZ Channel 2 Baton
Rouge http://abc26.trb.com/news/Hurricane_City
<http://www.hurricanecity.com/>

HF radio proved to be problematic at best. Not only did hurricane Katrina hit the coast and cause communications outages, but solar conditions also deteriorated, thanks to sunspot complex 798. A total of nine X-class solar flares caused a real mess with communications on the HF bands.

The most active communications were heard on the amateur radio bands. With minimal communications along the coast, amateur operators from around the nation responded to the disaster.

The Amateur Radio Relay League (ARRL) reports that amateur radio earned praise and respect as the Hurricane Katrina relief effort moved forward. Amateur radio equipment and supplies arrived at the American Red Cross Hurricane Katrina relief staging area in Montgomery, Alabama. They were turned around as quickly as possible to accompany volunteers into the field. A team headed by Alabama ARRL Section Manager Greg Sarratt, W4OZK, oversaw the amateur radio volunteer intake and registration, and led the way in satisfying the ever-changing requirements of the Red Cross and other served agencies.

"The American Red Cross and other served agencies are very thankful and appreciative that we are helping them out," Sarratt said. "I have talked with several ARC folks who said they could not operate without us!"

Some of the most exciting listening on HF originated on the Immigration and Customs Over the Horizon Enforcement Network (COTHEN).



After 9/11 the U.S. Coast Guard was absorbed into the Department of Homeland Security, and they made full use of the excellent capability of the COTHEN net. Rescues in real time and vital communications were passed on the robust HF network by both the Coast Guard and Customs Service. One had to only listen a short period of time to the COTHEN net to hear the real heroes of hurricane Katrina in the early hours after the storm hit. Table one is an extensive list of HF frequencies heard that were storm and recovery related. This is one list you might want to clip and keep close to your receiver for the next disaster that strikes the Gulf Coast.

If you want an accurate and up-to-date HF list that is not loaded with old and out-dated frequencies and information, I urge you to visit *MT* columnist Hugh Stegman's website and his updated hurricane frequency list at: <http://www.ominous-valve.com/hurricane.txt>. This is the best list on the internet. If you want to follow government and military communications, I urge you to point your browser to the WUN club website and check out their Government and Military frequency/designator list at: <http://www.wunclub.com/files/mla.html>

As I mentioned before, if you were not within VHF/UHF range of the central Gulf Coast, the next best thing to being there was provided by nearby scanner buffs streaming audio on the internet. In addition to Blanton's website mentioned above, another website worth bookmarking for future events is the Scanner Buff network at: <http://scannerbuff.net/hurricane.php>.

One of these audio links was piping the Louisiana State trunk radio system across the great electronic divide and, again, these communications were among the most riveting. Using our previously published guide to the Louisiana state system (written by John Mayson in the June 2005 issue of *MT*), it was easy to keep up with all the traffic being relayed by the internet.

Of course, the VHF/UHF air bands were humming with activity. Tables three and four will give you an idea of frequencies we monitored and the participants in the disaster recovery effort on the Gulf. A couple of the internet audio streams even included Milair UHF frequencies which carried the action for those not close enough to catch traffic directly on their scanners.

What does the future hold?

First, let me encourage each of you to please make a donation to the American Red Cross or the Salvation Army. Second, I hope each of you who might be in harm's way of one of these tropical storms or even a winter storm event, will make your preparations now before it is too late. Have a plan and the supplies in place to protect you and your family first. Finally, please don't gamble and throw the dice as to whether to stay or get out. If local officials order an evacuation, do not hesitate: get out!

The danger of hurricane season is not over. In fact, as this issue of *MT* is being delivered to you, we will be in the last few weeks of the hurricane season, though the danger will lessen until next June when the season cranks up in earnest again. It is my sincere hope that we will have no more loss of life and damage from another hurricane along our coastline. Maybe Mother Nature will calm down now and we won't have look at the satellite image of another monster from the tropics.

MT HURRICANE KATRINA COMMUNICATIONS

Table One: Key to Abbreviations

AFB.....	Air Force Base
AFSOC.....	Air Force Special Operations Command
AICC.....	Air Intercept Control Common
AL.....	Alabama
ALE.....	Automatic Link Establish
AMC.....	Air Mobility Command
ANG.....	Air National Guard
ARB.....	Air Reserve Base
ARES.....	Amateur Radio Emergency Service
ATC.....	Air Traffic Control
ARTCC.....	Air Route Traffic Control Center
AWACS.....	Airborne Warning and Control System
CAP.....	Civil Air Patrol
CBP.....	Customs and Border Protection
CCT.....	Combat Control Team
COTHEN..	Customs Over the Horizon Enforcement Network



EOC.....	Emergency Operations Center
FEMA.....	Federal Emergency Management Agency
FL.....	Florida
ICE.....	Immigration and Customs Enforcement
JAILS.....	Joint Air Logistics Information System
JT.....	Joint Task Force
JOB.....	Joint Operations Center
JOB.....	Joint Reserve Base
IA.....	Iowa
LA.....	Louisiana
LSB.....	Lower Sideband
LZ.....	Landing Zone
MARS.....	Military Affiliate Radio System
Medco.....	Medical Company
MS.....	Mississippi
NAS.....	Naval Air Station
NOMAD.....	North American Aerospace Defense Command
NG.....	National Guard
N.C.....	National Hurricane Center
NOLA.....	New Orleans
NOAA.....	National Oceanic and Atmospheric Administration
PAO.....	Public Affairs Officer
PP.....	Phone patch
PTD.....	Pilot-to-Dispatcher
RACES.....	Radio Amateur Civil Emergency Service
SAM.....	Special Air Mission
SAR.....	Search and Rescue
SATERN.....	Salvation Army Team Emergency Radio Net
SCN.....	SHARES Coordination Network
SE.....	Southeast
SEM.....	State Emergency Management
SHARES.....	Shared Resources
SOCC.....	Sector Operations Control Center
TALCE.....	Tactical Airlift Control Element
TFR.....	Temporary Flight Restriction
TX.....	Texas
TOC.....	Tactical Operations Center
USA.....	U.S. Army
USACE.....	U.S. Army Corps of Engineers
USAF.....	U.S. Air Force
USB.....	Upper Sideband
USCG.....	U.S. Coast Guard
USMC.....	U.S. Marine Corps
USN.....	U.S. Navy
USTRANSCOM	

Table Two: HF Frequency List (kHz)

Freq	Agency/Usage	Mode(s)
2326.0	Operation Secure SEM Net	ALE/USB
2411.0	Operation Secure SEM Net	USB
2414.0	Operation Secure SEM Net	ALE/USB
2419.0	Operation Secure SEM Net	USB
2422.0	Operation Secure SEM Net	USB
2439.0	Operation Secure SEM Net	USB
2463.0	Operation Secure SEM Net	USB
2466.0	Operation Secure SEM Net	USB
2471.0	Operation Secure SEM Net	USB
2474.0	Operation Secure SEM Net	USB
2487.0	Operation Secure SEM Net	USB
2511.0	Operation Secure SEM Net	USB
2535.0	Operation Secure SEM Net	USB
2569.0	Operation Secure SEM Net	USB

2587.0	Operation Secure SEM Net	USB		Traffic Net	USB (Daily 0700)
2801.0	Operation Secure SEM Net	USB	14325.0	Hurricane Net (NHC Hurricane Net)	USB
2804.0	Operation Secure SEM Net	USB	14396.5	SHARES SCN <Channel 2>	USB
2812.0	Operation Secure SEM Net	ALE/USB	14567.0	FEMA <F-3U/L>	USB/LSB
2958.5	USN Navy New Orleans Net	USB	14653.0	NG Nationwide Net	ALE/USB
3202.0	Operation Secure SEM Net	ALE/USB	14757.0	USA Nationwide Net	ALE/USB
3862.5	MS/Magnolia Section Phone Nets	LSB	14776.0	FEMA	ALE/USB
3873.0	West Gulf/LA/North Texas ARES		14898.5	SHARES SCN, <Channel 2 alt>	USB
	Emergency Nets	LSB (Nights)	15088.0	USCG	USB
	LA/MS/TX Emergency and		15094.0	SHARES SCN <Channel 7>	ALE/USB
	Tactical Traffic Nets	LSB (Nights)	15867.0	COTHEN/USCG <Scan 7>	ALE/USB
	TX Traffic Net	LSB	16338.5	NG Nationwide Net	ALE/USB
3910.0	LA Traffic Net	LSB	17487.0	SHARES SCN <Channel 8>	USB
3911.0	West Central FL Section/SKYWARN Nets	LSB	18594.0	COTHEN/USCG <Scan 8>	ALE/USB
3935.0	Central Gulf Coast Hurricane Net LSB	LSB	20890.0	COTHEN/USCG <Scan 9>	ALE/USB
	LA/TX Health and Welfare Traffic Nets		23214.0	COTHEN/USCG <Scan 10>	ALE/USB
3940.0	FL/Tropical Phone Traffic Nets	LSB (Nights)	25350.0	COTHEN/USCG <Scan 11>	ALE/USB
	South FL ARES Net	LSB			
3944.0	West Gulf Emergency Net	LSB			
3950.0	Northern FL ARES Net	LSB			
3965.0	AL Emergency Net/Traffic Net Mike	LSB			
3975.0	District 32 RACES Net	LSB			
4640.0	Operation Secure SEM Net	USB			
4490.0	SHARES SCN <Channel 3>	ALE/USB			
4573.0	SHARES SCN <Channel 1 alternate>	USB			
4582.0	National CAP Calling frequency	USB			
4960.0	LA NG	USB			
5135.0	Operation Secure SEM Net	ALE/USB	123.000	Hurricane hunter dropsonde broadcast	AM
5140.0	Operation Secure SEM Net	ALE/USB	123.025	Area helicopter coordination	AM
5192.0	Operation Secure SEM Net	ALE/USB	123.050	Area helicopter coordination	AM
5195.0	Operation Secure SEM Net	ALE/USB	123.450	Unknown (passed by Wolf)	AM
5211.0	FEMA <F-1U/L>	USB/LSB	123.850	NOLA TFR ATC CBP P-3 aircraft <Backup>	AM "Omaha 44"
5236.0	SHARES SCN <Channel 1>	USB	125.500	NOLA Approach control	AM
5320.0	USCG District Discrete	USB	126.875	NOLA Approach control	AM
5696.0	USCG Air-Ground	USB	127.350	MS Coast TFR ATC CBP P-3	AM "Omaha 45"
5711.0	SHARES SCN <Channel 4>	ALE/USB	127.500	Alexandria International tower	AM
5732.0	COTHEN/USCG <Scan 1>	ALE/USB	130.000	Gulfport MS Approach control	AM
5847.0	NG Nationwide Nets	ALE/USB	132.050	JTF Katrina support AWACS	AM "Kingfish Kilo"
5877.0	LA NG Net	ALE/USB	134.900	Alexandria Approach control	AM
6800.0	SHARES SCN <Channel 9>	USB		NOLA TFR ATC CBP P-3/USN E-2C	
6985.0	USACE Net	ALE/USB		check-in frequency	AM "Omaha 44/Wolf #"
7242.0	FL Midday Traffic Net	LSB	136.375	ICE Air-Air	AM
	Tropical Phone Traffic Net	LSB	136.725	USAF 89AW SAM Air-Air	AM "SAM"
7243.0	AL Emergency Net	LSB	138.050	JTF Katrina support AWACS	AM "Kingfish Kilo"
7248.0	District 32 RACES Net	LSB	138.125	NOLA Berman highway LZ	AM
7265.8	SATERN	LSB	138.450	NOLA Unknown LZ	AM
7285.0	LA/MS/TX Emergency and		138.475	NOLA Unknown LZ	AM
	Tactical Traffic Nets		138.525	NOLA Slugger LZ near Superdome	AM
	West Gulf ARES Emergency Net	LSB (Days)	139.000	NOLA Buffalo LZ	AM "Buffalo"
7290.0	LA/MS/TX Health and	LSB (Days)	139.125	NOLA Unknown LZ	AM
	Welfare Traffic Nets		139.250	USA Unknown (paired with 241.000)	AM
7348.0	FEMA	LSB (Days)	139.750	Keesler AFB TALCE	AM
7477.0	Operation Secure SEM Net	ALE/USB	142.250	NOLA Unknown LZ	AM
7480.0	Operation Secure SEM Net	USB	155.265	Gulfport Memorial hospital	NFM
7527.0	COTHEN/USCG <Scan 2>	ALE/USB	156.800	USCG Marine <Ch 16>	NFM
7633.6	USAF MARS Aircraft PP Net	USB	157.050	USCG Marine <Ch 21>	NFM
7650.0	USA Nationwide Net	ALE/USB		"Camp Cottonmouth" (Mississippi Coast)	
7802.0	Operation Secure SEM Net	USB			
7805.0	Operation Secure SEM Net	USB			
7932.0	Operation Secure SEM Net	USB			
7935.0	Operation Secure SEM Net	USB			
8047.0	NG Nationwide Net	ALE/USB			
8184.5	USA Air net	ALE/USB			
8912.0	COTHEN/USCG <Scan 3>	ALE/USB			
8983.0	USCG Air-Ground	USB			
9002.5	USN Navy New Orleans net	USB			
9081.5	US Army net	ALE/USB			
9106.0	SHARES SCN <Channel 5>	ALE/USB			
9110.0	USCG NMF Boston, MA weather charts	ALE/USB			
9260.0	Presidential Support	FAX			
	HMX-1 helicopters				
10194.0	FEMA	USB "Nighthawk"			
10242.0	COTHEN/USCG <Scan 4>	ALE/USB			
10493.0	FEMA <F-2U/L>	ALE/USB			
10586.5	SHARES SCN <Channel XF>	USB/LSB			
10588.0	FEMA	USB			
10816.5	NG Nationwide Net	ALE/USB			
11202.0	USCG NOLA Area relief operations	ALE/USB			
11217.0	SHARES SCN <Channel 6>	USB			
11494.0	COTHEN/USCG <Scan 5>	USB			
12087.0	NG Nationwide Net	ALE/USB			
12216.0	FEMA	ALE/USB			
13242.0	SHARES SCN <Channel 10>	USB			
13907.0	COTHEN/USCG <Scan 6>	ALE/USB			
13927.1	USAF MARS	USB			
13956.0	FEMA <F-4U/L>	USB/LSB			
14265.0	SATERN	USB			
14300.0	Maritime Mobile Service Net	USB (Daily 1700)			
	The Intercontinental Amateur				

Table Three: VHF/UHF Aircraft List

Freq	Agency/Usage	Mode(s)
38.150	USA hurricane operations	NFM
119.500	NOLA Area ATC	AM
120.750	Keesler AFB tower	AM
121.500	Civilian emergency and calling/NOAA/USAF	
	Hurricane hunter dropsonde broadcast	AM
	Area helicopter coordination	AM
	Area helicopter coordination	AM
	Unknown (passed by Wolf)	AM
	NOLA TFR ATC CBP P-3 aircraft <Backup>	AM "Omaha 44"
	NOLA Approach control	AM
	NOLA Approach control	AM
	MS Coast TFR ATC CBP P-3	AM "Omaha 45"
	Alexandria International tower	AM
	Gulfport MS Approach control	AM
	JTF Katrina support AWACS	AM "Kingfish Kilo"
	Alexandria Approach control	AM
	NOLA TFR ATC CBP P-3/USN E-2C	
	check-in frequency	AM "Omaha 44/Wolf #"
		AM
	ICE Air-Air	AM
	USAF 89AW SAM Air-Air	AM "SAM"
	JTF Katrina support AWACS	AM "Kingfish Kilo"
	NOLA Berman highway LZ	AM
	NOLA Unknown LZ	AM
	NOLA Unknown LZ	AM
	NOLA Slugger LZ near Superdome	AM
	NOLA Buffalo LZ	AM "Buffalo"
	NOLA Unknown LZ	AM
	USA Unknown (paired with 241.000)	AM
	Keesler AFB TALCE	AM
	NOLA Unknown LZ	AM
	Gulfport Memorial hospital	NFM
	USCG Marine <Ch 16>	NFM
	USCG Marine <Ch 21>	NFM
	"Camp Cottonmouth" (Mississippi Coast)	



Tuning in the World's Busiest Airport

By Larry Van Horn, N5FPW
MT Assistant Editor

This month it is Thanksgiving and Americans will be on the move. People will be traveling all over the country for the holidays. Traditionally in this country the Thanksgiving holiday is the busiest air travel time of the year. And a lot of air traffic will take off and land at the busiest airport in the world – Atlanta Hartsfield-Jackson International Airport.

It stands to reason some of the best and most interesting listening in the aircraft and land mobile bands can be heard in and around Hartsfield International. If you are going to fly through Hartsfield, *MT* has put together a monitoring guide for those of you who have a layover and a handheld scanner in your carry-on luggage.

Hartsfield Statistics

Hartsfield is owned by the City of Atlanta and operated by the Department of Aviation. It is 10 miles from downtown Atlanta. The airport encompasses a total area of 4,700 acres (1,518 Hectares).



The new tower – tallest in North America – will replace the old one, once it's complete. (Photo by Harry Baughn)

The passenger terminal complex measures 130 acres (52.6 hectares), or 5.7 million square feet. The Complex includes the Terminal Building, Concourses T, A, B, C, D, and E, the International Concourse. Within these Concourses are 148 domestic and 28 international gates.

There are four parallel runways in an east-west configuration:

9R/27L = 9,000 Feet Long (2,743 Meters)
9L/27R = 11,889 Feet Long (3,624 Meters)
8R/26L = 10,000 Feet Long (3,048 Meters)
8L/26R = 9,000 Feet Long (2,743 Meters)

In order to meet the increased demand for air travel and reduce the current level of delays, the need to build the new 9,000 foot Fifth Runway (Runway 10/28) took on new urgency. Construction is to be completed as soon as practical, and the runway is scheduled to be commissioned in May 2006.

Because of the new runway, a new FAA Air Traffic Control Tower (ATCT) is required to provide a clear line-of-sight to the new complex. The new ATCT's overall height will be 394 feet tall (the highest ATCT in the North American continent). The surfaces of all five runways will be visible from the Tower Cab Level. The existing tower site will be removed, with the vacated space being utilized by the development and expansion of Concourse E.

Monitoring the Aero Band

Because there is a lot of air traffic in the Atlanta area, the aero band is a nearly constant buzz of activity, except during the early morning hours when passenger traffic is at its lowest. During the early morning hours the

predominant activity in the skies over Atlanta will be cargo flights from a variety of cargo carriers. Table One is a current list of passenger and cargo carriers, their ATC callsigns, and passenger terminals that provide service into and out of Hartsfield.

Table Two is one of the most complete lists of aeronautical and related frequencies available for the Hartsfield Airport. It includes air traffic control, frequencies for ARINC (Aviation Radio, Inc, company and FBO, fixed base operator), and frequencies for ACARS (Aviation Communication Addressing and Reporting System) noted in the area.

Monitoring Ground Frequencies

We have also compiled a comprehensive list of ground frequencies in use at Hartsfield. The largest air carrier that uses Atlanta as its worldwide hub is Delta Airlines and all its feeder carriers. The operation is quite large, so Delta uses a 900 MHz Motorola trunk system. If you are flying Delta, you will definitely want to have your handheld trunk tracker loaded to monitor the heartbeat of the carrier's operation at Hartsfield.

Security and fire protection is provided by the City of Atlanta. We have also included the frequencies and trunk groups for all the aviation activity on the City of Atlanta Motorola trunk system. You will find a complete list of ground frequencies in Table Three.

So, if you are going to travel through Hartsfield-Jackson International Airport this Thanksgiving, make sure you pack your handheld scanner so you can catch some of the action at the world's busiest airport.

Table One: Airlines Serving Atlanta Hartsfield-Jackson Airport

Passenger Airlines

Airline	Airline ATC Callsign	Concourse
Aeromexico (AM)	Aeromexico	South Terminal Concourse E
Air Canada (AC)	Air Canada	North Terminal Concourse D
Air France (AF)	Air France	South Terminal Concourse E
Air Jamaica (JM)	Air Jamaica	North Terminal Concourse E
AirTran (FL)	Citrus	North Terminal Concourse C
Air Wisconsin	Wisconsin (See United)	
American Airlines (AA)	American	North Terminal Concourse T
America West (HP)	Cactus	North Terminal Concourse D



Special assistance/parking/ international operations	129.675	
Unknown	128.975	131.100
DHL Worldwide	131.625	
Emery World Air Cargo	131.750	
FedEx	131.000	131.925
Frontier Airlines	130.650	131.000
Northwest Airlines/Northwest Airlin		
Maintenance	130.350	
In-Range	131.750	
United Airlines/Air Wisconsin/United Express		
In-Range	130.250	131.075
Operations	131.050	
US Airways/US Airways Express		
In-Range	129.750	131.775

Area ARINC FBO Frequencies:

Area Airport Legend:

- ATL Hartsfield - Jackson Atlanta International Airport
- FTY Fulton County Airport (Brown Field)
- PDK Peachtree DeKalb Airport
- RYY Cobb County Airport (McCullum Field)

Airway Aviation/Air BP.....	130.900	(PDK)
Atlanta Northside Aviation.....	132.000	(RYY)
Epps Aviation (PDK).....	129.050	
Hill Aircraft and Leasing (FTY).....	129.575	
Mercury Air Center (ATL/PDK).....	131.650	
Preferred Jet Center (RYY).....	130.175	
Raytheon Aircraft Services.....		(FTY)

ACARS (ATL)	129.125	130.450	131.125
Unknown ARINC	129.025 (ATL)	129.400 (FTY)	120.125 (ATL) 130.675 (ATL) 130.850 (ATL) 131.075 (ATL)

Table Three: Ground Frequencies

Delta Air Lines Trunk System Atlanta, GA

System Type: Motorola Type II Smartnet (Analog)

Frequencies:

935.200	935.2125	935.225	935.2375	935.250	935.6375	935.650
935.6625	935.675	935.6875	936.2375	936.6875	936.7125	936.7375
937.1375						

Talkgroups:

- 16 Maintenance
- 32 Maintenance
- 48 Maintenance
- 80 Maintenance
- 112 Maintenance
- 160 Operations
- 176 Unknown user/usage
- 192 Operations
- 256 Weight and Balance
- 272 Aircraft Cleaning - Concourse A Gates
- 304 Aircraft Cleaning - Concourse B and D Gates
- 336 Aircraft Cleaning - Concourse E International Gates
- 400 International Operations
- 432 International Bag Recheck
- 448 Operations
- 464 Operations

- 480 Concourse A and E Tugs
- 496 Freight, B Drivers
- 512 Operations
- 544 Concourse A Gates In Range
- 576 International Baggage
- 624 Operations
- 672 Operations
- 720 Operations
- 752 Ramp, Concourse A Gates
- 784 Ramp
- 816 Operations
- 976 Passenger Services: Wheelchairs/Carts Concourse E International
- 1008 Passenger Services: Wheelchairs/Carts Concourse B

Atlanta Public Safety System

System Type: Motorola Type II Smartnet (Analog)

Frequencies:

856.4625	856.4875	857.4625	857.4875	858.2375	858.4375
858.4625	858.4875	858.7625	858.9375	859.2375	859.4375
859.4625	859.4875	860.2375	860.4625	860.4875	860.7625
860.9375	866.0625	866.3125	866.6125	866.7875	866.8625
867.1375	867.1875	867.3125			

Hartsfield Airport Talkgroups:

- 33744 Fire Department Administration
- 33776 Fire Department Operations
- 33808 Fire Department <TAC-1 >
- 33840 Fire Department Rescue
- 33872 Fire Department <TAC 2 >
- 33904 Airport Administration
- 33936 Airport Operations
- 33968 Airport Field Tech Maintenance <Channel 4 >
- 34000 Airport Emergency
- 34032 Airport Facilities <Channel 1 >
- 34064 Airport Facilities <Channel 2 >
- 34096 Police Department Investigation Units
- 34128 Police Department K-9 Units
- 34160 Police Department Patrol Units
- 34192 Police Department Tactical
- 34224 Police Department Dispatch
- 34256 Police Department Administration
- 34288 Airport FAA Emergency Crash Phone (Tower to FD)
- 34320 Federal Inspection Service
- 35504 Police Department Emergency
- 39344 Fire Emergency
- 41040 Airport Contractors

Miscellaneous Ground Freqs

Aircraft Services International	452.350	464.725
Airport Group International	461.600	462.350 464.925
Air Serve Corporation (Shuttle Bases)	452.300	463.350 463.650
AirTran Airways	460.650	460.700 464.650
America West	460.775	460.875
American Airlines	460.775	
Atlantic Southeast	451.500	
Continental	460.800	461.025
Independence Air (Trunk System)	460.6875	460.7125 460.8375
JetBlue Airways	463.3625	
Northwest Airlines	151.715	460.650 460.750
	460.850	464.125 464.575
United Airlines	460.6625	460.725 464.6375
US Airways	460.875	



Who Needs a Radio?

The Continuing (R)evolution of Internet Broadcasting and Podcasting

By Jesse A. Finkelstein

Most readers of *MT* grew up with radio as an important feature of daily life. Our concept of broadcasting has evolved through the years to encompass not only wireless radio transmission, but also internet streams by traditional local, national and international broadcasters. The impact has been immediate and significant: instead of straining through interference to hear an obscure shortwave transmission, the internet may offer a way to listen with local FM quality reception.

Similarly, the lack of commercials and programming diversity that attracts listeners to Sirius and XM satellite radio has drawn many to internet radio. While internet radio does not offer music on the drive to work, it requires no monthly fee and can be accessed (perhaps in violation of company policy) through employer provided PCs at work. Surveys show that for every satellite radio subscriber, eight people in the U.S. tune into internet radio broadcasts.

The advent of internet streaming as a method of distributing programming also had a dramatic impact on hobby or specialty broadcasters. The April issue of *MT* highlighted the extraordinary efforts undertaken by small broadcasters to reach a geographically limited audience in compliance with the FCC's Part 15 rules, which usually limit transmission range to a few blocks. Internet broadcasting not only opened the medium to a much broader population with less electronic expertise, but also suddenly allowed these broadcasters to reach an international audience.

While this permitted existing local hobbyists access to an unlimited potential audience, the phenomenon gave rise to a completely new group of broadcasters who never even considered low power radio transmission as an option. Indeed, many new formats which could never succeed in a local broadcast setting, or which would simply be uneconomic in a national syndication, now became feasible.

For example, there might only be one fan of exotic moose calls in each city. An internet broadcaster featuring all-moose sound programming could aggregate thousands of

listeners and even sell moose call CDs, even though previously such an enterprise could never have been successful from one physical location.

Internet broadcasting has around for a decade. However, "podcasting" – based on the ubiquitous iPod manufactured by Apple – has grown rapidly in a short time, demonstrating that our definition of broadcasting will be further stretched in the near future. In perhaps the most amazing reflection of how the concept of radio is evolving, Infinity Broadcasting announced in April that its San Francisco AM broadcast station will abandon its current format and start broadcasting podcasts over the AM airwaves. In this strange twist, the "anti-broadcast" movement has obtained access to the traditional broadcast medium that drove many of these hobbyists to develop alternatives in the first place.

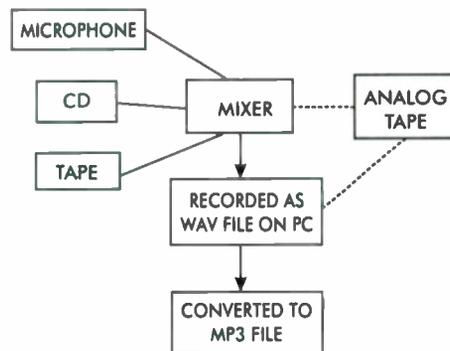
How does this all work?

Internet Broadcasting

Internet broadcasting is nothing new. Streaming "transmissions" of audio content have been used by large broadcasters for a number of years. Within the past decade, individual broadcasters have used services such as Live365 to create "internet radio stations." Listeners access the broadcasts by going to a website, downloading simple audio software, and clicking the appropriate link. The "broadcast" in most cases is a rotating series of mp3 files that the broadcaster uploads to the host servers.

Internet music broadcasters come in all stripes, from pop, to jazz, blues, hard rock and classical. The advent of CDs and mp3s spawned a large independent music production revolution, with tens of thousands of self-produced and distributed music products. Many of those independent artists have found that internet broadcasters are a good and more approachable source of promotion than radio broadcasters, who often must heel to tightly controlled music formats. As a result, rating services that once monitored only radio broadcast outlets are now

RECORDING A BROADCAST FOR DISTRIBUTION



looking at internet broadcaster airplay. Go to <http://www.radiowavemonitor.com> and see up-to-date tracking of music among various formats on the largest internet broadcasters.

Given that internet listeners are accessing audio through their computers, broadcasters often take advantage of the ability to integrate the broadcast with an active website. The website includes not only promotional and programming information, but may include links to provide immediate email or instant messaging feedback to the broadcaster, and perhaps a scrolling identification of selections currently playing and forthcoming.

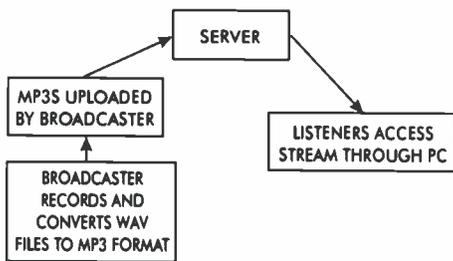
It is clear that the migration of listeners to internet radio is continuing. Arbitron, the radio industry's standard for survey data, found that internet broadcasters hosted by the top four networks (Yahoo's LaunchCast, AOL Radio Online, MSN Radio, Live365) had nearly 5 million unique listeners in a one week period.

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by David Lawson

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INTERNET BROADCASTING



In February 2005, 37 million people listened to internet radio, and in a one year period the top five internet radio stations increased their audiences by 32%. For two years running, surveys of several thousand respondents by RRadio Network found that over half of those interviewed look to internet radio as their source for new music, as compared with broadcast radio (24%) and satellite radio (4%). The survey group, which admittedly was based on users familiar with both internet and radio sources, showed that the respondents as a group expected to be listening most in the next year to internet radio (58.4%) as opposed to broadcast radio (15.65%).

The survey information on internet broadcasting shows how different it is from radio broadcast entertainment. In radio broadcasting, the peak listener times are morning and afternoon drive times to work and home again. Radio broadcasters have no competition for this role. However, in the workplace, much to the chagrin of network administrators trying to preserve bandwidth for legitimate work needs, streaming audiocasts are increasing in popularity. Similarly, college campuses, where all equipped students are potential listeners and where independently produced music is frequently sought out, targeted internet radio programming is making serious inroads against traditional radio broadcasters.

How to Become an Internet Broadcaster

It is relatively an easy matter to set up an internet broadcast station. For example, go to <http://www.live365.com> and for \$10 a month you can establish the station in a few hours. The "station" plays a rotation of mp3s that the broadcaster uploads to a dedicated server. Listeners can tune in through the live365 website. The basic internet radio station fee of around \$10 a month limits access to around 25 listeners at a time. For additional fees, broadcasters can allow a larger audience to listen at once, use expanded storage space on the server, and also include live broadcast segments. Some of these broadcasters run the usual mp3 rotation for all but a few hours, during which the live portions are originated.

There is no limitation on the content of the mp3 that restricts it to music. Accordingly, a radio station on live365 can include not only music mp3s, but station identifications and other speaking mp3s in the rotation. The creation of broadcasts can be as simple or as sophisticated as you choose. Some broadcasters simply upload mp3s of music, which requires no sound

recording or editing. Others intersperse their pre-recorded music mp3s with custom recorded voice or voice plus music mp3s. The "recording studio" in many instances is limited to the microphone that came with the PC. However, a relatively simple set-up with an inexpensive mixer allows the use of multiple microphones, or a microphone and DVD or tape source, to create an mp3 for uploading.

By recording the speaking mp3s as wav files, and then converting them to mp3 format with mp3 encoding software (available for about \$10), a variety of non-music program material may be uploaded for broadcast on the server. An advantage to using a service like *live365*, in addition to its simplicity, is that *live365* has negotiated bulk payment of royalties for artists. A broadcaster using his own server would be responsible for payment of these royalties, or would be limited to using unpublished music by independent artists (a limitation that some broadcasters and many podcasters happily live with).

Podcasting

The term "podcasting" is based on the Apple mp3 iPod player. Portable mp3 players made their debut in 1999. The first mp3 players by Rio were followed by many other manufacturers, but none achieved the market penetration of Apple's iPod. Eleven percent of Americans now own iPods, and analysts predict that Apple will sell another 20 million of them this year. Within the past two years, iPods have played a part in allowing us to experience another seismic shift both in the concept of broadcasting and in access to the broadcast medium.

At first, mp3 players were seen as a way to cram dozens of CD's worth of music into a smaller, lighter package. However, they also can be used like an "internet broadcast TiVo" – allowing listeners to download an internet broadcast in a matter of seconds. Suddenly, the previous domination of radio broadcasts during the all-important morning and afternoon drive time could effectively be challenged. Even though the creator of the podcast may record it at 9:23pm, a listener may enjoy it on a subway ride to work (where radio could not reach), in a car, or while jogging.

Media observers recently have written about the fact that radio broadcasters have been forced to broaden their extremely restricted playlists and offerings in order to counter the variety of material available on satellite broadcasters XM Radio and Sirius. While satellite radio offers great variety, nothing in the broadcast world compares to the smorgasbord of esoteric material available by podcast. All forms of music, including excellent "indie" tracks and performances, are found in podcasts, but that is only the beginning. Shows about fishing, new music, cooking, and politics (including rebroadcasts of segments from liberal radio network Air America) are readily available. Indeed, some podcasts are Seinfeld-ian aural blogs about nothing – merely narrations of what people are doing and thinking in their daily lives.

Podcasting, in theory, operates on the

listener's system very much like a desktop aggregator. An owner of a PC or laptop may subscribe to a number of print services, receive them as feeds, and view all of the feeds together. One observer suggests that the best way to understand it is to think of the iPod having a regular set of subscriptions that are checked on a continuing basis for updates. To those familiar with "blogs" (weblogs), think of a podcast as a blog with audio content.

The first software in widespread use to accomplish this is RSS 2.0 (the acronym is for "Really Simple Syndication"). RSS is a form of XML, a text mark-up language that is related to HTML, that has been around since 1998, but allows far greater flexibility to the author. All files used in RSS conform to XML standards, but there is no need for the podcaster or listener to podcasts to reach that level of technicality.

How to Podcast

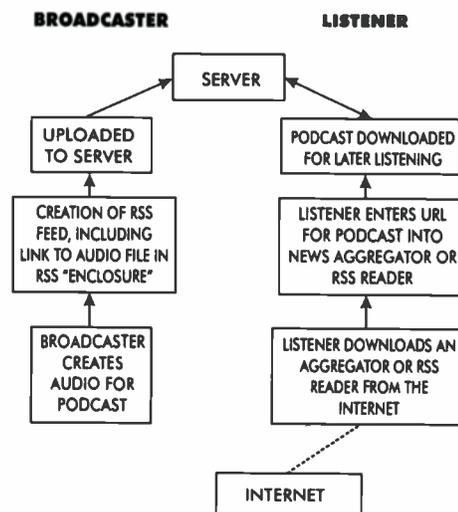
Podcasting generally involves three functions: creation of the content, posting of the content on the internet, and downloading by the listener.

Creation of Content for the Podcast

Content can be created with any audio program or sound editing software. The content can be speech, music, sounds of nature, etc, limited only by the imagination. Note that unless you obtain a license from ASCAP (about \$360 even if you have no revenue), you cannot play copyright protected music on your podcast. Music created by independent artists and not licensed or protected by intellectual property laws is fair game, which is why podcasts are a fertile breeding ground for the promotion of unsigned and virtually unknown (but in many cases, extremely talented) musicians. The entire audio file is then converted to mp3 format.

It is important to remember that audiophiles will likely produce recordings with much more "information" than is necessary or can be transmitted. The stretch to create the highest quality exacts a price: By using encodings above 56k or 64k, the broadcaster impedes the flow of data without any increase

PODCASTING



in quality to the ultimate listener. Remember, it is all bits and bytes to the computer.

iTunes, WinAmp, and other mp3 players allow the use of ID tags to identify in the iPod or other mp3 player window the content of the stream for the listener. Accordingly, your programming can have a truly professional appearance as it plays through the listener's digital player.

Uploading the Podcast to the Internet

The next step in the process is to make the content available to the listener by uploading to an internet host server that permits downloading files using the HTTP protocol. A number of servers are available for hosting podcasts.

Obviously, we need to make the podcast file available to listeners so that they (and their software) know how to access it. This is done by posting a blog entry on a blogging service that permits enclosures. The "enclosure" in this cast is the URL linking to the mp3 file that you created as a podcast, and is entered in a textbox after you post your blog entry.

Listeners Download the Podcast

The listener has installed a "podcasting client" (software like iPodder) on his or her computer. The client checks for updated RSS feeds by looking at the blog post and its RSS feed. When new content is available, the client downloads the appropriate mp3 file from the internet server host. The mp3 file is then added to the playlist on the iPod or other media player.

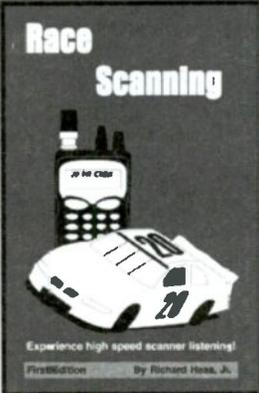
Like the "tivo'd" TV program, the podcast is available for listening at the chosen time by the listener.

Full Circle: Live Broadcast of Podcasts

The explosive growth of podcasting is perhaps best illustrated by the newfound interest of competing media. Satellite broadcaster Sirius is beginning a show devoted to reviewing the thousands of podcasts available. Taking things one step further, Infinity Broadcasting recently announced that it is changing the format of KYCY-AM 1550 in San Francisco to a podcast format. Listeners and erstwhile broadcasters can upload their podcasts to <http://www.kyouradio.com>. The radio station reviews the uploads, and chooses ones to broadcast. Within the first few days of availability, several hundred podcasts already had been uploaded.

The world of broadcasting continues to change at an increasingly rapid rate. Comparing internet broadcasting and podcasting makes the point: internet broadcasting, a relatively new phenomenon, has taken a decade to reach its current state of development and deployment. In one fifth that time, podcasting has grown so dramatically that other media are looking to podcasting as a source of content for rebroadcast. The interesting question remains: Will internet broadcasting and podcasting cannibalize, or actually reinvent traditional broadcast modes?

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Readers Write:

Reconditioned Dishes, FTA Receiver, AM Antenna & the Pro-95

Over the last several months a number of readers have written in with questions regarding a range of topics, so let's see what they're saying:

❖ Case of the Missing Manual

MT subscriber Neville Leslie writes: "From your article in *MT* some time ago I bought a Jonas 4.5-ft patio dish [from smalllear.com]. Never got around to setting it up due to my job and moving around...My problem now is putting it together. I can see how the front part goes together...it's the back with the stand or mounts...I misplaced the drawings and Smalllear.com said they don't have any..." Neville goes on to explain that he's retired and has "...a sunny spot in Barbados" where he and his wife will spend the winters. Now, that's a great retirement plan!

I located the company on the Internet but, unfortunately, they don't seem to be making that product any more. I e-mailed them but got no response. Then I remembered that another *MT* reader had sent me a picture of his Jonas 4.5-ft dish and it showed a fairly clear shot of the front assembly. I scanned the photo in and sent it to Neville.

It's one of the problems with modern electronics: Products come and go and many Asian manufacturers simply dump the product info from their web sites once the product is no longer made. There are a few examples of companies making their archives available to consumers. One is Radio Shack. Despite their shrinking usefulness to the DIY electronics crowd, they still maintain an extensive archive on their web site where consumers may download long lost owner's manuals from products discontinued decades ago. To access the list go to <http://www.radioshack.com> and click on "product manuals" at the top of the page.

Bought a used scanner and it didn't come with an owner's manual? Don't worry, *MT* to the rescue! Just go to <http://www.monitoringtimes.com> and click on "Equipment manuals." There's a ton of very useful information at the *MT* "reference library." Check it out!

Lost your owner's manual to your analog C-band receiver? Visit Satellite 911 on the web. They maintain a substantial archive of satellite receivers from decades ago. Go to <http://www.satellite911.com> and click on "receivers." You'll see a list of analog C-band

satellite receivers. Click on the model you have and you'll find out how to program the receiver.

If you know of any other web sites which have archives of electronic manuals, send the info in an e-mail and I'll share it with the rest of our readers.

❖ Zinwell FTA Receiver Repair

MT reader John Stanko writes, "Back in August 1999 I read your article on the Zinwell ZDX-9111 FTA satellite receiver...I purchased one and have had it working ever since. Well, last night we had numerous power surges here and I did not pull the plug on this unit. Now it is dead! I called Zinwell and, as you can guess, no more parts, service or schematics, etc. I checked it out: fuse OK...best guess is the small transformer is bad...do you know where I can find one?..."

Once again, manufacturers leave us high and dry. But, I have to say you've had a great run with that receiver—six years is a good long time. You could spend a lot of time looking for a replacement transformer without any success or you could take it to a local electronics repair shop and wait and wait. Most such shops have a diagnostic fee of \$25-50 and a bench fee of \$50/hour plus parts. You could spend more than the cost of a new FTA receiver.

But, here's the good news: There is one very reputable company, Professional Satellite Repair, which will fix any satellite receiver. Here's the deal: For a \$55.00 flat rate PSR will do all DSS (DISH Network or DirecTV) receiver repair, analog or digital C-band receiver repair including Free-To-Air (FTA) receivers. The \$55 includes parts, labor and return ground shipping and comes with a 6 month warranty. They're located in Pennsylvania and here's the phone number: 877-777-3492. Visit their web site at <http://www.PSR1.com> or E-mail: Repairs@PSR1.com Turn around time is typically 24 hours with PSR. I've used them and they're great!

❖ The Reluctant PRO-95

Phil e-mails from somewhere in Michigan: "I purchased a Radio Shack scanner PRO-95. I cannot pick up anything. I recently went on a trip and thought I would pick up truckers. I did not get any communications. At

home... marine, air, ham, nothing. Police, there is some communications. What's the deal? Am I doing something wrong? The scanner is scanning the frequencies."

I don't have any personal experience with the PRO-95. However, I did a look around a little and found that new PRO-95 owners seem to have trouble getting the unit up and running to their satisfaction. One of the best places to find out about nearly any kind of radio related electronics is eham.net (<http://www.eham.net>). There is quite a bit of discussion about that particular scanner and several owners have had the same problem you're experiencing.

You might also have some luck contacting customer support at Radio Shack. Here's their link: <http://www.radioshack.com/Contacts/ProductSupport.asp>. Detail your reception problems and see what happens. If all else fails, I wouldn't hesitate to take the product back and get a refund. Their refund policy requires you to wait for their check,



but it could be worth it. It might also be a good idea to get a store credit and use that to buy a scanner which might be more user friendly. And, finally, check out the *MT* chat board at <http://www.monitoringtimes.com>. You'll find a link to the chat board at the top of the page. Click on it and post your question in the scanner topics. It's quite possible that other readers who have the PRO-95 will be able to help.

❖ Resurrecting Antique C-band Gear

MT's own *Below 500 kHz* columnist, Kevin Carey, has been trying to resurrect an old 12-ft Conifer C-band dish he rescued from a neighbor's house intact. He's got it set up now and has tried to get the old, old Drake satellite receiver LNA with separate down-converter to work. In this case, it looks like the old gear is dead. Even though parts can still be found for such old systems, it's better to try to put new equipment on the dish. But, like the rest of us, Kevin is trying to keep costs to a minimum.

The Conifer 12-ft dish was used extensively throughout the cable-tv industry for downlinking cable-tv fare. It was considered the king of the home satellite TV viewers.

Assuming the dish is still in good shape (Conifer construction was widely revered), all that's needed to make it useful today is to put a modern C-band feed on it and scare up a newer receiver. Kevin has the dish mover, so that won't have to be replaced.

Most local satellite TV installers have many used C-band satellite receivers stacked up in their shops. One in good working order shouldn't cost more than \$50 with the remote. A good LNB and feed horn or LNBF (a combination of both) can be purchased for even less.

However, new receivers and LNBs complete with warranty are more readily found. The best place to shop for home satellite TV gear is Skyvision. Their web site <http://www.skyvision.com> has a tremendous wealth of information on the subject, including satellite charts, FAQs, and links to all kind of useful sites. And, if you call them at 800-500-9275 they'll send you a free catalog. They sell used C/Ku-band analog receivers as low as \$69.95. Get one with a dish drive for \$129. The best deal is the Motorola 4DTV receiver, which



Want to upgrade an old C-band dish? This used C/Ku-band analog receiver is yours for \$69.95 at Skyvision. (Courtesy: Skyvision)



Still, the ultimate is big dish receivers: Motorola's 4DTV does it all. UHF remote lets you operate the receiver from 50' away. (Courtesy: Skyvision)



4DTV back panel shows all the connections: C/ Ku LNB input, stereo out, dish drive terminals, HD output for additional HDD200 converter, VCH decoder slot. (Courtesy: Skyvision)

is able to receive analog and digital and encrypted subscription channels. It's still the ultimate satellite TV receiver and the price is often deeply discounted. Check their web site for the latest price.

For an extensive list of 4DTV channels available, check out this list: http://skyvision.com/pages/information_center/4dtvguide.html.

The world of the big dish is still quite viable. There are hundreds of channels in various formats, many dozens of radio stations, news and sport feeds, free, unencrypted channels. In fact, there's more to see and hear on the big dish now than there was in the big dish satellite TV heyday of 10 to 15 years ago.

❖ Amazon's Amazing AM Antenna

Ron Smith, noting an earlier mention of AM loop antennas in a previous column, writes "...Just got my [Terk AM Advantage] from Amazon for \$35 including UPS shipping. Crutchfield wants \$50 + UPS..."

Good work, Ron! It really pays to shop around. When I checked in at Amazon after your tip off, I noticed that they had several used Terk Advantage loops for even less. This is one product I wouldn't hesitate to buy used. There's simply nothing to break!



Terk AM Advantage. One reader found this antenna at Amazon.com. It not only looks good, but it works great! (Courtesy: Amazon.com)

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Allows armchair tuning of the RX-350. Function buttons allow operation of various receiver controls. Direct frequency entry via keypad.

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Why 50 and 75 Ohms?

In a recent column I discussed the choice of 50 ohms as a standard impedance for coaxial transmission lines. One of our *MT* readers, W9CWG, kindly submitted a four-page technical report from Bird Electronic Corporation which provided additional details, summarized here:

The important considerations for transmission line are: the breakdown voltage and loss of the inner insulation, and the power-carrying capacity of the conductor. Since these factors operate independently of one another, no single impedance is a perfect match for all three considerations. Therefore, a compromise between optimum power-carrying capacity (30 ohms) and breakdown voltage (60 ohms) was necessary.

During the 1940s, a Radio Manufacturers Association (RMA) committee recommended to the U.S. Navy a standard of 50 ohms, an impedance that could be achieved when using commercially-available copper water tubing for the conductors!

Why, then, do we use a nominal 75 ohms for TV coax and other video distribution systems? Since these are distributing very low signal levels, power-carrying capacity isn't a problem, nor is breakdown voltage. Only the dielectric attenuation contributes significant loss, and that is lowest at 77 ohms impedance.

Q. Are scanners with 2.5 or 7.5 kHz tuning steps necessary to hear the new narrowband technology transmission with 7.5 kHz deviation? (Gary Webbenhurst)

A. The new 7.5 kHz deviation allows twice as many signals within a band as the current 15 kHz deviation, but most scanners can be programmed in 5 kHz increments, which puts them close enough to the new assigned frequencies that their currently-wide filters will still pass the audio. However, the recovered audio will be smaller because of the narrower deviation (frequency modulation), but turning up the volume control takes care of that. The problem would come from scanners with sharper filters or wider step increments which may be far enough off frequency to miss the deviation from the narrower, off-frequency signals.

Q. Do large trunking systems with multiple frequencies have multiple transceivers and antennas to handle the various talk groups? (William Tobin, email)

A. Multiple transceivers, yes, but the system is usually divided into several locations, and a single antenna can be used at each location with isolators to enable the simultaneous operation of the radios. Since it's not likely that every assigned channel will be active at any instant, the system doesn't require that many transceivers. The selection is computerized in order of priority.

Q. What is WAAS and how does it improve GPS positioning? (Mark Burns, Terre Haute, IN)

A. The Wide Area Augmentation System (WAAS) is a free nationwide service utilizing a combination of satellites and 25 ground stations to refine the readings from Global Positioning Satellites (GPS) to provide resolutions of better than 10 feet. It does this by compensating for atmospheric, timing and satellite orbit errors. The final coordinates are retransmitted through a geostationary (fixed position) satellite for reception by WAAS-compatible GPS receivers.

Q. Rather than erect an outdoor wire antenna for shortwave reception, I'd like to opt for an indoor active antenna, preferably in a closet. What are the limitations, and can you recommend a particular model?

A. An active antenna is very practical if you can't erect a full-size, passive antenna. However, the same caveats apply for an active antenna as for a passive antenna:

- (1) The antenna should be far away from electrical power lines and electronic devices that emit radio interference;
- (2) The antenna should be as high as possible, and not confined by wiring, metal heat/air ducts, aluminum siding or metallized Mylar insulation.

The H800 and H900 Skymatch antennas are superb for this purpose. My recommendation would be to select a number of key, weak frequencies, and experimentally position the Skymatch in various locations, finally choosing the one with the best performance and least electrical interference.

Q. How many users can occupy a single frequency assignment at one time? (Brendan O-Sullivan)

A. Other than time-sharing or multiplexing the frequency, I don't know of any way a channel can support more than one user at a time. This is, of course, assuming that the mode is a voice, and the channels are standard bandwidths as required for the audio passband.

If you have a wider bandwidth, then multiplex is possible, but such channels are not available for two-way communications to the commercial sector. The wider bandwidths, combined with narrow-banding techniques, would allow more than one user at a time.

The big problem comes with full-carrier AM and FM which is inherently a spectrum waster. Whereas you can transmit a 3 kHz voice band in SSB, on AM and FM you have the redundant 3 kHz on each side of the center carrier.

Q. My new WiNRADiO G303i works great to pick up most SW stations, but many of the stations that I can pick up on my old Radio Shack DX390 are completely gone on the WiNRADiO, even when using the same antenna. All of the surrounding frequencies work great on the WiNRADiO. Is this a defective WiNRADiO card? What can I do to fix this problem myself? (Jim Hansen)

A. It may be hard to believe, but I suspect the problem is with your DX390, not the WiNRADiO! That model was infamous for images and intermod products – internally generated spurious signals that resulted from strong signals mixing in the RF circuits, then being tuned in on frequencies where they weren't actually transmitting.

The WiNRADiO G303i is a giant step in quality above the old Radio Shack product; if it doesn't hear a signal, it probably isn't there! You can easily verify this by trying to hear those same signals on another high-quality receiver other than the WiNRADiO: my bet is that you won't hear them on that one, either!

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 bobgrove@monitoringtimes.com. (Please include your name and address.) The current Ask Bob is now online at our website:
<http://www.monitoringtimes.com>

Gary Webbenhurst

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Last month I shared my bright ideas for mobile installations in my new Ford Escape. This month I share some ideas for possibly upgrading your home listening station.

Do you have, or want, an actual radio room (or ham shack)? Can you make do with a small closet or just a desk? Whether you are the man of the house, or the three star general that runs the place, you deserve a comfy recliner chair for easy monitoring. How can you establish or improve your monitoring station? Think it through. Don't take this project lightly. You really need to put on your thinking cap. Ask your partner for suggestions, or a ham radio buddy, the electronics geek down the street, or look at photos in radio magazines to see the shacks of other radio gurus.

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I have two stations. When I built my modest retirement home, I designed a room just for radio and computer operations. I had a large bookcase and desk built in. That wall backed up to my closet in the master bedroom. Power cables and antenna coax were fed through the wall where two 2-amp Astron power supplies and antennas could be hidden out of sight in my closet. I could also run coax up to the attic and outside. A surge protector and uninterruptible power supply (UPS) plug into the electrical outlets I had wired in the closet. This feeds the two Astrons; I just set 'em and forget 'em. They have run 24/7 for four years with no problem.

In the radio room, I mounted four ham mobiles underneath the bookcase: ten meters, 222 MHz, two meters, and a dual band. On the desktop I have four base/mobile scanners with the four to one BX2 Scan-A-Mix speaker. On the other side I have the Pro 2053 and the Yaesu 5000. Behind both groups of radios is a DC power strip. This arrangement keeps power, speaker and antenna wires to a minimum.

One of my best ideas was to make a long DC power cord to reach across the room to facilitate computer programming for handheld and mobile rigs. For the cloning cables, I use



a serial male to female "extension cord" to the back of the desktop computer. This saves me from crawling under the computer desk to connect the cloning cables.

I slowly transitioned from this primary radio room to a recliner in the TV room. An oak side table holds my Pro 2051, Pro 83, and Yaesu FT-60R with a 12 volt marine battery underneath for everyday and emergency power. The deep cycle battery has a six pole MFJ DC power strip with Anderson connectors so other accessories and radios can be operated, for example, a three hole outlet with a 12 volt gooseneck lamp. I also have a DC to AC power converter with 150 volt AC output. Both devices are permanently glued to the sides of the battery. If I have to take the battery mobile, it's all set to go. I condition and trickle charge it about once a month.

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Your antenna is the key to everything. To whom do you want to listen? What frequency bands are involved? Do they use state of the art trunked digital systems or plain old low/high band VHF? Do you live in the middle of a large metro population, or in a rural, hilly, or mountainous region? If the supplied antenna does not pull in what you want to listen to, you must experiment and work your way up. Before erecting a tall (expensive) mast or tower, try a compromise. Perhaps a telescoping or specialized antenna like the Austin Condor, or a frequency specific 800 MHz or 160-161 MHz RR antenna. I have used everything from a small Radio Shack discone hung from the ceiling with fishing line, to a simple ground plane hidden in a closet shelf. In my motor home, I hooked the coax to a metal window frame by backing out a screw, attaching the center feed line and retightening the screw. This even works for AM-FM!

You can try antennas in the attic or the disguised Ventenna on an existing vent shaft. Go to <http://www.grove-ent.com> and check the variety of antennas to meet every need and budget. You can call them for their expert advice and to place an order at 1-800-438-8155. I highly recommend the Austin Condor (\$35) for

wide band indoor coverage and the larger Grove Scanner Beam II for outdoor directional needs. The legendary Scantenna won't let you down as a general coverage outdoor antenna. Personally, I intend to try the new amplified WinRADIo AX-31B Planar Log-Periodic Antenna.

Here is another interesting site to check out: <http://www.ssejim.co.uk/> Also watch the *Antenna Topics* column in *MT* for other antenna websites.

Still not getting the signal you need? If using a beam, experiment with aiming it slowly for the best signal. Perhaps you need an amplifier for specific range, say, 155 MHz or 800 MHz.

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Do you suffer from interference or static? Do you have cable TV jacks? You might not be paying for cable service, but signals may still be present that could interfere with radio reception. This is common in apartment houses where a renter moves out, leaving the cable TV wire dangling on the floor, shooting out RF that is fully capable of penetrating the sheet rock into your living space. If you suspect this interference source, ask the manager to enter the vacant apartment and place a "terminal plug" on all the cable outlets. This is another case when a frequency finder or sniffer can help you track down interference.

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There is a wide choice of radios for experienced and knowledgeable radio hobbyists who know exactly what features they want in a new radio based on what new radio technology is being used in their area etc. If you are brand new to the hobby, go down to Radio Shack and ask for a demonstration. If they are busy, come back when there are no customers. Tell them what agencies you want to monitor, and ask them to recommend the most appropriate scanner and to explain what systems local agencies use, like trunked and/or digital 800 MHz.

Narrow band technology and frequency assignments are already here. For a top of the line scanner, look for 7.5 kHz steps on VHF. On UHF look for 6.25 steps. A bright backlight display is an absolute must for scanners.

Like many hobbies, radio monitoring is expensive. Ham radio is even more expensive. Budget, sacrifice, and spend wisely. Personally, I watch for sales, but I never buy from individuals on eBay or refurbished. Pick established, honest dealers who have favorable return policies, and good after sale technical support. I am saving up for my next radio, the Uniden 396T. Check out the specs: Wow! My dealer? Grove Enterprises.



Plain Speaking about Ten Codes

As we've said in this column many times, effective use of public safety radio systems requires planning and coordination, especially when multiple jurisdictions are involved. This ability to communicate smoothly and efficiently between agencies, part of an overall goal of *interoperability*, now has a new source of standards and procedures.

The Association of Public-Safety Communications Officials (APCO) took the first steps toward standardization in 1940 with the development of "Ten Signal Cards," which standardized an initial set of 17 brevity codes. These codes evolved over time to include the familiar phrase "10-4," indicating a message was received. Police departments recognized several benefits from the use of these codes, including improved accuracy, increased privacy, and a reduction in response time.

Many years later, APCO published a revised "Ten-Signal" list of brevity codes, recommending that they be adopted as a nationwide standard. The following are the most commonly used Ten Signals, taken from *The Public Safety Communications Standard Operating Procedure Manual*, published by APCO in 1969.

Ten Sig Description

- 10-1 Unable to copy - change location
- 10-2 Signals Good
- 10-3 Stop Transmitting
- 10-4 Acknowledgment
- 10-5 Relay
- 10-6 Busy - stand by unless urgent
- 10-7 Out of Service
- 10-8 In Service
- 10-9 Repeat
- 10-12 Stand by (stop)
- 10-13 Weather and road report
- 10-18 Complete assignment quickly
- 10-19 Return to _____
- 10-20 Location
- 10-21 Call _____ by Telephone
- 10-22 Disregard
- 10-23 Arrived at scene
- 10-24 Assignment Completed
- 10-25 Report in person to (meet) _____
- 10-28 Vehicle registration information
- 10-29 Check records for wanted
- 10-30 Illegal use of radio
- 10-33 Emergency
- 10-36 Correct time
- 10-41 Beginning tour of duty
- 10-42 Ending tour of duty
- 10-43 Information
- 10-50 Accident
- 10-51 Wrecker needed

- 10-52 Ambulance needed
- 10-55 Intoxicated driver
- 10-59 Convoy or escort
- 10-74 Negative
- 10-75 In contact with _____
- 10-76 En route
- 10-77 Estimated Time of Arrival (ETA)
- 10-88 Advise present telephone number of _____

Although APCO hoped that these Ten Codes would become standardized, over time many departments changed the meaning of some codes and replaced others. These days there are a fair number of differences in the meaning of Ten Codes you may hear.

There are a number of Internet sites that have various lists of Ten Codes. One good site to check is <http://www.bearcat1.com/radio.htm>.

At the direction of the President, the Department of Homeland Security (DHS) developed a framework for "incident management." These incidents, presumably emergency in nature, are supposed to be handled through structures, procedures and processes documented in a comprehensive program called the National Incident Management System (NIMS).

To ensure that incident management organizations can communicate and share information with each other through wireless systems, the NIMS will include standards to help ensure that wireless communications and computing for Federal, State, local, and tribal public safety organizations and nongovernmental organizations are interoperable.

The Federal Emergency Management Agency (FEMA) is probably familiar these days to most readers, given their generally poor and confusing performance in the wake of Hurricane Katrina.

FEMA, as part of DHS, is responsible for enacting NIMS. One of the many initiatives in the plan that FEMA is encouraging is the use of "plain language" over the radio, rather than the use of Ten Codes. FEMA argues that interoperability is much easier, and will have much less chance of confusion, if emergency personnel simply say, in plain English, what they're doing. Instead of saying "10-50," for instance, a police officer can say "auto accident." It would also eliminate a fair amount of initial personnel training, since no one would have to memorize a list of brevity codes.

As you might imagine, this idea does have a few drawbacks. First is the safety of

those using the radio. During a traffic stop, for instance, when the officer requests a "10-29" (a check to see if there are outstanding warrants) and is within carshot of the driver, the response from the dispatcher can make a difference. Overhearing a plain English message of "the vehicle is reported stolen" could trigger a driver to run or attack the officer, where a simple "10-16" (New York City code for the stolen vehicle) would not.

Privacy is another consideration. Police officers are well aware that scanner users are listening. Plain English messages while discussing a specific individual could reveal information that should otherwise be kept confidential.

FEMA is looking to have many local agencies use plain English by late next year. Their leverage is to have those agencies asking for grants to confirm that they are working toward NIMS compliance, including using plain English on the radio. Agencies that are not making progress may have their grant requests scrutinized much more closely or even held up. Agencies that do cooperate, on the other hand, could expect their grant requests to be approved quickly.

❖ Umatilla County, Oregon

Dan,

I just purchased the Pro-2096 scanner from Radio Shack. I'm trying to program in a trunked system for my area and I'm having trouble finding some of the information needed to do so. In the manual under "programming trunking systems" it says that in order to monitor Motorola VHF and UHF systems I must program the scanner with additional parameters: base frequency, step and offset. At the bottom of the page it says this information is on the Internet or in published guide books. I cannot find this information in Police Call Volume 9 guide book or on the CD provided. Can you help?

I live in eastern Oregon.

System name: Umatilla County

Location: Pendleton Oregon

County: Umatilla

System Type: Motorola Type II Smartnet

Frequencies:

453.10000

453.62500



453.90000
 460.10000 - Primary Control Channel
 460.25000
 460.45000
 460.60000

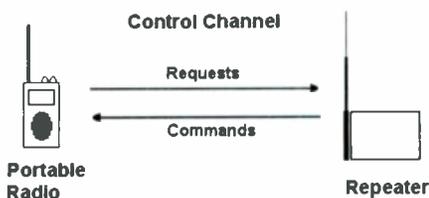
The other question I have is, the same frequencies as above are used in another town near by Pendleton. Can my scanner be programmed to tell the difference between the two cities when a call comes across using the same numbers? Your guide gives me call signs, are they the way to tell the difference?

Thank you in advance for taking the time to read and respond to my e-mail.
 - Don in Pendleton, Oregon

Let's start with the basics. In a trunked radio system, conversations take place on radio frequency channels that are dynamically assigned by the system controller. When a voice transmission takes place, the controller sends commands to the mobile radios, instructing them to tune to the assigned voice channel so they can hear the transmission. In Motorola trunking systems, these tuning instructions carry the channel in a coded form. Instead of using the actual radio frequency, the instructions use a channel number. In systems operating in the 800 MHz and 900 MHz bands, each channel number always refers to the same radio frequency. In systems that operate in the 400 MHz band, however, a channel number may not always refer to the same radio frequency.

In the 400 MHz band, each system has a *base frequency* where everything starts. This is the lowest frequency that can come from the repeater. This frequency has a channel number of 380, which is referred to as the *offset*.

Each system also has what's known as *step size*. This refers to the spacing between channels. For instance, if you have a system with a base frequency of 460.0000 MHz and a step size of 12.5 kHz, the channel "map"



would look like this:

Channel Number	Frequency
380	460.0000
381	460.0125
382	460.0250
383	460.0375

As you can see, each channel is separated by a gap of 12.5 kHz.

So, to correctly track a Motorola trunked system in the 400 MHz band, you will need three additional values: *base*, *offset*, and *step size*. Determining these values can be a challenge, which is why many references suggest looking in guidebooks or on the Internet.

The frequencies you list in your letter appear to be for the Motorola Type II system operated by Umatilla County from Pendleton. Voice activity is analog and the system uses the following seven frequencies: 453.100, 453.625, 453.900, 460.100, 460.250, 460.450 and 460.600 MHz. Note that the first three begin with 453 and the final four begin with 460. This split will require two sets of base/offset/step sizes and can be set up in your scanner using two banks.

For scanner memory bank number 1, use: base of 453.0125 MHz, a step size of 6.25 kHz; and an offset of 380. Although the standard step sizes are 12.5 kHz and 25 kHz, 6.25 kHz is a legitimate value and reflects the desire of the Federal Communications Commission (FCC) to squeeze more channels into the same amount of space.

Within bank one, enter the first three frequencies of 453.1000, 453.6250, and 453.9000.

The last four frequencies require values so in scanner memory bank number 2, use: base value of 460.0000 MHz, a step size of 6.25 kHz and an offset of 537. This puts the base of 460.0000 MHz at channel 537, which is 157 channels above the original base of 380.

Enter the frequencies of 460.1000, 460.2500, 460.4500 and 460.6000. This should be enough information to allow you to monitor the system.

The Army Chemical Depot in Umatilla, Oregon, is one of eight chemical weapon storage facilities operated by the United States Army. First opened in 1941, the Depot is now devoted to destroying chemical weapons via a high-temperature incinerator. An exercise testing the security of the depot performed in January 2004 revealed a few shortcomings, including the ability of unauthorized personnel to enter the depot. Please be careful in your scanning - hanging around there with radio receiving equipment may make you a "subject of interest" to base security and local law enforcement.

As you note in your letter, the Depot operates a Motorola Type II system with a mixture



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of analog and APCO Project 25 digital voice. Four frequencies are reported for the system: 416.5625, 419.1625, 419.3625 and 419.7625 MHz. Based on the frequencies, I would expect a step size of 6.25 MHz here as well. Try a base of 416.5625 and an offset of 380 and see what happens. Unfortunately I don't have any reported talkgroups, so I can't help you there. Just leave the scanner "open" and try to match the conversations with the talkgroup numbers that appear on the scanner's display.

❖ Peoria, Illinois

Peoria County, in northwestern Illinois, appears to be ready to contract with M/A-COM for a new radio system. The Peoria County Emergency Telephone System Board is responsible for the 9-1-1 system in the county, including four Public Safety Answering Points (PSAPs) located in Bartonville, Chillicothe, Peoria and Peoria Heights. Many jurisdictions across Illinois were shortchanged last year when the State diverted \$1.3 million from a wireless 9-1-1 fund to cover a budget deficit. This prevented many agencies from upgrading their PSAPs to track and report the location of emergency calls made from cellular telephones. The Emergency Communications Center in Peoria handles more than 100,000 calls each year, with about 40% of those coming from wireless phones.

This year appears to be better, at least for Peoria County, which is looking to replace their existing radio equipment. The technical committee recommended that the full board move ahead on the M/A-COM bid, which is reported to be a bid for an OpenSky system.

Until a new system is in place and running, here are some public safety frequencies within the county. The Peoria County Sheriff operates conventionally (non-trunked) on a number of frequencies including 158.730 (Dispatch), 155.595 (Command) and 158.790 MHz (Operations). A link to the Illinois State Police network can be heard on 154.875 MHz and 155.055 MHz is reserved as a statewide mutual aid channel.

County Fire and Emergency Medical Services can be heard on 462.975 MHz.

Police in the city of Peoria use 460.050, 460.250, and 460.325 MHz and the East Peoria Police are listed as 460.075 and 460.425 MHz. The Peoria Fire Department can be heard on 154.145, 154.070 and 153.890 MHz while East Peoria is listed as 154.205 MHz. Local volunteer fire departments in the area use 154.370 MHz.

❖ Saskatoon, Saskatchewan, Canada

Dear Mr. Veeneman:

I am planning to buy my first scanner this fall. I am considering the Uniden BC72XLT, and I am wondering if you know of any reviews of this model, or perhaps your own opinion. I don't have any good reason to buy this model except that it's the one they are offering at the local shop. Any words of advice/ideas would

be welcome. It's not a trunk tracker, and I can't afford a trunk tracker just now.

- William in Saskatoon, Canada

The BC72XLT is a compact handheld scanner made by Uniden. It is on the low end of the features and coverage scale, with 100 channels in 10 banks and coverage that tops out at 512 MHz. As you said, it does not trunk track any systems and does not demodulate APCO-25 digital voice. It does have Uniden's "Close Call" feature, which allows you to automatically tune to nearby transmissions. It also offers preprogrammed searches in various service bands, making searching for activity easier.

The BC72XLT should be able to follow the Royal Canadian Mounted Police (RCMP) in your area, which are listed as operating on the following frequencies: 155.340, 155.4300, 155.580, 155.610, 155.640, 155.7000, 156.030 and 156.240 MHz. You may also hear RCMP traffic on 155.310, 155.460, 155.670 MHz.

However, unless your interests are very narrow and fall within the capabilities of the BC72XLT, I suspect you may grow frustrated with its limitations. It was designed primarily as a NASCAR race fan scanner, but will miss much of the public safety action in your area. You may be happier, in the long run, with a more full-featured scanner.

For a sample of the kinds of activity going on in Saskatoon that you might miss with a BC72XLT, go to <http://www.saskatoon-scanner.com/live/> where you can listen to local and province police, fire and emergency medical services over the Internet from your computer.

In case you're curious, the feed is coming from a Radio Shack PRO-96 scanner, programmed to monitor and track much of the activity on Saskatoon's Motorola Type II system. The PRO-96 is able to handle both the analog and the APCO-25 digital voice traffic that appears on the system. Frequencies in use are 854.8875, 855.1375, 855.3875, 855.6375, 855.8875, 856.1375, 856.3875, 856.6375, 856.8875, 857.1375, 860.1375, 860.3875 and

860.6375 MHz.

A list of reported talkgroups on the system:

Dec	Hex	Description
464	01D	Fire/EMS (Common)
560	023	Fire 1
592	025	Fire 2
624	027	Fire 3
656	029	Fire 4
688	02B	Fire 5
720	02D	Fire (Dispatch)
2064	081	Police/Fire/Transit (Common)
2096	083	All Departments (Common)
3216	0C9	Transit (Announcement)
3344	0D1	Transit (Customer Service)
3376	0D3	Transit (Call All Buses)
3472	0D9	Transit (Inspectors)
3536	0DD	Transit Route 1
3568	0DF	Transit Route 2
3600	0E1	Transit Route 3
3632	0E3	Transit Route 4
3664	0E5	Transit Route 5
3696	0E7	Transit Route 6
3728	0E9	Transit Route 7
3760	0EB	Transit Route 8
3792	0ED	Transit Route 9
3824	0EF	Transit Route 10
3856	0F1	Transit Route 11
3888	0F3	Transit Route 12
3920	0F5	Transit Route 13
3952	0F7	Transit Route 14
3984	0F9	Transit Route 15
4016	0FB	Transit Route 16
4048	0FD	Transit Route 17
4080	0FF	Transit Route 18
4112	101	Transit Route 19
4144	103	Transit Route 20
4176	105	Transit Route 21
4208	107	Transit Route 22
4240	109	Transit Route 23
4272	10B	Transit Route 24
4304	10D	Transit Route 25
4336	10F	Transit Route 26
4368	111	Transit Route 27
4400	113	Transit Route 28
4432	115	Transit Route 29
4464	117	Transit Route 30
32016	7D1	Police (Dispatch)
32048	7D3	Police 2
32080	7D5	Police 3
32112	7D7	Police 4
32144	7D9	Police 5
32176	7DB	Police 6
32208	7DD	Police 7
32304	7E3	Police 8
32336	7E5	Police 9
32432	7EB	Police 10
32464	7ED	Police 11
32496	7EF	Police 12

The other large system in your area appears to be SaskTel Mobility, which operates a province-wide EDACS network over several repeater sites, each transmitting on a number of frequencies. Agencies using this network include the Royal Canadian Mounted Police (RCMP), the Ministries of Environment and Transportation, and numerous local emergency medical services. However, before you run out and buy an EDACS-capable scanner just for this, be aware that SaskTel Mobility has announced plans to shut down the FleetNet 800 network at the end of next year due to aging equipment and declining reliability.

That's all for this month. More information, including previous columns, can be found on my website at <http://www.signal-harbor.com>. I welcome your electronic mail to danveeneman@monitoringtimes.com. Have



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Size: 7.06" Wide x 6.10" Deep x 2.44" High

Frequency Coverage: 25 0000-54 0000 MHz, 108 0000-174 0000 MHz, 400 0000-512 0000 MHz, 806 0000-823 9950 MHz, 849 0125-868 9950 MHz, 894 0125-956 0000 MHz

The Bearcat BCT8 scanner, licensed by NASCAR, is a superb preprogrammed 800 MHz trunked highway patrol system scanner. Featuring TrunkTracker III, PC Programming, 250 Channels with unique BearTracker warning system to alert you to activity on highway patrol link frequencies. Preprogrammed service searches makes finding interesting active frequencies even easier and include preprogrammed police, fire and emergency medical, news agency, weather, CB band, air band, railroad, marine band and department of transportation service searches. The BCT8 also has preprogrammed highway patrol alert frequencies by state to help you quickly find frequencies likely to be active when you are driving. The BCT8 includes AC adapter, DC power cable, cigarette lighter adapter plug, telescopic antenna, window mount antenna, owner's manual, one year limited Uniden warranty, frequency guide and free mobile mounting bracket. For maximum scanning enjoyment, also order the following optional accessories: External speaker ESP20 with mounting bracket & 10 feet of cable with plug attached \$19.95 Magnetic Mount mobile antenna ANTMBC for \$29.95



Bearcat® BCD396T Trunk Tracker IV

Suggested list price \$799.95/CEI price \$519.95

APCO 25 9,600 baud compact digital ready handheld TrunkTracker IV scanner featuring Fire Tone Out Paging, Close Call and Dynamically Allocated Channel Memory (up to 6,000 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.40" Wide x 1.22" Deep x 5.35" High

Frequency Coverage:

25 0000-512 0000 MHz, 764 0000-775 9875 MHz, 794 0000-823 9875 MHz, 849 0125-868 8765 MHz, 894 0125-956 0000 MHz, 1240 0000 MHz - 1300 0000 MHz

The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as Fire Tone Out Decoder. This feature lets you set the BCD396T to alert if your selected two-tone sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning. Close Call Radio Frequency Capture - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Useful for intelligence agencies for use at events where you don't have advance notice or knowledge of the radio communications systems and assets you need to intercept. The BCD396T scanner is designed to track Motorola Type I Type II Hybrid, SMARTNET, PRIVACY PLUS LTR and EDACS analog trunking systems on any band. Now follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. Dynamically Allocated Channel Memory - The BCD396T scanner's memory is

organized so that it more closely matches how radio systems actually work. Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 3,000 channels are typical but over 6,000 channels are possible depending on the scanner features used. You can also easily determine how much memory you have used and how much memory you have left. Preprogrammed Systems - The BCD396T is preprogrammed with over 400 channels covering police, fire and ambulance operations in the 25 most populated counties in the United States, plus the most popular digital systems. 3 AA NIMH or Alkaline battery operation and Charger - 3 AA battery operation - The BCD396T includes 3 premium 2,300 mAh Nickel Metal Hydride AA batteries to give you the most economical power option available. You may also operate the BCD396T using 3 AA alkaline batteries. Unique Data Skip - Allows your scanner to skip unwanted data transmissions and reduces unwanted beeps. Memory Backup - If the battery completely discharges or if power is disconnected, the frequencies programmed in the BCD396T scanner are retained in memory. Manual Channel Access - Go directly to any channel. LCD Back Light - A blue LCD light remains on when the back light key is pressed. Autolight - Automatically turns the blue LCD backlight on when your scanner stops on a transmission. Battery Save - In manual mode, the BCD396T automatically reduces its power requirements to extend the battery's charge. Attenuator - Reduces the signal strength to help prevent signal overload. The BCD396T also works as a conventional scanner to continuously monitor many radio conversations even though the message is switching frequencies. The BCD396T comes with AC adapter, 3 AA nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, SMA/BNC adapter, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO or ESAS systems. Order on-line at www.usascan.com or call 1-800-USA-SCAN.

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Bearcat® BC246T Trunk Tracker III

Suggested list price \$399.95/CEI price \$214.95
Compact professional handheld TrunkTracker III scanner featuring Close Call and Dynamically Allocated Channel Memory (up to 2,500 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.72" Wide x 1.26" Deep x 4.6" High

Frequency Coverage:

25 0000-54 0000 MHz, 108 0000-174 0000 MHz, 216 0000-224 9800 MHz, 400 0000-512 0000 MHz, 806 0000-823 9875 MHz, 849 0125-868 9875 MHz, 894 0125-956 0000 MHz, 1240 0000 MHz - 1300 0000 MHz

The handheld BC246T TrunkTracker scanner has so many features, we recommend you visit our web site at www.usascan.com and download the free owner's manual. Popular features include Close Call Radio Frequency Capture - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Dynamically Allocated Channel Memory - Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 1,600 channels are typical but over 2,500 channels are possible depending on the scanner features used. You can also easily determine how much memory is used. Preprogrammed Service Search (10) - Makes it easy to find interesting frequencies used by public safety, news media TV broadcast audio, Amateur (ham) radio, CB radio, Family Radio Service, special low power, railroad, aircraft, marine racing and weather frequencies. Quick Keys - allow you to select systems and groups by pressing a single key. Text Tagging - Name each system, group, channel, talk group



ID, custom search range and S.A.M.E. group using 16 characters per name. Memory Backup - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. Unique Data Skip - Allows the BC246T to skip over unwanted data transmissions and beeps. Attenuator - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. Duplicate Frequency Alert - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. 22 Bands - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAh nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part #HF24RS for \$29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.

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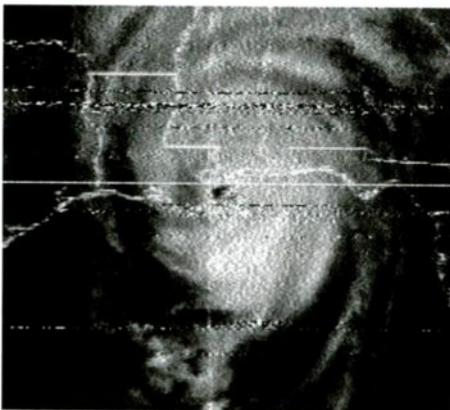
Katrina Blasts US Communications

Several utility stations have been negatively affected by the severe hurricane that hit the United States Gulf Coast on August 29, 2005. High-powered WLO, Mobile Radio, on Mobile Bay in Alabama, lost most of its capability. While its normal traffic frequencies have been silent, it was reported on 5696 and 8983 kilohertz (kHz) upper sideband (USB) passing emergency traffic to the US Coast Guard Communication Area Master Station, Atlantic (Camslant), near Norfolk, Virginia. Nice work, guys. Of course KLB, the other Shipcom station out in Seattle, is undamaged.

WNU, Slidell Radio, which is now a Globe Wireless network entry node, was completely knocked off the air, and is still off at press time. The nearby town of Slidell, Louisiana, is said to be 80 per cent destroyed. Slidell is just northeast of the greater New Orleans area, across Lake Ponchartrain and connected by a miles-long twin causeway which was severely damaged in the storm. This has greatly hampered traffic on Interstate 10, a major east-west route for commerce.

Ben Mesander, a long time utility listener, copied the last satellite picture to be transmitted by FAX (radiofacsimile) from NMG, the US Coast Guard station in New Orleans. It is time stamped 1215 Coordinated Universal Time (UTC) on August 29. This is 7:15 in the morning local time. It shows the eye just coming onshore. Slidell is, in fact, directly under the northern eye wall.

At press time, all services from this station remain completely down. The transmitting site was reported to be dry on an early Coast Guard C-130 overflight, but power and communication lines must be completely restored. According to



Last Image from NMG 29 Aug 05

a Coast Guard press release, the staff has been temporarily relocated to Saint Louis, MO.

As a consequence, the Boston Coast Guard station, NMF, has expanded its schedule to broadcast the missing tropical charts, which ironically include National Hurricane Center warnings and predictions. Starting times are 0452, 1028, 1824, and 2228 UTC. Frequencies are 4235.0 (night), 6340.5, 9110.0, and 12750.0 (day), all 5000 watts. As always, FAX is tuned in USB, and the radio dial reads 1.9 kHz below listed carrier frequencies.

Of course, the tropical charts remain available on the Internet at their usual addresses. The complete schedule is at <http://weather.noaa.gov/pub/fax/hfmarsh.txt>. A complete Coast Guard fax schedule, as up-to-date as is possible here, is always at this column's web site at <http://www.ominous-valve.com/uteworld.html>. I have also posted the FAX of Katrina coming ashore.

Physical damage to equipment was only one problem affecting communications into and out of a disaster area as large as the entire United Kingdom. At press time, it seems as if nothing works reliably except satellite phones and good old shortwave, and shortwave, in fact, has had its problems. Weird stories of interference from stations in the Caribbean and even local jamming are flying through the Internet rumor factory – not that anything has even remotely been substantiated at press time. Even the ionosphere itself, which is considerably above any terrestrial weather, was repeatedly knocked out by solar flares.

This column thanks all the brave and unselfish personnel who gave up long hours and their own safety to help in what may yet turn out to be the worst natural disaster in US history. They literally saved tens of thousands of lives.

❖ COTHEN

COTHEN stands for Customs Over-The-Horizon Enforcement Network. It is the major wide-area tactical anti-smuggling radio system in the United States, using an extremely sophisticated and flexible array of base transmitters, mobiles, and entry points.

This venerable net was set up in 1985 by the old US Customs Service. USCS has since become part of the Department of Homeland Security, where it's been split up into parts of CBP (Customs and Border Protection), and ICE

(Immigration and Customs Enforcement). CBP describes its mission as "protecting borders against terrorism," while ICE has many enforcement and investigative duties, most visible of which is drug interdiction.

COTHEN is used mostly by ICE, along with the various Joint Task Forces (JTFs) that have formed over the years for this mission. CBP is another player, and was heard participating in post-Katrina rescue operations. Other players are the US Coast Guard, US Drug Enforcement Administration, and the military. At least 235 radios are COTHEN-capable.

When the Coast Guard was the first major presence in the Katrina area, COTHEN lit up immediately. The only busier service was amateur radio, especially on 14265 and 14325 kHz USB.

COTHEN has always been a scanning net. Originally it used Selscan (Federal Standard 1045A), a Rockwell/Collins system with a distinctive buzzing noise. Some of this is still heard on very rare occasion. The rest, however, has gone over to the more modern Automatic Link Establishment (ALE) technology, with its cyclic, gobbling noise.

Nearly all COTHEN voice traffic starts with ALE handshakes. If a two-way Link Quality Assessment (LQA) comes up on your screen, it's time to stop the scan and wait for a very likely voice exchange. This can be plain or secure, using digital or the gurgly old KY-65 "Parkhill" encryption.

There's no reason to believe COTHEN will not ultimately return to its pre-Katrina traffic volume, which is still pretty interesting. Scan these USB frequencies (all kHz): 5732, 7527, 8912, 10242, 11494, 13907, 15867, 18594, 20890, 23214, and 25350. At this point in the solar cycle, the 7, 10, and 11 megahertz frequencies are much the busiest, though 13907 and 15867 get a lot of hits in daytime, and 5732 does at night.

ALE identifiers seem to be contractions of the voice calls. LNT is CAMSLANT, and PAC is CAMSPAC, its Pacific counterpart on Point Reyes in California. "J" plus two numbers is for Coast Guard helicopters, which identify as Juliet plus a longer number with the ALE ID in the last two digits. CNT is the Central Communications Node, in Texas, and the linked voice station that comes up is "Ping Pong." EST is Jack Knife, at the eastern node.

Happy scanning, and see you next month.

Hugh Stegman

hughstegman@monitoringtimes.com

www.ominous-valve.com/uteworld.html

ABBREVIATIONS USED IN THIS COLUMN

AFB.....	Air Force Base
ALE.....	Automatic Link Establishment
ARQ.....	Automatic Repeat Request teleprinting system
CAMSLANT..	Communication Area Master Station, Atlantic
CAMSPAC....	Communication Area Master Station, Pacific
CBP.....	US Customs and Border Protection
CW.....	Morse code telegraphy ("Continuous Wave")
DASH-8.....	De Havilland Canada DHC-8 turboprop airliner
DEA.....	US Drug Enforcement Administration
DSC.....	Digital Selective Calling
EAM.....	Emergency Action Message
EOC.....	Emergency Operations Center
FAX.....	Radiofacsimile
FEC.....	Forward Error Correction teleprinting system
FEMA.....	US Federal Emergency Management Agency
HFDL.....	High-Frequency Data Link
HF-GCS.....	High-Frequency Global Communications System
M8.....	Cuban CW "numbers" cut to ANDUWRIGMT
MARS.....	US Military Affiliate Radio System
Meteo.....	Meteorological
PACTOR.....	Packet Teleprinting Over Radio
RSA.....	Republic of South Africa
RTTY.....	Radio Teletype
SAM.....	Special Air Mission
SHARES.....	Shared Resources
SITOR-A.....	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B.....	Simplex Teleprinting Over Radio, FEC mode
UK.....	United Kingdom
Unid.....	Unidentified
US.....	United States
USCG.....	US Coast Guard
VIP.....	Very Important Person

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 have their ENIGMA (European Numbers Information Gathering and Monitoring Association) designators in ().

2812.0 SEMOHQ-Unknown FEMA State EOC, sounding in ALE on a known SECURE (State Emergency Capability Using Radio Effectively) frequency, also 2326, another SECURE, at 0938. (Ron Perron-MD)

3349.0 NNN0HNB-South Carolina Navy/Marine Corps MARS net control, passing hurricane-related traffic to Gulfport from NNN0ASA, at 0014. (Mark Cleary-SC)

4041.0 NNN0IRA-US National MARS Emergency Net, taking standby for hurricane traffic at 0036. (Cleary-SC)

4724.0 Chandler-US military, with a 28-character EAM simulcast on 8992, 11175, and 15016, at 1602 and 1638. (Jeff Haverlah-TX)

4925.0 0000210001-Greek Ministry of Information, ALE sounding at 2207. (Day Watson-UK)

5103.7 MGJ-UK Royal Navy Faslane, RTTY message that control had transferred to GYA, London, at 1400. (Watson-UK)

5211.0 WGY912-FEMA Special VIP Support Facility, Mount Weather, VA, hurricane traffic with WGY963 (Richmond, VA), WGY906 (Denton, TX), and CAMSLANT (USCG, VA), at 1338. (Cleary-SC)

5320.0 CAMSLANT-USCG, VA, calling cutters *Pampano*, *Pelican*, and *Razorbill* following Hurricane Katrina at 1837. (Cleary-SC)

5400.0 WOLHF1-Unknown US Army Corps of Engineers, ALE sound, also 9122.5, at 0646. (Perron-MD)

5598.0 Reach 104-US Air Force Air Mobility Command transport, getting clearance from New York at 0357. (Garie Halstead-WV)

5649.0 Speedbird 208-British Airways flight from Miami to London, position for Gander at 0441. KLM 734-Flight from Aruba to Amsterdam, position for Gander at 0522. (Halstead-WV)

5696.0 Coast Guard 1502-USCG HC-130, Elizabeth City, NC, on a pattern search at 0044. Coast Guard 1720-USCG HC-130, telling CAMSLANT, VA, that they are cutting short a damage

assessment flyover due to visibility, at 2322. (Cleary-SC)

WLO-Mobile Radio, AL, working CAMSLANT at 2335 (Rick Baker-OH) [Yes, WLO was running emergency traffic directly to the Coast Guard. -Hugh]

5711.0 Cape Radio-US Air Force, Cape Canaveral Air Force Station, FL, working space shuttle Booster Recovery Vessel *Liberty Star*, troubleshooting satellite comm at 1055, then tried 10780 with no joy, back to 5711, at 1124. (Todd Van Gelder-MD)

5732.0 Coast Guard 1502-USCG HC-130, leaving Clearwater, FL, setting guard with CAMSLANT on a communication support mission, at 0122. 4CS-CBP P-3, passing position of people needing rescue to FEMA via Hammer (March AFB, FL), at 0123. Hammer, going clear after Parkhill scrambling to ask 45C for the tail number and location of a downed aircraft, at 1725. CAMSLANT-USCG, sending Coast Guard 1720, an HC-130, to investigate reports of people trapped on a barge, at 2147. (Cleary-SC)

6586.0 New York-Atlantic oceanic air traffic control, getting position of American 56 at 0112. (Tom Sevart-KS)

6761.0 Bolt 41-US Air Force Air Mobility Command tanker, calling C-17A transport LIFTR 31 at 1303. (Cleary-SC)

6809.0 FC6-FEMA WGY906, Region 6, Denton, TX, calling MS4 (WGY964, Jackson, MS) in ALE during Katrina at 2156. (Cleary-SC)

6985.0 USACE1010-US Army Corps of Engineers, Washington, DC, ALE sounding at 1458. (Perron-MD)

6992.7 MFM01-Unknown CW station calling MFJ99, at 1851. (Watson-UK)

7313.5 AFA2CO-US Air Force MARS net control, taking check-ins at 1227. (Cleary-SC)

7348.0 FC6-FEMA WGY906, TX, calling LA6 (WGY946, Louisiana EOC, Baton Rouge) in ALE after Katrina at 0200. (Cleary-SC)

7348.0 441FEMAUX-FEMA Auxiliary Station, calling FCSFEM, FEMA Communications Supervisor, VA, at 1348. 441FEMAUX calling FC4FEM, Region 4, Atlanta, GA, in ALE at 1406. (Perron-MD)

7481.5 Cuban CW "Cut Number Station" (M8), five-figure groups with bad frequency drift, at 2220. (Sevart-KS)

7527.0 Coast Guard 1720-USCG HC-130, patch via Service Center to Clearwater Air, FL, at 2016. Hammer-CBP, CA, working 4CS, a P-3, coordinating rooftop rescues at 2323. (Cleary-SC)

7527.0 Service Center-US Customs, ALE and voice with F40, Coast Guard 2140, who is enroute to New Orleans at 0118. (Perron-MD)

7532.0 0000210288-Greek Ministry of Information, ALE sound at 0326. (Watson-UK)

7632.0 NNN0TWT-US Navy/Marine Corps MARS, taking SHARES regional net check-ins at 0148. (Cleary-SC)

8414.5 9HU17-Vessel *Naftobulk 1*, DSC distress call (fire, explosion), at 0634. NMN-USCG CAMSLANT, identifying in CW at 2159. [Oops - Hugh] 3FTL8-Vessel *Stream Express*, DSC distress call at 2332. (Watson-UK)

8503.9 NMG-USCG New Orleans, with FAX text weather forecast at 2150. (Sevart-KS) [Station now off air due to Katrina -Hugh]

8734.0 Olympia Radio, Greece, with voice identification loop in English and Greek at 0137. (Sevart-KS)

8912.0 LNT-USCG CAMSLANT, ALE-initiated voice with J16, Coast Guard 6016, helicopter enroute to New Orleans at 0130. Juliet 09-Coast Guard 6009, helicopter telling CAMSLANT that they are assisting a vessel in distress, at 1244. D44-CBP P-3, ALE to CNT (CBP regional node), then voice with Ping Pong (Customs Surveillance Center, TX), at 2001. Juliet 38-Helicopter Coast Guard 6038, evacuating 4 people from Biloxi High School, at 2151. (Perron-MD) Juliet 31-USCG helicopter Coast Guard 6031, working CAMSLANT in many rescue hoist operations being shown on cable news, at 2256. (Baker-OH)

8918.0 N831DC-Corporate Raytheon Hawker 800B, position for New York at 2109. (Halstead-WV)

- 8927.0 01-HFDL Ground Station, Dixon, CA, uplink message to Northwest Airlines N661US, a 747-451, that VHF service was available through Anchorage, AK, at 0149. (Glenn Blum-TX)
- 8983.0 CAMSLANT-USCG, VA, working TCC-4 (USCG Transportable Command Center #4), for relay to cutter *Pamlico*, at 0213. CAMSLANT, working cutter *Pamlico* and Coast Guard 2135, who were assessing hurricane damage assessment to the Coast Guard's NMC transmitter near New Orleans, at 1449. (Cleary-SC) Rescue 110-US Coast Guard, working CAMSLANT on a search for trapped persons at 1240, 1330, and 1458. CAMSLANT, tasking Coast Guard 2135 (ALE "F25") with a search for a USS *Bataan* landing craft, at 2110. Coast Guard 1500, working CAMSLANT on a search, at 2230. (Perron-MD) Many air rescue operations, stepping on each other, starting at 2320. (Blum-TX) CAMSLANT working TCC-4, then TCC-4 working cutter *Pamlico*, starting at 2340. (Baker-OH)
- 8992.0 Offutt-US Air Force HF-GCS alternate control point, Offutt AFB, NE, broadcasting the new "Net Control listening on HF-GCS frequencies..." message, followed by all HF-GCS public frequencies, at 0243. (Mr. Science-NJ) [Several people have heard this weird announcement at different times on HF-GCS. No clue what it's for - Hugh] Offutt-US Air Force, working RSC, possibly Rockwell/Collins service center, at 1826. (Haverlah-TX)
- 9230.0 0000210001-Greek Ministry of Information, calling 0000210305, ALE at 1755. TLZ126-US Army 126th Aviation, deployed to Iraq, ALE sound at 1902. (Watson-UK)
- 9996.0 RWM-Moscow, Russia, with standard time beeps in CW, at 0226. (Sevart-KS)
- 10120.0 BR1-Brazilian Army, Brasilia, calling SP1 and then working RJ1, Rio de Janeiro, in ALE at 2332. (Watson-UK)
- 10194.0 FC4FEM-FEMA Region 4 Communications Manager, Atlanta, GA, calling FCSFEM, also 10588 and 12216, at 1323. (Perron-MD)
- 10242.0 1500-Coast Guard 1500, a C-130, patching E-City Air (Coast Guard Air Station, Elizabeth City, NC) to pass on-scene time in rescue ops, initiated with ALE callsign "500," at 0054. (Hugh Stegman-CA)
- 11175.0 Offutt-US Air Force HF-GCS, NE, with the new "Net Control" message, at 0150. Puerto Rico HF-GCS, calling RSC at 1252. SAM 9300-US Air Force Distinguished Visitor aircraft, patch via Offutt HF-GCS for Baton Rouge weather, at 1522. (Haverlah-TX) Unid-US military, with Skyking broadcast at 0238. (Tom-PA)
- 11202.0 CAMSLANT-USCG, VA, advising Coast Guard 2127 to tell all aircraft operating over New Orleans to use that frequency, at 1429. Coast Guard 2127, leaving the area at 1640. (Perron-MD)
- 11232.0 Goose 71-US Air Force Special Operations Command, patch via Trenton Military to Duke Field, FL, ops-normal in Katrina operations at 1609. Air Force Rescue 4863-US Air Force HC-130P, patch via Trenton Military to King Ops during Katrina rescues, at 2117. (Cleary-SC)
- 11244.0 Zaper 66-US Air Force EC-130, patch via Puerto Rico HF-GCS discrete to "Maintenance," then sent back to 11175, at 0207. (Haverlah-TX)
- 11282.0 San Francisco-Pacific air traffic control net, getting position of American 387, at 0143. (Sevart-KS)
- 11315.0 04-HFDL ground station, Riverhead, NY, working Continental CO0052, United Parcel Service UPS2752, Northwest Airlines NW0756, and other aircraft, at 2153. (Sevart-KS)
- 11490.0 000021000-Greek Ministry of Information, calling various stations in ALE, at 0609. 23F-Chilean Navy, calling FVJ in ALE, at 2110. (Watson-UK)
- 11494.0 J38-USCG Coast Guard 6038, telling CAMSLANT their helicopter is over a vessel in the Mississippi River, and that gun shots had been fired from the vessel, at 0128. Omaha 3CS-CBP aircraft calling CNT in ALE, then working Ping Pong (US Customs, TX) to ask if a DASH-8 could refuel in New Orleans, at 2320. (Stegman-CA)
- 12087.0 HQ702N-US Air National Guard headquarters, Andrews AFB, MD, calling L060AN, Louisiana National Guard, in ALE at 1722. M040SN-Mississippi National Guard, calling HQ703N, National Guard Readiness Center, VA, ALE at 2109. (Perron-MD)
- 12122.0 MVP1-US Army Corps of Engineers, Mississippi Valley Division, ALE sound at 1239. (Perron-MD)
- 12216.0 FC4-FEMA Region 4, GA, calling AL4, Alabama State EOC, Birmingham, also on 14776, at 1442. (Perron-MD)
- 12594.5 A9M-Hamala Radio, working an unknown vessel in SITOR-A, at 1652. (Bob Hall-RSA)
- 12789.9 NMG-USCG, New Orleans, with weather FAX chart, then schedule and tropical forecast in FAX text, at 2023. (Sevart-KS) [Station now off air due to Katrina. -Hugh]
- 13101.0 WLO-Mobile Radio, AL, synthesized "DECTalk" female voice with weather and traffic list, at 2020. (Sevart-KS) [This broadcast now off air due to Katrina. -Hugh]
- 13907.0 Coast Guard 1709-USCG HC-130, position for CAMSPAC at 0201. (Cleary-SC)
- 13925.5 G336-Unknown US Army Corps of Engineers, ALE sound at 1631. (Perron-MD)
- 13927.1 Sooner 81-OK Air National Guard C-130H, patch via AFA1YD, telling Ops they had been cleared into Navy New Orleans, at 0117. (Cleary-SC)
- 14260.0 WB8BZH-Jackson, MS, emergency officer in Gulfport, passing information to N3DV, at 2251. (Stegman-CA)
- 14265.0 W7LXR-Control of Salvation Army Team Emergency Radio Network (SATERN), taking a report of 15 people trapped on roofs, at 1829. (Stegman-CA) [Traffic passed to Coast Guard, people rescued. -Hugh]
- 14396.5 AAR7AL-SHARES National Coordination Net, relay from AAT3AM to AFA3HY, regional coordination station, at 1631. (Cleary-SC)
- 14653.0 A040LN-Alabama National Guard, calling LAC62NG, Louisiana NG, Carville, LA, also on 12087, at 1940. (Perron-MD)
- 14776.0 FC4-FEMA Region 4, GA, working MS4, Mississippi State EOC, Jackson, ALE at 1447. (Perron-MD)
- 15867.0 Coast Guard 1703-US Coast Guard C-130, patch via Service Center to Elizabeth City Air, shutting down a bad engine and continuing to E-City on the remaining three, at 0048. (Perron-MD) Juliet 38-USCG helicopter Coast Guard 6038, working CAMSLANT at 1850. (Baker-OH)
- 15988.0 DDK-Pinnenberg Meteo, RTTY test loop at 1645. (Hall-RSA)
- 16812.7 NRV-USCG, Apra Harbor, Guam, SITOR-B weather at 1150. (Hall-RSA)
- 16840.5 RRR34-Moscow Radio, Russia, with SITOR-B frequency and shipping list, at 1000. (Hall-RSA)
- 17029.0 Unid-Station sending RTTY traffic to RTMKS, Russian vessel *Boris Derewanko*, plus others at 0823. (Watson-UK)
- 17146.4 CBV-Chilean Navy, Valparaiso, weak weather FAX at 1140, stronger at 1640. (Hall-RSA) CBV-Valparaiso Radio, Chilean Navy ("Armada de Chile"), with FAX weather chart at 1630. (Blum-TX)
- 17147.0 URL-Sevastopol Radio, Ukraine, working ships in RTTY at 1700. (Hall-RSA)
- 17441.0 5YE-Nairobi Meteo, coded RTTY weather at 1614. (Hall-RSA)
- 18594.0 45CS-CBP aircraft, complaining to Hammer, CA, that flight restrictions are preventing movement of supplies into Biloxi, then went secure on 8912, at 1642. Unid-Coast Guard aircraft reporting they will put a hard-copy all-aircraft message aboard a helicopter going to New Orleans, at 2100. (Perron-MD)
- 19692.5 ZSC-Globe Wireless, Cape Town, RSA, working unknown vessel in GW-PACTOR, at 0612. (Hall-RSA)
- 23337.0 ICZ-US Air Force, Sigonella, Italy, ALE sounding at 1102. ADW-US Air Force, Andrews AFB, MD, sounding at 1540. 170-Unknown station, sounding at 1555. (Hall-RSA)

HF DataLink, Kiel Radio, and a Mystery

This month we take a quick refresher in ARINC's HF Datalink system linking planes and ground stations throughout the world, update you on the status of coast station Kiel Radio, and take a look at a mystery signal.

❖ HF Datalink

Anyone who has traveled internationally by air will know that some of the shortest routes between cities like Tokyo and New York will take the aircraft over the northern polar regions. For routes such as this, and many others, there is little VHF radio coverage for long stretches and the aircraft must instead maintain contact through HF radio.

Around a decade ago, ARINC, a private company which services the communications needs of many airlines and airport authorities, realized this need for enhanced communications with airliners and cargo aircraft too far away from land to be reached by VHF ACARS (Aircraft Communications Addressing and Reporting System). ACARS was by then a widely utilized way of transmitting anything from passenger lists to flying conditions and the state of all manner of systems onboard the aircraft.

Seeing a business opportunity, ARINC started to build out a new network of groundstations and equip aircraft with modems to send and receive messages much like VHF ACARS but instead using longer range HF circuits. Thus, HF Datalink, or HF Globalink (as ARINC markets the service), was born.

Although the system has proven to be somewhat less commercially successful than ARINC probably expected, Globalink remains active with the fleets of many passenger airlines and air cargo companies.

Today, a network of 17 strategically-placed groundstations orchestrate Globalink traffic worldwide on many HF channels. Here's where to tune – the numbers before each groundstation being the station identifiers which are transmitted as part of each message:

01 San Francisco, CA, USA
2947, 4672, 5508, 6559, 8927, 10081, 11327, 13276, 17919, 21934 kHz

02 Molokai, Hawaii
8912, 10081, 11312, 11348, 13276, 17919, 17934, 21928, 21937 kHz

03 Reykjavik, Iceland
5720, 6712, 8977, 11184, 15025, 17985 kHz

04 Riverhead, NY, USA
3428, 11315, 13276, 17934, 21931, 21934 kHz

05 Auckland, New Zealand
5583, 6535, 10084, 13351 kHz

06 Hat Yai, Thailand
6535, 8825, 10066, 13270, 17928, 21949 kHz

07 Shannon, Ireland
6532, 8942, 10081, 11384 kHz

08 Johannesburg, South Africa
3016, 4681, 8834, 13321, 21949 kHz

09 Barrow, AK, USA
5544, 6646, 8936, 11354 kHz

13 Santa Cruz, Bolivia
8957, 11318, 13315, 21997 kHz

14 Krasnoyarsk, Russia
10087, 13321 kHz

15 Al Muharraq, Bahrain
5544, 8885, 10075, 11312, 13354, 17967, 21982 kHz

16 Agaña, Guam
8927, 13339, 17919kHz

17 Telde, Gran Canaria
2905, 5589, 6529, 8948, 11348, 17928, 21955 kHz

Charles Brain, author of the popular PC-ALE program, has written free software called PC-HFDL to decode these signals. You can also use the Skysweeper suite. For those with a Mac, Black Cat System's MultiMode will also decode HF Datalink (see Resources).

❖ Kiel Radio

Another Internet provider for those on the high seas equipped with HF radios is Germany's Kiel Radio. Kiel provides email, weather, positioning, fax and many other e-services to ships. Mobile stations connect using modified PacTORG-II modems from SCS. The main sta-

tion can also be heard with regular channel free markers and Morse identifier on the following channels:

DAO2..DAO22
2628.5, 2550, 2846.5, 4242.5, 4263.7, 6357, 6434, 8510.4, 8637, 12762, 12831, 16978.9, 17046.5, 22474.5 and 22604 kHz

DZ08..DZ022
8514.4, 8716, 12422, 13078.5, 169829, 17198.5, 17198.5 and 22567.5 kHz

HEB24..HEB38
4249, 6367, 8445, 8483, 12685.5, 13024 and 16912 kHz

KKL12A
12101.5 kHz

WLO12
12885, 9058.5 kHz

Kiel Radio users can also utilize the services of another independent "Internet at sea" company, MarineNet in Florida, which operates under callsign WKS.

❖ Mystery Signals

Finally, here's an interesting one to tune into. For many years, on the frequencies below, two 1350 Hz shifted FSK signals at 110bd appear at very precise intervals each minute. The most plausible information points to a British Royal Navy system that is used for synchronization purposes.

3295.3	
5436.0	M+27secs
5436.2	M+22secs
6354.1	M+08secs
8460.1	M+08secs
12726.0	M+53secs
12726.2	M+00secs
16096.5	M+44secs
22139.2	M+37secs
26357	M+30secs

Take a listen to this unusual signal. Until next time, enjoy your digital utility listening.

Resources

PC-HFDL	http://www.chbrain.dircon.co.uk/pchfdl.html
Skysweeper	http://skysweep.com
Multimode	http://www.blackcatsystems.com/software/multimode.html
Kiel Radio	http://www.kielradio.com
MarineNet	http://www.marinenet.net



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Katrina Prompts New Shortwave Relay

One week after the Katrina disaster, a relay of WWL appeared via WHRI in South Carolina. Or rather, WWL combined with former (and no doubt again) rival stations from the Clear Channel group, as "United Radio Broadcasters of New Orleans" or URBONO (pronounced yer-ba-NOH). It seems that World Harvest Radio had many hours of unsold airtime which it could immediately turn over to URBONO, retaining a few hours of its own programming to honor previous commitments. The SW schedule, initially incorrect, appeared on <http://www.wwl.com> but we never heard it referred to on the air; in fact, when one caller from Houston asked how he could hear WWL on SW, the answer was: listen on the internet!

The relays were running up to two minutes late compared to 870, presumably using a web feed, and were rudely interrupted every half hour for WHRI IDs, which at least were pared down from the full rendition of *Onward Christian Soldiers*. The designated blocks were joined and cut off abruptly without any continuity or reference to frequency retuning. WHRI sometimes resumed its own programming contrary to schedule one day, back to URBONO the next. URBONO included CBS Radio news on the hour instead of WHR's preferred IRN.

Still, for the second time in its history, WHR was providing a genuine public service. But why? This was never stated either; perhaps the fact that WWL could initially operate with only half power of 25 kW on 870 was a reason to fill in perceived coverage gaps. WHRI beams toward South America were replaced with two antennas aimed across the US, putting generally excellent signals into OK, but Lousiphama may have been skipped over, and there were a lot of propagational disturbances. This allowed relatives, evacuees, and anyone else interested beyond WWL's AM coverage to keep up with the situation – if they had SW and knew about it. There was zero info about this in the mainstream press. Nor was it at all clear when the relays would be stopped, and in all probability they did stop long before this issue reaches you, but for the record, the

nominal UT schedule, still in effect three weeks post-Katrina, was:

M-F: 05-11 5835, 12-14 11785, 14-20 15285 (but subject to interruption for "maintenance" any time between 15 and 18), 22-24 9840. Sat: 05-12 5835, 14-17 15285, 23-24 9840. Sun: 05-12 5835, 14-17 & 18-21 15285. UT Mon: 02-05 5835. By Sept. 21, a reduced schedule had been posted, of M-F 12-14 on 5835, 14-20 on 15285, but both were missing the following day.

The WRNO shortwave site in New Orleans came through Katrina virtually unscathed: Building and transmitter OK, no flooding in the building, no damage to antenna or coupler, etc. A large oak tree fell on power lines nearby, and that was the main problem. It may have to be removed by an independent contractor. Target date for going on the air became the end of October, according to sources at the station via George Thurman, TX. Even without hurricanes, the target date has been delayed countless times for one reason or another. Of course, even if it had been on the air, it would have been merely a remote transmitter for the evangelical organization now owning it in Texas. Don't expect the New Orleans sound of Joe Costello's WRNO ever to come back.

You Can't Listen to this Column

But we can refer you to several websites which specialize in SW sounds. Perhaps the best organized is Dave Kernick's Interval Signals Online, <http://www.intervalsignalsonline.com>

Dmitri Mezin has added to his collection, True Sounds Audio Archive, http://dxsignal.info/listen_eng.htm

Thanks to Adiel Nunes on the *radioescutas* group for pointing out Interval Signal Library – Recordings of world radio broadcasting received in Japan (extensive dating back to 1973), <http://www.asahi-net.or.jp/~RP4N-KWMR/bcl/sound2/index.html>

Irkutsk DX Circle – its own files are missing, but a few links to other sites work: <http://www.irkutsk.com/radio/jingles.htm>

AFGHANISTAN The Indo-Asian News service quotes Abdul Rehman Panjshiri, director of international relations at Afghan Radio and TV, that "The 100 kW shortwave transmitter with seven antennas being installed by India at Yakatoot in Kabul is being completed this month [September]. It will enable Kabul Radio programs to be heard in South East Asia, South Asia, Africa and Europe. The people in remote areas in Afghanistan who remain cut off during the harsh winter months will now be able to follow the happenings in Kabul and other areas of the country through this transmitter." (Media Network blog; New Kerala via Alokesh Gupta) Yakatoot, spelled differently, was the site of the original R. Kabul/R. Afghanistan SW. Where else, for a country prefixed YA? (gh)

ARGENTINA R. Baluarte, 6214.3, two days in a row from 2300 tune-in, fair signal with little interference, religious talks, audio very muffled (Mike Barraclough, England, WDXC Contact) 6214.2, Puerto Iguazu, 2332-2344, Spanish, religious program, phone-ins (Carlos Gonçalves, Portugal, DX LISTENING DIGEST) 6214.1, at 2145, very good in comparison to other LA-signals. Antennas must have been improved (Jan Edh, Sweden, SW Bulletin) 6214v, at 0450, music and talk indicated this station (Björn Fransson, *ibid.*)

AUSTRALIA Who is relaying this? 7875-USB, at 1030-1130, SSB relay of ABC Western Australia service. ID "ABC local radio" talk on sports, computers, 1100 news, mentions of "ABC Western Australia" Strong clear signal (David Hodgson, TN, DXLD)

BANGLADESH Bangladesh Betar, external SW Service, with a tube-type transmitter only on 7185, broke down in late August, and it was feared might go off the air permanently for lack of replacement parts. But the engineers got it going again after two days (Ashik Eqbal Tokon, Bangladesh, DXLD) Check for English at 1230-1300, 1815-1900 (gh)

All times UTC; All frequencies kHz; * before hr = sign on.
* after hr = sign off; // = parallel programming;
+ = continuing but not monitored; 2 x freq = 2nd harmonic; B-05 = winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there;
u.o.s. = unless otherwise stated

BENIN In early 2004, Trans World Radio obtained a license to broadcast on medium wave from Benin. The Protestant radio ministry hopes to be on the air with a 100 kW-transmitter [1566] in November 2005. Now, TWR and HCJB plan to expand the scale of the station to shortwave. This would finally fill the gap left by the destruction of ELWA Monrovia during Liberia's civil war. More info at: <http://www.twrafrica.org/projects/projects-01.asp> (Dr. Hansjoerg Biener, DXLD) But, ELWA has been revived, at least on 4760; why not go from there? Other Liberian SW is coming back too (gh) Benin is the only West African country dominated by voodoo (TWR Africa site)

BHUTAN Could anyone in South Asia confirm whether Bhutan is still active on 6035 (gh) BBS with OK signal, but low modulation in mid-September around 0230 and 0300 on 6035 (Partha Sarathi, DXLD) Over here try it at "0100 or 1300" before it is too late (gh)

BOLIVIA 4781.35, unID LA, close down ceremony at 0212, not Guatemala or Ecuador. Later: it's Radio Tacana, Tumupasa, provincia de Iturralde, departamento de La Paz, identified from my recording by Ignacio Sotomayor, Spain and confirmed by Henrik Klemetz, Sweden (Björn Malm, Ecuador, DXLD) The s/off theme is *Ballade pour Adeline*, played by Richard Clayderman on the piano (Klemetz, *ibid.*) A couple of clear IDs on 4781.3 at 0108, romantic music (Mark Veldhuis, Netherlands, *ibid.*)

BOTSWANA Please let everyone know that we try very hard to answer every reception report received at this station. It is very nice for my technicians to know that the hard work they are doing is being received around the world. Please keep listening in (Thomas Powell, VOA transmitting plant manager in Botswana, tpowell@bot.ibb.gov via Dmitry Mezin, Russia, Signal)

CANADA CBC locked out 5500 employees on August 15, and there was still no resolution with the Canadian Media Guild union by late September. Besides its negative effect on domestic CBC radio and television program-

ming, RCI also had to make substitutions during the many hours it carries CBC (gh)

I have heard Ideas at 0105-0200 but the signal is terrible 75% of the time (Sandy Finlayson, PA, swprograms) Ideas on SW, eh? Cool - actually fulfills a longstanding wish of mine!! (Richard Cuff, PA, *ibid.*) Me too. That would have been on 9755, 11990, 13710 (gh) I quite agree! It is one of the few good things that have come out of the CBC mess (Sandy Finlayson, *ibid.*) CBC filled some airtime by picking up news and other programming from BBC, but unionized employees at BBC filed strong objections to being made scabs (gh)

CHINA CRI to be renamed China Broadcast Network. I doubt this will affect the name in Chinese, but at least the English service will be renamed. I imagine they will re-image the top and bottom of the hour promos. The new name goes well with their web-address, <http://chinabroadcast.cn> (Connor Walsh, ex-CRI, *dxing.info*) No such change audible as of mid-Sept, still CRI, China Radio International (gh)

COLOMBIA R. Lider had been absent from 6139.78 for some months, but heard again Sept 2, 0550-0613 & 0742-0830 with Spanish ballads with IDs between just about every song, fair-good. But then gone again (Ron Howard, CA, DXLD) Its revival was fleeting, heard on that date only. 6140 is occupied earlier at 0300 by an extremely strong Turkey, and also Cuba (Adán González, Venezuela, DXLD)

CUBA In mid-Sept, RHC appeared on 5055 at 0219-0336 in Spanish, F-G; what are they doing here? (Ron Howard, CA, DXLD) Getting set for sunset trough in winter nights, when even 6 MHz won't propagate well (gh) TIFC was not heard on 5054.6; usually I get TIFC later, about 0800-0900, with a good carrier but almost no audio. They certainly will not have much of a chance if RHC stays here (Howard) RHC was missing from 5055 the next night, but resumed the following night at 0300, good signal and sound; not heard before on tropical band (Björn Malm, Ecuador, *ibid.*)

[non] On August 15, WRMI launched a new SW program for Cuba, Radio República, 8 hours a day on 9955, produced in Miami by the Cuban Democratic Directorate, with a variety of news, info and entertainment, an alternative to the propaganda strictly controlled by the Cuban government. The Directorate was previously on La Voz del CID, and with a less ambitious schedule on WRMI. From the DST shift Oct 30 we expect the schedule to be: weekdays 10-13, 16-21; Sat & Sun 10-11, 16-21; and UT Sun & Mon 03-05 (Jeff White, WRMI) See also USA

DENMARK World Music Radio plans to resume 5815 in October (WRTH July Update) As of mid-Sept, Nothing about this at <http://www.wmr.dk/> (gh)

ECUADOR A bandscan at 0100-0200 Aug 26 found on 3450.0v, La Voz de Riobamba (3 x 1150) with rockolera music (Rafael Rodriguez, Colombia, *playdx*)

HCJB German service announced that there will be no transmission from Pifo to Europe (German to the Americas is not affected) in B05 but also this: With a recently signed agreement, HCJB has to dismantle the Pifo facilities within two years. No decision has been made yet if a new station elsewhere in Ecuador will be built. In the end this will depend on the financial situation of the mission. Also for this reason the transmission to Europe has been cancelled for B05 in order to save money that otherwise would have been spent on a transmitter not able to provide a reliable service. In May a studio guest of Kim Elliott explained that earlier hopes to continue at Pifo after dismantling the tallest towers had been crushed. Now it appears to be questionable if any substantial replacement for Pifo will ever be built (Kai Ludwig, Germany, DXLD)

EGYPT Egyptian Overseas Radio has a new web site, unfortunately with pop-ups, at: <http://www.overseas-radio.listen.to> or <http://listen.to/overseas-radio> They were mentioned 'in the Mailbag' at 2200 on 9990 (Erik Kaie, Copenhagen, DXLD) No pop-up in source web <http://www.freewebs.com/overseas-radio> Are you sure this is an official site? (Roberto Scaglione, Sicily, *ibid.*) Seems to have been put together by a member of staff with Internet skills, probably embarrassed that they are one of the few international broadcasters without a website (Andy Sennitt, Holland, *ibid.*)

An article in *Egypt Today* confirms that the international service of Radio Cairo was almost slashed, but saved by pressure from the Head of the Radio Division of ERTU, Omar Bateesha, who took up his appointment in March 2001. Bateesha says that soon after coming to office, he found plans were in the works to slash 25 languages from the international service while cutting its total programming hours from 71 a day to just 20.

"These stations have a significant economic and political role," Bateesha says. "They help Egypt keep its friends. We talk day and night about the need to communicate with 'the other,' to rectify misconceptions, while we plead that we shut down some of these lines of channels to cut expenses. The budget of just one TV soap is more than that for the entire international service. Besides, what about those who work for these stations? Shall we send them home? I really fought the move, and I hope the new leadership keeps it the way it is." Read the whole article: *A Man of the Time* <http://www.egypttoday.com/article.aspx?ArticleID=5592> (Andy Sennitt, Media Network blog)

EQUATORIAL GUINEA R. Nacional, Bata, heard on 5005 from 0447, opening morning programming at 0457 with national anthem, African music and ID. Strangely, they keep announcing a frequency which disappeared a good many years ago, 4926, as well as 5005 and FM (Manuel Méndez, Spain, DXLD)

ETHIOPIA [and non] An interesting legal question about whether Ethiopian (or any foreign) government can sue dissidents in US for defamation, as the Ethiopian government is trying to do against Tensae Ethiopia Voice

of Unity, 1500-1600 on 15660, <http://www.tensae.com> See <http://yekolatemari.blog.com/291652/> (via Bernd Trutenau, DXLD)

GERMANY At the IFA (International Radio Exhibition) in Berlin, Peter Senger of DW, and also head of the DRM Consortium, said DW will be adding more DRM, outside peak listening hours, on 6075. He added that DW wants to establish DRM ASAP, because "it saves us much money, and we cannot continue in AM only because some listeners have many conventional radios. You can donate them to the museum."

Also, the German service of Deutsche Welle will be thoroughly reformatted with the start of B05 - no unified program anymore but customized versions for the individual target areas. The current structure with a 4-hour schedule, repeated, will become a thing of the past (Kai Ludwig, Germany, DXLD)

GUYANA GBC, Sparendam, has made attempts to return to the air, heard about once a month in the 0900-1000 period on 3291.04 (Robert Wilkner, FL, DSWCI DX Window) On 3291.14, I sometimes hear a carrier and then a numbers station, such as at 0421 (Adán González, Venezuela, DXLD)

HUNGARY R. Budapest B-05 English: 0200-0300 9515 & 0330-0400 9775, both to NAM; 1600-1630 9565, 6025 & 2000-2030 3975, 6025 both to EU; 2200-2230 9735 to Af, 6025 to EU (Bob Padula, HCJB DX Partyline) Unlikely the 0200 would now be an hour long unlike the others, typo? Keep in mind that a great many more time and frequency changes take place October 30 with the end of DST and the start of the B-05 season (gh)

INDIA AIR is going to replace all 90 mb frequencies with 60 mb, effective at start of B05 schedule. Proposed channels are: Bhopal 4870 ex-3315; Shimla 4980 ex-3223; Gangtok 4810 ex-3390; Delhi (not yet finalised) 5020 ex-3365 (from <http://www.dxasia.info> via Alokesh Gupta, DXLD)

INDONESIA RRI Palu heard varying around 3949-3950; rarely reported daytime frequencies of 1035 and 7234v kHz were also heard when I visited Balikpapan in East Kalimantan (Alan Davies, Sidoarjo, Indonesia, mid-August, DXLD)

RRI, 9680 heard with Kang Guru Radio English, Australian Aid program for English learners, using RRI facilities on SW plus 89-odd FM outlets, Wed & Sun 1000-1020 (Ron Killick, NZ, HCDX)

ISRAEL Do you have any news at all about the external/SW service situation? Still in limbo, not dealing with the issue one way or another? (gh) I've been told that there is now a Board of Governors and a permanent Director General will be appointed in November. A decision would be probably be made sometime shortly after that point (Doni Rosenzweig, DXLD)

JORDAN [and non] Hearing R. Jordan's only English broadcast, on 11690 until 1630 in summer, 1730 in winter, is getting more and more difficult. There is always RTTY too dense for comfort. HCJB moved onto 11690 for South America during the first part of the broadcast; then in mid-August we heard BBCWS with sports in English at 1515. This was registered as South Africa at 1500-1700, 500 kW at 5 degrees, but apparently not activated earlier in the A-05 season. Yet a few minutes later and 2 megameters away reception was entirely different (Glenn Hauser, OK, DXLD)

Tuned up to avoid RTTY at 1528 with English pop tunes, IDs like "Hits from the past and present, 96.3 FM" and "Radio Jordan 96.3 FM". Two time pips to 1600 newscast, 1607 main points repeated, contact addresses and e-mails. 1608, local Jordanian weather, 1609 back to 96.3 FM. SIO 343 (Mick Delmage, Sherwood Park, Alberta, *ibid.*)

NETHERLANDS Rob Greene's popular weekly commentaries on RN came to an end as he reached mandatory retirement age, but we expect him to start a weblog and to appear on RN on an ad-hoc basis (Andy Sennitt, RN, DXLD)

NORWAY The SW station at Kvitøy resumes broadcasting, in DRM for a 9-month test period relaying BBC to Central Europe. Ordinary SW from Kvitøy and Sveio ended on Dec. 31, 2003, when Radio Norway and Radio Denmark closed down (Stavanger Aftenblad via Svein Olav Pedersen, HCDX) Tests began Aug 30: 0700-1600 on 9470, 1600-1900 on 7465, both 190 degrees with DRM power of 50 kW (Andy Sennitt, DXLD) However, 7465 reported on DRM forums to be running as late as 2200, QRM from Sahara 7460 (Mike Barraclough, *ibid.*) Actually someone reported 7465 until 2309? the WWCR was on 7465 in analog from 2200 (gh)

OMAN R. Sultanate of Oman, English at 1400-1500 on 15140, continued to be sporadic but was back for about a week in late August (gh) News, IDs, pop music, techno-pop dance music; 1500 into Arabic. Weak but in the clear; improved to fair level by 1445 (Brian Alexander, PA, DXLD) Techno-pop dance music?! No features about Omani culture? What's the point of doing an hour in English, then? (gh) Relay of the domestic English language network (throughout Oman on FM, cf. WRTH page 303), not produced for listeners abroad. Same pattern as some other Arabic countries, like Jordan (Bernd Trutenau, Lithuania, *ibid.*) Relay of Oman's "Radio 2" also on the digital Hotbird satellite. You can also hear their English FM program via <http://www.oman-tv.gov.om/rdeng/default.asp> (Erik Kaie in Copenhagen, *ibid.*) 15140 fair at sign-on, dramatically improved to at least S7 with very nice western EZL music when I tuned away at 1425. Glad to see them back! (Walt Salmani, BC, *ibid.*) TG for a source of EZL music! (gh)

PAPUA NEW GUINEA Wantok R. Light, 7120, mid-to-late August logs: 1015-1032, English, interview; positive ID in passing at 1027! Poor, best listening in USB. Really running the listed 1 kW? (Scott R. Barbour, Jr., NH, DXLD) 0750-0902, blocks of gospel music including "Amazing Grace." 0758 & 0809, ID in passing. 0830-0850, sermon by American accented preacher, music block until top of the hour. 0900 prerecorded station info and "Wantok Radio Light" ID. Weak but well modulated. Best here around Eastern PNG sunset (David Hodgson, TN, *ibid.*) 1020-1035

Shortwave Broadcasting

at end of Aug with ballads, calendar of events for Sept; I'm sending a report for this one! (Scott Barbour, NH, *WORLD OF RADIO*) Full data 'Grass Hut and Locals holding Portable Radios' card with info letter in 3 months. v/s David Olson, Chief Engineer, P29CQ/KL7K. Date on letter was four days after I sent a follow-up to the station (Edward Kusalik, Alberta, Canada, *ibid.*)

PERU On 5019.96, Radio Horizonte, 1014-1100. I really enjoy listening to this station when it's fading in well. Signal was good with huaynos music, each tune over ten minutes in duration; still audible at 1100 (Chuck Bolland, FL, *DXLD*)

PHILIPPINES R. Pilipinas at 0250-0330* on 17655, oldies hits until 0302, then *Music Watch*, songs of Philippine artists. 0327 ID and closing, // 15270 and 11885 (Iwao Nagatani, *Japan Premium*) Starts at 0200, but seldom makes it to NAM (gh)

SÉNÉGAL [non] A new service, West Africa Democracy Radio, tested for one week in August at 0800-0900 via Rampisham, UK on 17555 in English and French. Planned to return in September for 4 hours a day; see <http://www.wadr.org> (Mauno Ritola, *Media Network*, Jari Savolainen, Bernd Trutenau, *DXLD*)

SERBIA & MONTENEGRO [non] A schedule covering 1745-2200 UT only for "R. Yugoslavia", but effective 1 August showed Arabic at a new time: 1745-1800 to Europe on 6100, 250 kW ND (via José Elías Díaz Gómez, Venezuela, *DXLD*) The original A-05 had Arabic only at 1430-1500 on 11800 for ME and Italian at 1730-1800 (always only one language at a time). At first we thought this schedule was incomplete (gh) No trace of English to NAM at 0000 and 0430 on 9580 (Phillip David Smith, *DXLD*) Actually not heard since the end of June (Bob Thomas, CT, *ibid.*) Nothing heard on previous schedule before 1745, then Arabic on 6100, 1800 Russian, 1830 English, 1900 Spanish on 7200, 1930-2100* in other languages on 6100, only to Europe (Wolfgang Büschel, Germany, *ibid.*) It seems these drastic cuts are due to financial problems, and might lead to completely closing the external service (Célio Romais, *Panorama*, Conexión Digital)

SIKKIM See INDIA; AIR Gangtok from B-05 is on 4810 replacing 3390. Forget about ever hearing it in our mornings as long as the XERTA blob is on there (gh)

SINGAPORE [non] Marie Lamb sends word that the transferring of production of the *Wavescan* program from England to Singapore over Adventist World Radio has been delayed. AWR still plans to re-launch it as part of its Asian edition with Adrian Peterson providing consultation and some script preparation. The delays caused concern in the DX community that this program was quietly terminated. Apparently, that is not the case although when we will hear *Wavescan* again is not certain (Richard A. D'Angelo, *NASWA Journal*)

SRI LANKA Alok das Gupta monitored SLBC for <http://www.dxasia.info> and reports: SLBC has dropped all evening transmissions to India both in English and Hindi. Hindi 0030-0400 UT is now on 7275 (strong co-channel from AIR Chennai) and 11905. Second transmission is at 0800-1230 on 7275, 11905. English in the evening is completely dropped. Sinhala to ME at 1610-1840 is now on 11715 (Andy Sennitt, *DXLD*) 7275 ex-7300, and also jumped to 7312.5 (Jose Jacob, *ibid.*)

SUDAN R. Omdurman opening on 7200 at *0300-0326, Arabic, Chanting/drums at sign-on. Brief Horn of Africa music and YL with ID. News mentioning "Republic of Sudan" at 0306 when news ended (Scott R. Barbour, Jr., NH, *DXLD*) And 9505 at 1920-1931*, 1924 ID, local song, 1930 closing, 1931 Kor'an recitation and sign-off (Iwao Nagatani, *Japan Premium*)

[non] V. of Sudan, 7999.33, *1528-1540, sign-on with IS, opening announcement, music, 1532 ID as *Idha'at Sawt Sudan* (Kouji Hashimoto, *Japan Premium*) 5 kW from unknown site in Eritrea (Wolfgang Büschel, BC-DX)

TAJIKISTAN R. Tajikistan, 7245, talk in Dari till 1644, then IS and ID in English as "This is Dushanbe, the capital of Republic of Tajikistan," news and music; 1700 Arabic (Iwao Nagatani, *Japan Premium*) Always good to have reconfirmed this tiny external service in English we have little hope of hearing, except maybe dead of winter. English also supposed to be at 0345-0400 (gh)

TIBET As of mid-August, the Chinese-controlled Tibet Peoples Broadcasting Station schedule included "Holy Tibet" show in English at 0700 and 1630. Frequencies apparently in use from overall schedule with (azimuths): 0700 on 9490 (85), 9580 (290); 1630 on 7125 (85), 7385 (290). Lower frequencies may be on throughout: 6200 (nd), 6130 (290), 6110 (220), 5240 (nd), 4920 (nd), 4905 (nd). None favor NAM, more or less northerly from Tibet (*Nagoya DXers Circle* via *Australian DX News*)

[non] From 1st September, Voice of Tibet starts two new broadcasts into India, unbiased news and info in Tibetan language only, at 1400-1430 and 1530-1600 on 17550. Since these target the Tibetan exile community in India only, we hope and expect that the Chinese authorities will not attempt to interfere on these transmissions," says Oystein Alme at VOT administrative office in Norway. "Our transmissions into Tibet and China have faced severe jamming attempts by Chinese stations for many years now, thus badly affecting the availability of VOT's SW transmissions also in India." VOT's programs are also available in mp3 format at <http://www.vot.org> (VOT via Jaisakthivel, Ardic DX Club, Tamil Nadu) No interference here at 1400-1420 on 17550 (Iwao Nagatani, *Japan Premium*) In the clear here, except: Chinese "Fire Dragon" music jammer came on from about 1415 and stayed on till 1520* and back

at *1535-1600* (Anker Petersen, Denmark, *DSWCI DX Window*) Only way to be sure China does not jam them is for them to be inaudible in Tibet (gh) Site is Dushanbé, Tajikistan, 100 kW, 131 degrees; in B-05 both move to 7465 (*Observer*, Bulgaria) This site <http://www.phayul.com/Index.aspx> has lots of exile news about Tibet, including info on V. of Tibet (via Jem Cullen, *ARDXC*)

UGANDA Nominal sign-off time for R. Uganda is 2105, but in August was heard staying on later. If this keeps up, will help penetrate further into NAM this winter (gh) 4976 in vernacular as late as 2223, African songs; but noisy audio and distorted modulation (Carlos Gonçalves, Portugal, *DXLD*) Still past 2235, but two nights later off before 2130; the other frequency, 5025.98 has been reported till 2200* or later but with weak audio, but that too went back to earlier closing (Thorsten Hallmann, Germany, *ibid.*) A few days later, 4976 still on at 2110 (Iwao Nagatani, *Japan Premium*) With exceptionally good conditions, heard 5026, 59 until 2105*. Nice local music and language (Jouko Huuskonen, Finland, *DXLD*)

UNITED KINGDOM [and non] On Polish Radio's *Multimedia*, Tim Ayris of World Radio Network said they would be starting a test service for London in DRM, to see how well it copes with London's topography. Also launching a DRM service for Western Europe, presumably on SW. David Duckworth then spoke with WRN; London DRM will be on a 26 MHz frequency from Croydon with a directional aerial (Mike Barraclough, *WDXC Contact*) More from a WRN press release: from the Croydon broadcast tower in South London; Croatia's RIZ-Transmitters supplied the Yagi antenna and transmitter. The presently unused 26 MHz band could support up to 50 new stereo radio services. If it works in London, then local DRM can work anywhere, says Tim Ashbruner, WRN engineering. A skywave DRM service will come from SE Europe with Telefunken modulator and exciter (via Kai Ludwig)

BBCWS DRM tests: see *NORWAY*

USA A 7-page VOA program guide in pdf is available, with lots of detail about programming, FM relay stations, etc., in several parts via <http://www.voanews.com/english/about/ProgramGuide.cfm> A new November edition should be up shortly; if not, maybe still the May edition (gh)

A little-known fact is that each VOA transmitter site has a slightly different sign-on and sign-off version to play on CD coming from HQ Washington. Even most VOA techs don't know that. If you know that, you know for sure which site just signed on or off. Another bunch of useless information that comes straight from me (Charles A. Taylor, NC, ex-IBB, *ABDX*) Less useless if you would elucidate (gh)

Radio Free Asia has appointed its Vice-President for Administration and Finance, Libby Liu, as its new president. Ms Liu succeeds RFA's founding President, Richard Richter, who retired in July. She had been with RFA for two years (ABU via Alokesh Gupta, *DXLD*) Her Asian heritage and Mandarin language skills only add to her ability to connect with RFA's employees and broadcast mission (RFA Board via Andy Sennitt, *Media Network* blog)

WRMI, Radio Miami International, got a new website design in August and Showcast streaming was being added in Sept. On weekdays, only three programmers shared the 24 hours: Christian Media Network, Overcomer Ministry, and on 9955, the new *Radio República* - see CUBA [non]. R.R. also occupied 8 hours a day on weekends, leaving the remainder for all other programming. *WORLD OF RADIO* on 7385 shifted to Sat 2100, Sun 1400, and *DX Partyline* Sat 2130, Sun 1330. If this schedule sticks, standard time from Oct 30 makes them one UT hour later. See <http://www.wmri.net> (gh)

WWCR's George McClintock has carried out extensive monitoring surveys in several parts of the world, checking out the signals of WWCR and its US competitors. These are displayed in pdf color-coded charts via http://www.wwcr.com/wwcr_sales/wwcr_monitoring.html (gh)

Please refer to our FAQ section at <http://www.wwr.org> - We cover the topic of competitors making signal comparisons. An educated broadcaster is our best client (SM) (Dave Frantz, *WWRB*)

The Redeemed Christian Church of God launched a media network, the Dove Media Group Inc., HQ in Irving, Texas, subsidiaries in UK and Nigeria. Among other projects, the company has acquired two SW radio frequencies broadcasting to the northern and southern hemispheres on 15.250 and 5.5 MHz respectively, the same frequencies already made famous by the VOA [sic] (*Vanguard*, Nigeria)

Actually this refers to WWRB on 15250 and 5050(!) which announced plans to start carrying Dove Media from August 1, but this was still not on the air by late September (gh)

Looking for pictures of the WRUL/WNYW/WYFR SW operation at Hatherley Beach, Scituate MA, 1937-1979 that could be added to the extensive site about that facility at <http://www.northernstar.no/wnyw.htm> (Svenn Martinsen, former WNYW listener in Norway, *DXLD*)

VENEZUELA R. Amazonas, nominal 4939.66 but usually missing, reappeared in late Aug, very distorted on 5032v at 2239 (Adán González, Venezuela, *DXLD*) A few days later on 5036, and then on 5042 (Björn Malm, Ecuador, *WORLD OF RADIO*)

ZIMBABWE With no more SW Radio Africa to jam on SW, another surrogate service got hit from mid-August, V. of the People, 7120 via Madagascar at 1700-1800. The same Chinese retro-cycler jammer in use, severely wiping out VOP and anything else for 80 kHz, 7080-7160; very highly-trained level of active jamming. SWRA jamming only occupied 10 kHz (David Pringle-Wood, Harare, Zimbabwe, *DXLD*)

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

0009 UTC on 6035

COLOMBIA: La Voz del Guaviare. Spanish. Latin style vocals to ID and ads. (Rich D'Angelo, PA/NASWA Flash Sheet). Tent. Log for Colombia's **Marfil Estereo** 5910, 1014-1030 with campesino music format. (Scott Barbour, Intervale, NH)

0020 UTC on 7315

GERMANY: IBC via Juelich. Tamil language talks to musical segments. Nice ID at 0045. Closedown with IDs and postal address at 0059. Fair-good signal. (D'Angelo, PA)

0048 UTC on 11745

CHILE: Voz Christiana. Spanish religious programming monitored to 0052. 17680, 2040-2047 Spanish with Christian rap/hip hop. (Joe Wood, Greenback, TN) Chile's **Radio Esperanza** 6090, 1050-1135 Spanish. (Arnaldo Slaen, Buenos Aires, Argentina)

0121 UTC on 6214

ARGENTINA: (Tent) Radio Baluarte. Spanish voice over music to phone-in program at 0129. Fair audio under static. (Barbour, NH) Argentine **Radio Diez** 5400 LSB, 0226-0305. (D'Angelo, PA) 5400, 0158-0208+. (Harold Frodge, Midland, MI)

0124 UTC on 9737.8

SRI LANKA: SLBC. Signal heard just barely through the static. Pop ballads to talk between selections. Heard a time check and "Colombo, Sri Lanka" and a tentative identification. Noted 9770, 0101-0118. (Barbour, NH)

0140 UTC on 4985

BRAZIL: Radio Brazil Central. Portuguese. Extended religious choral music and text // 11815. Brazilians monitored in Portuguese: **Radio Cultural Ondas Tropicais** 4845, 0140-0145.* (D'Angelo, PA). **Radio Anaguer** 11825, 1944-1950. **Radio Clube Do Para** 4885, 0322-0328. (Wood, TN) **Radio Clube Paranaense** 9725, 2245-2300 // 6040; **Radio Emisora Rural** 4945, 0015-0045; **Radio Difusora** 4945, 0105-0115; **Radio Record** 6150, 0023-0035; **Radio Gaucha** 11915, 2325-2345. (Gayle Van Horn, NC) **Radio Difusora** 4915.07, 0840-0900. (Barbour, NH) **Radio Senado** 5990, 1027-1035. (Slaen, ARG)

0145 UTC on 6115

ALBANIA: Radio Tirana Int'l. Financial news concerning German banks, followed by poetry program. (Wood, TN)

0155 UTC on 7205

RUSSIA: Voice of Jazz program to VOR identification and world news. (Wood, TN) 15455 at 2012 with Moscow Mailbag. (Bob Fraser, Belfast, ME)

0200 UTC on 5970

BELARUS: Radio Belarus. Sign-on with multilingual identifications including English. Program schedule and mailing address. News and program segments with identifications repeated at 0230. (Tom Banks, Dallas, TX)

0225 UTC on 4819

HONDURAS: HRVC/La Voz Evangelica. Spanish. Tune-in to gospel and contemporary Christian music station identification with call sign at 0230. Audible at 0400, 0630 and 0745 subsequent rechecks. Honduran **La Voz de Misiones** 3340, 0340-0432 with religious format. (D'Angelo, PA)

0302 UTC on 4910

ZAMBIA: ZNBC. Tribal vocals to English and vernacular announcements from two male host. Laughter and early morning banter between them. Fair-good signal quality. (D'Angelo, PA)

0326 UTC on 4005

VATICAN CITY: Vatican Radio. French comment to bells interval signal at 0340. Station should be shifting from Santa Maria di Galeria transmitter to the Vatican transmitter at 0345, but no signal change detected. (Frodge, MI) 0038-0042. (Wood, TN)

0407 UTC on 6020.25

PERU: Radio Victoria. Lively Spanish religious revival to 0412 and mention of La Voz de la Liberacion. Portuguese observed at 0418 // 9720. Signal interference from University Network (Costa Rica) and WYFR on 9725. (Frodge, MI) Peru's **Radio Tacna** 9504, 1124-1129. (Slaen, ARG)

0635 UTC on 15240

AUSTRALIA: Radio. Australian Rules football game, with the Kangaroos down by three points. Fair reception quality. (Wood, TN) 0445 on 15240 // 15515. (Howard Moser, Lincolnshire, IL)

1025 UTC on 4890

PAPUA NEW GUINEA: N8C. Pidgin/English. Announcer's updates to pop/rock tunes. Audible to 1140. PNG's **Radio East New Britain** 3385, 1045-1115. (Banks, TX) Tentative on PNG's **Wantok Radio Light** 7120, 0935-1000. (Barbour, NH)

1310 UTC on 9570

CUBA: China Radio Int'l relay. News item on future relations with Japan. (Fraser, ME) Spanish 11760 // 1800 Cuba) (Moser, IL)

1526 UTC on 15560

PORTUGAL: RDP. Easy-listening music to Portuguese text updates, 13700 // 13660 at 0030. (Wood, TN)

1350 UTC on 15190

NETHERLANDS ANTILLES: BBC WS relay. *Off the Shelf* program feature on Don Quixote and the inn keeper. 17810 at 2025. (Fraser, ME) **Radio Netherlands** relay 17810, 2029-2038. ID, time pips and time check. News in English ready by Guy Wilson. // 17735, 17660; 6165, 0433-0446. (Wood, TN)

1425 UTC on 9745

ECUADOR: HCBJ. Spanish service to North and Central America and mentions of Mexico. Email address for reception reports. Time pips and identification at 1500. (Wood, TN) *DX Partyline* 12005 at 1230, all but covered by Cuba on 12000. (Fraser, ME) Ecuador's **Radio Chaskis** 4909.24, 0922. (Barbour, NH)

1516 UTC on 15350

TURKEY: Voice of Turkey. Turkish commentary to folk music. (Wood, TN) *2200. (Banks, TX)

1620 UTC on 15785

ISRAEL: Galei Zahal. Very faint signal of Hebrew programming and music. (Wood, TN) **Kol Israel** 15460 at 1900; 11590 at 1903. (Fraser, ME)

1833 UTC on 15475

GABON: Africa # 1. French political discussion on Gabon, Senegal and Chad. Station ID to closing routine at 1858. Co-channel interference on 15476 (Antarctica?). Noticeable heterodyne audible after sign-off. (Frodge, MI)

2020 UTC on 9420

GREECE: Voice of Greece. Greek. Usual Greek folk music program. (Fraser, ME) Foni Tis Helladas 12105, 2319-2332. Tune-in to Greek ID, "Helliniki Telephonia" to local music and brief announcements. SIO 323 in USB with interferences observed. (Frodge, MI)

2044 UTC on 11735

ZANZIBAR: (Tent.) Voice of Tanzania. Arabic style music to vernacular announcements, but no discernable ID. Poor signal quality for national anthem at 2100*. (Barbour, NH; D'Angelo, PA) 2025-2100* (Van Horn, NC)

2155 UTC on 11600

CZECH REP: Radio Prague. Czechs Today program to ID and one trumpet blare interval signal. Audible 9415, 2253-2257.* SIO 443+. (Frodge, MI)

2217 UTC 9290

LATVIA: Radio Tatras Int'l. Format of pop oldies to IDs and promos. Announcement: "Greetings to friends in Europe, Latvia, Slovakia, Scandinavia and the Baltics." Fair/poor, best to monitor in USB. (Barbour, NH)

2219 UTC on 7125

GUINEA: Radio Nationale Guinee. French. Announcer's text to national music program. Several versions of the station identification amid SIO 332, although covered by unid sign-on at 2300. (Frodge, MI) Heard 2226-2300 with IDs and highlife music. Good signal until Russian Int'l Radio's open carrier and test tones at 2250, followed by sign-on. (D'Angelo, PA)

2355 UTC on 6925

PIRATE: WHYP. James Brownyard show on "how to be a pirate radio operator." Parody ads and interviews with other pirate operators. Devo's *Whip It* tune to sign-off announcements and *Ballad of the Green Beret* classic tune. Fair-good quality signal. (Wood, TN)

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

The Pursuit of Information

This is supposed to be a column about programming. I mean, it is titled "Programming Spotlight." The original brief for it was to focus on the programs available on shortwave radio. Well, that's proving to be difficult.

In point of fact, while surfing the internet seeking to mine it for advance knowledge of interesting and compelling shortwave radio content, I have found that even the best sites are pretty much disregarding shortwave. A big reason for this is that the sources which produce programming and the stations that broadcast it either don't plan much in advance or they protect their information as if it were the crown jewels. (Both are correct answers, by the way.)

That is the innate contradiction of the internet. Whereas it is, in one sense, much easier for a consumer to gain access to all sorts of data, recognition that that information has value (very high value, apparently, to some) leads to an effort to harbor it from disclosure, either entirely or at least until the originator decides it should be disclosed. This may be to permit the source to control it in such a way as to realize full value or impact from the release of it – or to prevent others from beating them to the punch.

How else to explain why the BBC World Service – arguably the best planned radio service on the planet – waits until the first of the month in question to release its monthly comprehensive e-mail newsletter informing listeners – and everyone else, unfortunately – what's going to be on? I say "unfortunately," because professional scribes like myself only get a few days' advance word from the BBC Press Office, certainly not enough to satisfy the deadlines of a print magazine.

Now, to be fair, a good part of the BBC's reasoning no doubt recognizes that things happen quickly in the modern world and often upset plans made or announced too far in advance. But that doesn't change the fact that a lot works against the very noble (if I may say so myself) objectives of this column.

❖ This Month's "Catch"

Or should that be "Cache"? This month I thought I would share with you some of the stuff I've found recently, some of which is only tenuously or tangentially connected to the mandated topic of "shortwave programming."

The first news bite is a press release issued by Pacific Garden Mission on September 15, excerpts of which I reprint here. My sole com-

ment, apart from congratulations, is that one often overlooked thread that runs through radio broadcasting is its use – apparently successful – as an instrument of religious proselytizing, regardless of era or mode.

History's Longest Running Radio Drama Series

Unshackled! – 55 Years Old

• 2,860 different broadcasts have aired since September 23, 1950

Chicago, Sept. 15, 2005 (The Religion Wire™) – September 23 marks the anniversary of the very first *Unshackled!* radio broadcast in 1950. Former PGM Superintendent, the late Harry Saulnier, was a visionary. He wanted to present stories of lives changed at Pacific Garden Mission, so he aired a 15-minute program on Chicago radio station WAIT in 1945, entitled "Doorway to Heaven," for a short time. On September 23, 1950, a group headed by writer/director John Gillies assembled in a WGN radio studio for the historic first broadcast of *Unshackled!* Adopting the format of the popular radio dramas of the day, the thirty-minute program featured its signature organ musical bridges and real sound effects from the outset.

The title was chosen to emphasize how a person's life is changed...transformed from the shackles of the sin of wrong choices, disobedience and selfish motives, to the freedom of the Christian faith. Years before they came into vogue, *Unshackled!* was presenting "reality" programs based on stories of real people...

After that first broadcast, the popularity of *Unshackled!* soon became apparent as hundreds of letters poured in each week. Because of WGN Radio's powerful 50,000 watt clear-channel transmitter, listener response came from the eastern half of the US and Canada, and even from ships at sea in the Atlantic. From that one radio station, the program now airs over 6,500 times each week on over 1600 radio stations and outlets in the US and around the world. In addition to the English broadcast, it is translated and re-dramatized in Spanish, Arabic, Russian, Romanian, Polish, Korean and Japanese. Over the years, *Unshackled!* has presented 2860 different true to life episodes....

In the early days, the program featured lives of people from skid row affected by alcohol and drug abuse. Names such as Casey Jones, Jimmy the Rat and Hattie Matthews were dramatized...prostitutes, mobsters, and criminals. Eventually, stories of others who were not necessarily *down and out* were featured...people such as Billy Sunday, who went from a famous,

highly paid professional baseball player to an ardent evangelist. Today's stories deal with issues such as abuse, abandonment, pornography, gambling, fear, lust, anger, sexual dysfunction and crime.

For the full release, visit <http://www.unshackled.org>

❖ The Passing Parade

Here are two stories that illustrate the changing face of radio. Both are from the **Radio Netherlands Media Network Blogspot** maintained by Andy Sennitt. In some ways, Andy's career reflects the changes that have rocked international broadcasting over the decades. He is perhaps best known for his long association with *The World Radio-TV Handbook* as assistant editor to the legendary Jens Frost and then editor in his own right, before moving on to Radio Netherlands. Even there, he has experienced a transition from contributor to Media Network when it was a radio program to managing its re-emergence as a valuable internet resource.

Even there, I might note, only a fraction of the information disseminated deals with shortwave radio – a further transition from a time not all that long ago when that was virtually all there was!

Swiss Radio International reflects on 70 years of history

Swiss Radio International, now operating as *swissinfo*, is celebrating its 70th anniversary. A special dossier tells its story – from shortwave to Internet. The anniversary is tinged with sadness, as the continued existence of the organization hangs in the balance. Go to: http://www.swissinfo.org/specials/70_years_swissinfo/index.html to experience one of the best there ever was.

WRN Marketing Manager interviewed on Radio Polonia

On a recent edition of the Multimedia Show on Radio Polonia, Peter Gentle talks to Tim Ayris, Marketing manager at the WRN. Hear Tim on the origins of the World Radio Network, how the organization has expanded, on WorldSpace, and tailoring the network to meet the changing demands of the international radio audience.

You can listen to the programme in MP3 via the link on this page. http://www.radio.com.pl/admin/cm/polonia/_sekcja163/_audio/multimedia.mp3

❖ BBC's Czech Service at Risk?

This piece in *The Prague Post* illustrates a phenomenon that we in North America have come to expect, if not quite accept – the replacement of services and programs we've long appreciated to fund the establishment or expansion of services to other world regions. The irony in this report comes from the fact that service to a one time world "hot spot" is apparently to be eliminated in order to serve a newer, more immediate "hot spot." The cynic in me would also draw your attention to the term "elite opinion makers," a class of listeners to whom the World Service says it focuses its broadcasts.

Cuts to BBC Czech service feared Arabic programs may replace those in European languages

By Peter Kononczuk
Staff Writer, *The Prague Post*
September 14, 2005

Senior politicians and media experts fear the country may lose a trustworthy and independent source of news if the BBC (British Broadcasting Corporation) makes cuts to its long-established Czech section.

Though no announcement has been made confirming local reports that downsizing is in the wind, the radio broadcaster has admitted it's weighing wide-ranging changes in its foreign-language programs and seeks to focus more on the Arab world.

Though the BBC attracts just 16,000 listeners here daily – a tiny share of the audience compared with domestic radio stations – experts say that its international outlook makes it highly attractive to elite opinion makers and that Czech radio would not be able to fill its shoes.

Foreign Affairs Minister Cyril Svoboda has appealed to his British counterpart Jack Straw to preserve the BBC's Czech-language section, which has been on the airwaves continuously for 66 years.

"It is a station that is world-class in its style and content. It covers topics that are not emphasized in the Czech media," Svoboda told reporters Sept. 2 after talks with Straw at a two-day meeting of European Union foreign ministers in Great Britain.

The BBC, which served as an important provider of uncensored news to the Eastern bloc during the Cold War, remains the world's biggest and best-known public broadcaster.

Insiders say that Prague employees of the BBC World Service, funded by the British Foreign Office, are now on tenterhooks, worried that they could lose their jobs, ... some fearing that the Czech language could disappear from BBC airwaves as early as January after broadcast officials in London make a final decision on the Prague office in October...

The Czech press has also reported, without giving a source, that apart from the Czech services, most of the BBC's foreign-language sections serving Central Europe are under threat.

Mike Gardner, head of media relations for the BBC World Service in London, said that ... the BBC believes an urgent need has arisen to set up an Arabic television station service, adding that

the British government has made it clear it will not provide extra money for new services. Funding must instead be found through "reprioritization."

...Jan Jiráček, an associate professor at the media department of Prague's Charles University, said "The BBC offers a trustworthy style that's not very frequently seen in the Czech Republic. However, its exceptional role is also partly the result of the miserable state of Czech journalism."

During the Cold War, he added, the BBC played a similar role to U.S.-funded Radio Free Europe, which Soviet bloc states censored for championing democratic values in broadcasts....

That is not to say that the BBC World Service is abandoning Europe. The following article also comes from the Media Network Blogspot and illustrates, for now, the hope international broadcasters are placing in Digital Radio Mondiale. What remains to be seen is whether radio consumers will also embrace it.

❖ BBC World Service launches DRM Europe Service

BBC World Service today [September 2] launched a digital radio service in English to the Benelux countries and neighboring parts of France and Germany. A mediumwave frequency, 1296 kHz, provides the core service 18 hours a day, supplemented by digital transmissions on shortwave. Transmission providers for the new service are Telenor in Norway, and VTC in the UK, who operate and manage both the BBC's analog and digital networks internationally.

BBC World Service regards DRM as a major opportunity, as John Sykes, BBC Project Director, Digital Radio, explains: "Digital Radio is about increased listener choice, and a revolution in the way we use radios. No more fiddling around with frequency dials and wavebands: you select your station by name, and the radio will find the best frequency automatically. We're also planning to introduce an electronic program guide, which will allow listeners who are using radios with a record function to effectively create their own schedule. We'll be working closely with the radio industry to foster and encourage innovative products which our listeners will find easy to use."

❖ Anti-BBC Sentiments

The last piece for this month says several things at once to me. First, it illustrates the impact the BBC has, not only in the world of international broadcasting but in the world of broadcasting in general. Second, seeing as how the information within it was "leaked" by a major (perhaps "the" major) commercial broadcasting mogul, it perhaps illustrates the lengths some in that sector are prepared to go to take down public service broadcasting.

Thirdly, the fact that a government leader will partner himself with a commercial interest that has regularly behaved in a self-serving and anti-social manner (witness Sky's capitulation to the Chinese government's crackdown on press freedoms in order to realize commercial gain) in a bald-faced effort to "take down" a recognized and universally respected icon of factual and

trustworthy journalism, says a lot about how much danger the free flow of information may be in today, despite the internet. Here Mr. Blair sounds more like Robert Mugabe than Winston Churchill, if you don't mind me saying so. This is reprinted from *The Scotsman*. You can read the entire article at <http://news.scotsman.com/index.cfm?id=1956002005>

Blair blasts BBC over US 'hatred'

Eddie Barnes, Political Editor

Tony Blair has sparked another furious row with the BBC after claiming the corporation's coverage of the hurricane Katrina disaster was anti-American.

According to remarkable claims by Rupert Murdoch, the world's most powerful media baron, the Prime Minister was so shocked by the BBC's reporting of hurricane Katrina that he described it as "full of hatred of America"...

The News International chairman told the audience: "Tony Blair – perhaps I shouldn't repeat this conversation – told me yesterday [Thursday] that he was in Delhi last week, and he turned on the BBC World service to see what was happening in New Orleans; and he said it was just full of hate of America and gloating about our troubles."

Murdoch's revelation was backed up by Clinton, who said there was nothing factually inaccurate [? – ed.] but reports were "stacked up" against the government.

Leading critics of the corporation joined Blair in the attack... However, others rushed to the BBC's defense, claiming that Blair had been exposed in what amounted to a cheap attempt to curry favor with Murdoch, who is a long-standing critic of the BBC. His company, News International, also controls the BBC's rival Sky News.

Former BBC correspondent and MP Martin Bell said: "Tony Blair was telling Murdoch what he wanted to hear because he needs Murdoch's support. If Tony Blair wants to take issue with the BBC's reporting, then he has a forum in which to do it."

"I thought the BBC's reporting was exemplary especially the coverage from Matt Frei. If Tony Blair wants to pick a fight with the BBC he will get no support except from the usual henchmen in the Murdoch press. Last time he picked a fight with the BBC it did him more damage than it did the corporation."

As with other media outlets, much of the BBC's coverage focused on the delays in rescuing the thousands of mainly poor black people who were trapped in New Orleans after the flood for up to five days. The BBC focused much attention on how the hurricane appeared to expose American's racial divide, as well as posing questions about the impact that global warming had had on the tragedy.

A spokesman for the BBC said: "We have received no complaints from Downing Street, so it would be remiss of us to comment on what was reported to be a private conversation... A spokesman for Blair refused to say whether or not the Prime Minister had met Murdoch in New York last week. He said: "There isn't much I can say. The Prime Minister has not expressed these views personally to me."

And so it goes. See you in December.

AM QSL Tips

Medium wave QSLing remains a popular quest for enthusiasts who delve into the expanding AM radio bands. As with shortwave, the process begins with a basic reception report with the date, time (in the station's local time) frequency and program details. Verifiable information should include on-air personality names, public service announcements, identifications, sporting events, commercials or program format.

If music is monitored, song titles or artist will help determine the accuracy of the logging; however, don't get too tied down with an extended play-by-play description over a long period of time. Fifteen or twenty minutes is adequate. List the basics, but omit word for word details. Most stations have had budget or staff cutbacks and have little time to answer mail. The last thing you want to do is bore

the staff with pages of extensive details or a demanding demeanor.

Keep your report or letter friendly and conversational, and tell a bit about yourself, equipment, your hobby or occupation. A brief explanation of medium wave DXing and QSLing will assist staff personnel who may not understand this aspect of radio listening. Send your letter to the Chief Engineer, who should have a basic idea of the hobby or to a program director.

If you've received no reply in three or four months, opt for a follow-up report. Include a copy of your original report with two mint stamps, and a brief, friendly cover letter. Smaller stations will appreciate a self-addressed-envelope.

Keep it simple, courteous and to the point! The impression you present as a hobbyist could affect all of us!

AMATEUR RADIO

Euro Russia RW4AA 10 meters SSB. Full data "you have a friend in Russia" black and white card via ARRL bureau. Received in four months. (Larry Van Horn N5FPW, NC)

Macedonia Z32XX 10/17 meters SSB. Full data two-color card. Received in 62 days for SASE to: Dragan Davkovski, 3330 SW Eveningside Drive E # 20, Topeka, KS 66614. Dragan is currently stateside and cards may be sent to his U.S. address for previous contacts. (Van Horn, NC)

Slovenia S52ZW 10 meters SSB. Full data black and white map card via ARRL bureau; S57M, 10 meters SSB for two color cards via ARRL bureau. Both cards received in four months. (Van Horn, NC)

EQUATORIAL GUINEA

Radio Africa 15190 kHz. Full data transmitter card unsigned, plus schedule and form letter. Received in 14 days for an English report and one U.S. dollar. Station address: Pan American Broadcasting, 2021 Alameda, Ste. 240, San Jose, CA 95126-1145. The Cupertino, California, address is no longer valid. (Bill Wilkins, Springfield, MO)

GERMANY

Deutsche Welle. 9545 kHz via Nauen, Germany. Full data card signed by Horst Scholz-Transmission Management & B. Klaumann, plus station schedule. Full data verified cards enclosed for: 17845 via Alma Ata, Kazakhstan; 15355 // 17660 via Trincomalee, Sri Lanka; 15425 via Kranji, Republic of Korea; 9900 via Irkutsk, Asiatic RSFSR; 7430 via Petropovlovsk, Asiatic RSFSR. Station address: D-53110, Bonn, Germany. Website: <http://www.dw-world.de/> (Edward Kusalik, Coaldale, Alberta, Canada).

MEDIUM WAVE

KKAD Vancouver, WA 1550 kHz AM. Full data station card signed by Dave Bischoff-Chief Engineer. Received in six weeks for an AM report. Station address: 888 SW 5th Avenue Ste 790, Portland, OR 97204. Website: <http://www.ontheradio.net/radiostations/kkadam.aspx> (R.J. Browning, Sacramento, CA)

KQKE 960 kHz AM. Full data station card signed only as "The Quake" from the Promotions Department, plus huge promotional package including KQKE pens, T-shirt, keychain, mug, three whistles, stickers and cards. Received for an earlier follow up letter with a CD enclosed. Station is a Clear Channel affiliate and obviously a great verifier! Station address: 340 Townsend Street, San Francisco, CA 94107. <http://www.quake-radio.com> (Patrick Martin, Seaside, OR)

KSKO 870 kHz AM. Full data verification letter signed by Timothy A. Terrell-News Director & Walt Gregg-General Manager. Received in 11 days after a follow up letter and CD from 2002 report. Station address: P.O. Box 70, McGrath, AK 99627. Website: <http://www.ksko.org/> (Martin, OR)

WRCG 1420 kHz AM. Full data prepared card returned as verified, plus a CD. Received in nine days after my third follow up. Station address: 1353 13th Avenue, Columbus, GA 31901. (Martin, OR) Website: <http://www.wrcg.com/home.php> (Martin, OR).

WLNO 1060 kHz AM. Partial data verification on station letterhead, signed by D. Gayril Gibson-General Manager. Received in 11 days for an AM report, one US dollar (returned) plus a return address label (used). Station address: Oakwood Corporation Center, 401 Whitney Ave., Ste. 160, Gretna, LA 70056. When active, station website has a WLNO QSL Info link at: <http://www.wlno.com> (Wilkins, MO)

Turks & Caicos Islands: Radio Vision Christiana Int'l 530 kHz AM. Full data blue colored card signed by Wendell Seymour-Manager/Technical. Received in 52 days for an AM report and one U.S. dollar. Station address: North End, South Caicos, Turks & Caicos, British West Indies. (Brian Bagwell, St. Louis MO)

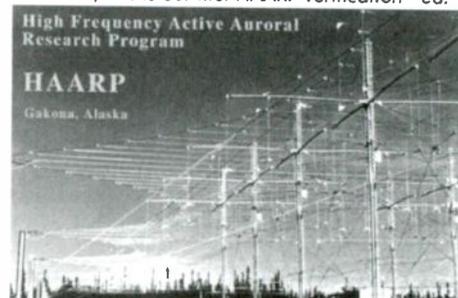
RUSSIA

Asiatic RSFSR via Khabarovsk 12065 kHz, 5890 kHz via Vladivostok. Bible Voice Broadcasting. Full data Globe Reaching Nations card plus schedule. Received in 72 days.

QSL via UK address; P.O. Box 1160 Mount Albert, Ontario L0G 1O. (Kusalik, CAN)

UTILITY

HAARP (High Frequency Active Auroral Research Program) 3250, 3300, 5800 kHz. Full data color HAARP transmitter card. Received four days after sending my report via email at the station's website; <http://www.haarp.alaska.edu/comment.html> (Rafael N. Elias, Glendale, AZ) Thanks for the contribution, this is our first HAARP verification - ed.



KSM Radio, 12993, 6474 kHz USB. RCA Radiogram QSL card to commemorate Night of Nights celebration conducted by the Marine Radio Historical Society. Received in 15 days for a utility report and a SASE. QSL address: Mrs. D.A. Stoops, P.O. Box 381, Bolivar, CA 94924-0381. (R.C. Watts, Louisville, KY) KSM 6474 and KPH 6475 in three weeks. (Wilkins, MO)

VATICAN CITY STATE

Vatican Radio 9605 kHz. Partial data card unsigned, plus stickers and schedule. Received in 115 days for an English report. Station address: 00120 Citta del Vaticano, Vatican City State. Website: <http://www.vaticanradio.org> (Joe Wood, Greenback, TN)

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 Standard Time) 5, 6, 7 or 8 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 hour.

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, 7:30 pm Eastern, 6:30 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., "Vanuotu, 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
occ:	occasional
DRM:	Digital Radio Mondiale

In the same column ⑤, 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 ⑥ follow to the right of the station listing; all frequencies are listed in k hertz (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 print deadline.

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
pa:	Pacific
sa:	South America
va:	various

Shortwave Broadcast Bands

kHz	Meters
2300-2495	120 meters (Note 1)
3200-3400	90 meters (Note 1)
3900-3950	75 meters (Regional band, used for broadcasting in Asia only)
3950-4000	75 meters (Regional band, used for broadcasting in Asia and Europe)
4750-4995	60 meters (Note 1)
5005-5060	60 meters (Note 1)
5730-5900	49 meter NIB (Note 2)
5900-5950	49 meter WARC-92 band (Note 3)
5950-6200	49 meters
6200-6295	49 meter NIB (Note 2)
6890-6990	41 meter NIB (Note 2)
7100-7300	41 meters (Regional band, not allocated for broadcasting in the western hemisphere) (Note 4)
7300-7350	41 meter WARC-92 band (Note 3)
7350-7600	41 meter NIB (Note 2)
9250-9400	31 meter NIB (Note 2)
9400-9500	31 meter WARC-92 band (Note 3)
9500-9900	31 meters
11500-11600	25 meter NIB (Note 2)
11600-11650	25 meter WARC-92 band (Note 3)
11650-12050	25 meters
12050-12100	25 meter WARC-92 band (Note 3)
12100-12600	25 meter NIB (Note 2)
13570-13600	22 meter WARC-92 band (Note 3)
13600-13800	22 meters
13800-13870	22 meter WARC-92 band (Note 3)
15030-15100	19 meter NIB (Note 2)
15100-15600	19 meters
15600-15800	19 meter WARC-92 band (Note 3)
17480-17550	17 meter WARC-92 band (Note 3)
17550-17900	17 meters
18900-19020	15 meter WARC-92 band (Note 3)
21450-21850	13 meters
25670-26100	11 meters

Notes

- Note 1 Tropical bands, 120/90/60 meters are for broadcast use only in designated tropical areas of the world.
- Note 2 Broadcasters can use this frequency range on a (NIB) non-interference basis only.
- Note 3 WARC-92 bands are allocated officially for use by HF broadcasting stations in 2007. They are only authorized on a non-interference basis until that date.
- Note 4 WRC-03 update. After March 29, 2009, the spectrum from 7100-7200 kHz will no longer be available for broadcast purposes and will be turned over to amateur radio operations worldwide.

MT MONITORING TEAM

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Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo, *NASWA Flash Sheet*; *BCL News*; *Cumbre DX*; Glenn Hauser, *Enid, OK/DX Listening Digest*, Md. Azizul Alam, Rajshahi, Bangladesh; Daniel Sampson/*Prime Time-SW*; *DX Window*; *Observer*, Bulgaria; ODXA/DX Ontario; Larry Van Horn N5FPW, MT Asst. Editor; *Hard Core DX*; *NASWA Journal*; WWDX.

**GLENN HAUSER'S
WORLD OF RADIO**
<http://www.worldofradio.com>

For the latest DX and programming news, amateur nets, DX program schedules, audio archives and much more!

0000 UTC - 7PM EST / 6PM CST / 4PM PST

0000	0015	vi	Cambodia, National Radia	11940as		
0000	0015		Japan, Radia 6145na	13650as	17810as	
			17825na			
0000	0027		Czech Rep, Radia Prague Intl	7345na	9440na	
0000	0030		Australia, HCJB 15525as			
0000	0030		Australia, Radia 9660as	12080as	13630pa	
			15240pa	17715as	17750pa	
0000	0030		Burma, Dem Voice of Burma	9435eu		
0000	0030		Egypt, Radia Cairo 11885na			
0000	0030	mtwhfa	Serbia & Montenegro, Intl Radia		9580va	
0000	0030		Thailand, Radia 9570va			
0000	0030		UK, BBC World Service	3915as	5970as	
			6195as	9410as	9740as	11945as
			11955as	15280as	15310as	15360as
			17655as	17790as		
0000	0030		USA, Voice of America	7215va	12140as	
			15185va	15290va	17820va	
0000	0045		India, All India Radia	9705as	9950as	
			11620as	11645as	13605as	
0000	0057		Canada, Radia Canada Intl	9690as		
0000	0059		Spain, Radio Exterior Espana	15385na		
0000	0100		Anguilla, Caribbean Beacon	6090am		
0000	0100		Australia, ABC NT Alice Springs		2310irr	
			4835da			
0000	0100		Australia, ABC NT Katherine	5025da		
0000	0100		Australia, ABC NT Tennant Creek		4910da	
0000	0100		Canada, CFRX Toronto ON	6070da		
0000	0100		Canada, CFVP Calgary AB	6030da		
0000	0100		Canada, CKZN St John's NF	6160da		
0000	0100		Canada, CKZU Vancouver BC	6160da		
0000	0100		Canada, Radia Canada Intl	9755am	11990am	
			13710am			
0000	0100		China, China Broadcast Network		6020na	
			7180as	9570na	13600eu	
0000	0100		Costa Rica, University Network	5030va	6150va	
			7375va	9725va		
0000	0100		Cuba, Radia Havana	12000na		
0000	0100		Germany, Deutsche Welle	7130as	9505as	
			9825as			
0000	0100		Guyana, Voice of	3290da		
0000	0100		Malaysia, Radia 7295as			
0000	0100	vi	Namibia, Namibian BC Corp	3270da	3290da	
			6060da	6175do		
0000	0100		Netherlands, Radia	9845na		
0000	0100		New Zealand, Radio NZ Intl	15720pa		
0000	0100	vi	Papua New Guinea, Wantok Radia Light		7120va	
0000	0100		Sierra Leone, Radio UNAMSIL	6137da		
0000	0100		Singapore, Mediacorp Radia	6150do		
0000	0100		UK, BBC World Service	5975am		
0000	0100		Ukraine, Radio Ukraine Intl	7440na		
0000	0100		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0000	0100		USA, KAIJ Dallas TX	5755na		
0000	0100		USA, KTVN Salt Lake City UT	7505na	15590na	
0000	0100		USA, KWHR Naalehu HI	17510as		
0000	0100		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0000	0100		USA, WBOH Newport NC	5920am		
0000	0100		USA, WEWN Birmingham AL	5810va	7425va	
			13615va			
0000	0100		USA, WHRA Greenbush ME	7520na		
0000	0100	mtwhf	USA, WHRI Nablesville IN	7490am	9515am	
0000	0100	as	USA, WHRI Nablesville IN	7315am		
0000	0100		USA, WINB Red Lion PA	9320am		
0000	0100		USA, WJIE Louisville KY	13595am		
0000	0100	twhfa	USA, WMLK Bethel PA	7385am		
0000	0100	sm	USA, WMLK Bethel PA	9955am		
0000	0100		USA, WTJC Newport NC	9370na		
0000	0100		USA, WWCR Nashville TN	3210na	5070na	
			9985na	13845na		
0000	0100		USA, WWRB Manchester TN	3185na	5050na	
			5085na	5745na	6890na	
0000	0100		USA, WYFR Okeechobee FL	6065na	9505as	
			11835na	17805na		
0000	0100		Zambia, Christian Voice	4965af		
0030	0045	s	Germany, Pan American BC	9740as		
0030	0100		Australia, Radia 9660as	12080as	13630pa	
			15240pa	15415pa	17750pa	
			17775as			
0030	0100		Lithuania, Radia Vilnius		11690na	
0030	0100		Thailand, Radia 5890na			
0030	0100		UK, BBC World Service	5970as	6195as	
			9410as	9740as	11955as	15280as
			15310as	15360as	17790as	
0030	0100		USA, Voice of America	7215va	9780va	
			11760va	15185va	15290va	17740va
			17820va			
0035	0100	sm	Austria, Radia Austria Intl	9870sa		
0043	0058	twhfa	Austria, Radia Austria Intl	9870sa		
0045	0100		Pakistan, Radia 9340as	11565as		
0055	0100		Italy, RAI Intl 11800na			

0100 UTC - 8PM EST / 7PM CST / 5PM PST

0100	0115	s	Australia, HCJB	15405as		
0100	0115		Italy, RAI Intl	11800na		
0100	0115		Pakistan, Radia 9340as	11565as		
0100	0127		Czech Rep, Radia Prague Intl	6200na	7345na	
0100	0128		Vietnam, Voice of	6175na		
0100	0130		Australia, Radia 9660as	12080as	13630pa	
			15240pa	15415pa	17715as	17750pa
			17775as			
0100	0130	mwfa	Belarus, Radia 5970eu	7210eu		
0100	0130	s	Germany, Universal Life	9485as		
0100	0130		Slavakia, Radia Slavakia Intl	5930am	9440am	
0100	0130		Uzbekistan, Radia Tashkent	7190as	9715as	
0100	0156		Romania, Radia Romania Intl	6040na	9690na	
			11820na	15430na		
0100	0157		Netherlands, Radia	9845na		
0100	0159		Canada, Radia Canada Intl	9755am	11990am	
			13710am			
0100	0200		Anguilla, Caribbean Beacon	6090am		
0100	0200		Australia, ABC NT Katherine	5025da		
0100	0200		Australia, ABC NT Tennant Creek		4910da	
0100	0200		Australia, Voice Intl	7355as		
0100	0200		Canada, CFRX Toronto ON	6070da		
0100	0200		Canada, CFVP Calgary AB	6030da		
0100	0200		Canada, CKZN St John's NF	6160da		
0100	0200		Canada, CKZU Vancouver BC	6160da		
0100	0200		China, China Broadcast Network		6005na	
			6020na	9570na	11870as	13640as
0100	0200		Costa Rica, University Network	5030va	6150va	
			7375va	9725va		
0100	0200		Cuba, Radia Havana	6000na	9820na	
			12000na			
0100	0200		Guyana, Voice of	3291da		
0100	0200		Indonesia, Voice of		9525as	11785pa
			15150al			
0100	0200		Japan, Radia 5960as	11860as	11935sa	
			153235as	17560va	17685pa	17810as
			17825ca	17845as		
0100	0200		Malaysia, Radia 7295as			
0100	0200	vi	Namibia, Namibian BC Corp	3270do	3290da	
			6060do	6175do		
0100	0200		New Zealand, Radia NZ Intl	15720pa		
0100	0200		North Korea, Voice of	7140as	9345as	
			9730am	11735am	13760as	15180as
0100	0200	vi	Papua New Guinea, Wantak Radia Light		7120va	
0100	0200		Russia, Voice of	7180na	7250na	15545na
			15555na			
0100	0200		Sierra Leone, Radia UNAMSIL	6137da		
0100	0200		Singapore, Mediacorp Radia	6150do		
0100	0200		UK, BBC World Service	6195as	9410as	
			11955as	15280as	15310as	17790as
0100	0200		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0100	0200		USA, KAIJ Dallas TX	5755na		
0100	0200		USA, KTVN Salt Lake City UT	7505na		
0100	0200		USA, KWHR Naalehu HI	17510as		
0100	0200		USA, Voice of America	7115va	9885va	
			11705va	11725va		
0100	0200		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0100	0200		USA, WBOH Newport NC	5920am		
0100	0200		USA, WEWN Birmingham AL	5810va	7425va	
			13615va			
0100	0200		USA, WHRA Greenbush ME	5850na		
0100	0200	mtwhf	USA, WHRI Nablesville IN	7490am	9515am	
0100	0200	as	USA, WHRI Nablesville IN	7315am		
0100	0200		USA, WINB Red Lion PA	9320am		
0100	0200		USA, WJIE Louisville KY	13595am		
0100	0200	twhfa	USA, WMLK Bethel PA	7385am		
0100	0200	sm	USA, WMLK Bethel PA	9955am		
0100	0200		USA, WTJC Newport NC	9370na		
0100	0200		USA, WWCR Nashville TN	3210na	5070na	
			5935na			
0100	0200		USA, WWRB Manchester TN	3185na	5050na	
			5085na	5745na	6890na	
0100	0200		USA, WYFR Okeechobee FL	6065na	9505as	
			11835na	17805na		
0100	0200		Zambia, Christian Voice	4965af		
0100	0200		Austria, Radio Austria Intl	9870am		
0110	0200	sm	Libya, Voice of Africa	7230af		
0113	0130	twhfa	Austria, Radio Austria Intl	9870am		
0115	0130	a	Austria, Radio Austria Intl	9870sa		
0130	0200		Australia, HCJB 15405as			
0130	0200		Australia, Radia 9660as	12080as	13630pa	
			15240pa	15415pa	17715as	17750pa
0130	0200	s	Belarus, Radia 5970eu	7210eu		
0130	0200		Iran, Voice of the Islamic Rep	9495am	11875am	
0130	0200		Sweden, Radia 6010na	9435va		
0130	0200	twhfa	USA, Voice of America	7405va	9775va	
			13740va			
0133	0200	sm	Austria, Radio Austria Intl	9870me		
0140	0200		Vatican City, Vatican Radio	9650as	12055as	
0143	0158	twhfa	Austria, Radio Austria Intl	9870na		
0145	0					

0200 UTC - 9PM EST / 8PM CST / 6PM PST

0200	0227	Iran, Voice of the Islamic Rep	9495am	11875am
0200	0230	Australia, HCJB	15405as	
0200	0230	Austria, AWR Europe	9895as	
0200	0230	Belarus, Radio	5970eu	7210eu
0200	0230	Croatia, Croatian Radio	9925sa	
0200	0300	Anguillo, Coribbean Beacon	6090am	
0200	0300	Argentina, RAE	11710om	
0200	0300	Australia, ABC NT Alice Springs		2310irr
		4835do		
0200	0300	Australia, ABC NT Katherine	5025do	
0200	0300	Australia, ABC NT Tennant Creek		4910do
0200	0300	Australia, Radio	9660as	12080as
		15240pa	15415pa	15515as
		21725pa		17750pa
0200	0300	Australia, Voice Intl	7355as	
0200	0300	Bulgaria, Radio	9700na	11700na
0200	0300	Canada, CFRX Toronto ON	6070do	
0200	0300	Canada, CFVP Calgary AB	6030do	
0200	0300	Canada, CKZN St John's NF	6160do	
0200	0300	Canada, CKZU Vancouver BC	6160do	
0200	0300	China, China Broadcast Network		9580na
0200	0300	Costo Rica, University Network	5030va	6150va
		7375va	9725va	
0200	0300	Cuba, Radio Havana	6000na	9820na
		12000na		
0200	0300	Egypt, Radio Cairo	7260na	
0200	0300	Guyana, Voice of	3291do	
0200	0300	Hungary, Radio Budapest	9515na	
0200	0300	Malaysia, Radio	7295as	
0200	0300	Namibia, Namibian BC Corp	3270do	3290do
		6060do	6175do	
0200	0300	New Zealand, Radio NZ Intl	15720pa	
0200	0300	North Korea, Voice of	4405as	13650as
		15100as		
0200	0300	Papua New Guinea, Wantok Radio Light	7120va	
0200	0300	Philippines, Radio Pilipinas	11885va	15120vo
		17665va		
0200	0300	Russia, Voice of	5945me	7180na
		9860na	15545na	15555na
		17660na		15595na
0200	0300	Sierra Leone, Radio UNAMSIL	6137do	
0200	0300	Singapore, Mediacorp Radio	6150do	
0200	0300	South Korea, Radio Korea Intl	9560va	11810sa
		15575va		
0200	0300	Taiwan, Radio Taiwan Intl	5950na	9680no
		11875as	15465as	
0200	0300	UK, BBC World Service	5975am	9750af
		9825am	11760me	11955as
		15280as	15310as	15360as
		15360as	15360as	17790as
0200	0300	USA, AFRTS	4319usb	5446usb
		7590usb	7812usb	12133usb
		12133usb	12579usb	13362usb
		12579usb	13362usb	13855usb
0200	0300	USA, KAIJ Dallas TX	5755na	
0200	0300	USA, KJES Vado NM	7555na	
0200	0300	USA, KTVN Salt Lake City UT	7505na	
0200	0300	USA, KWHR Noolehu HI	17510as	
0200	0300	USA, Voice of America	7115va	9885va
		11705va	11725va	
0200	0300	USA, WBCQ Kennebunk ME	5105na	7415na
		9330na		
0200	0300	USA, WBOH Newport NC	5920am	
0200	0300	USA, WEWN Birmingham AL	5810va	7425va
		13615va		
0200	0300	USA, WHRA Greenbush ME	5850na	
0200	0300	USA, WHRI Noblesville IN	7490am	9515am
0200	0300	USA, WHRI Noblesville IN	7315am	
0200	0300	USA, WINB Red Lion PA	9320am	
0200	0300	USA, WJIE Louisville KY	13595am	
0200	0300	USA, WMLK Bethel PA	7385am	
0200	0300	USA, WMLK Bethel PA	9955am	
0200	0300	USA, WTJC Newport NC	9370na	
0200	0300	USA, WWCR Nashville TN	3210na	5070na
		5935na		
0200	0300	USA, WWRB Monchester TN	3185na	5050na
		5085na	5745na	6890na
0200	0300	USA, WYFR Okeechobee FL	5985na	6065no
		9505na	11835na	11855na
		4965af		
0200	0300	Zombia, Christian Voice		
0215	0230	Nepal, Radio	3230as	5005as
		7165as		6100as
0225	0235	Libya, Voice of Africa		7230af
0230	0258	Albania, Radio Tirano		6115eu
0230	0258	Vietnam, Voice of	6175na	7160eu
0230	0300	Belarus, Radio	5970eu	7210eu
0230	0300	Sweden, Radio	6010na	
0245	0300	Myanmar, Radio	9730do	
0250	0300	Vatican City, Vatican Radio	7305om	9605am
0256	0300	Turkey, Voice of	6140va	7270va

0300 UTC - 10PM EST / 9PM CST / 7PM PST

0300	0320	Vatican City, Vatican Radio	7305am	9605am
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0300	0327	Czech Rep, Radio Prague Intl	7345na	9870na
0300	0330	Egypt, Radio Cairo	7260na	
0300	0330	Myanmar, Radio	9730do	
0300	0330	Philippines, Radio Pilipinas	11885va	17665va
0300	0330	Thailand, Radio	5890na	
0300	0330	USA, KJES Vado NM	7555na	
0300	0330	USA, Voice of America	4930af	6080af
		7290af	7340af	9885af
		17895af		
0300	0330	Vatican City, Vatican Radio	9660af	
0300	0350	Turkey, Voice of	6140va	7270va
0300	0355	South Africa, Channel Africa	6150af	
0300	0400	Anguillo, Caribbean Beacon	6090am	
0300	0400	Australia, ABC NT Alice Springs		2310irr
		4835do		
0300	0400	Australia, ABC NT Katherine	5025do	
0300	0400	Australia, ABC NT Tennant Creek		4910do
0300	0400	Australia, Radio	9660as	12080as
		15240pa	15415pa	15515as
		21725pa		17750pa
0300	0400	Australia, Voice Intl	13685as	
0300	0400	Canada, BBC World Service	11955na	
0300	0400	Canada, CBC NQ SW Service	9625na	
0300	0400	Canada, CFRX Toronto ON	6070do	
0300	0400	Canada, CFVP Calgary AB	6030do	
0300	0400	Canada, CKZN St John's NF	6160do	
0300	0400	Canada, CKZU Vancouver BC	6160do	
0300	0400	China, China Broadcast Network		9690am
		9790am	11870as	15110as
0300	0400	Costa Rica, University Network	5030va	6150va
		7375va	9725va	
0300	0400	Cuba, Radio Havana	6000na	9820na
0300	0400	Guyana, Voice of	3291do	
0300	0400	Japan, Radio	21610pa	
0300	0400	Malaysia, Radio	7295as	
0300	0400	Malaysia, Voice of	6175as	9750as
0300	0400	Namibia, Namibian BC Corp	3270do	3290do
		6060do	6175do	
0300	0400	New Zealand, Radio NZ Intl	15720pa	
0300	0400	North Korea, Voice of	3560as	7140as
		9345as	9730as	
0300	0400	Papua New Guinea, Wantok Radio Light	7120va	
0300	0400	Russia, Voice of	5900na	7180na
		15545na	15555na	15595na
		15595na		17660na
0300	0400	Rwanda, Radio	6055do	
0300	0400	Sierra Leone, Radio UNAMSIL	6137do	
0300	0400	Singapore, Mediacorp Radio	6150do	
0300	0400	South Africa, Channel Africa	3345af	
0300	0400	Taiwan, Radio Taiwan Intl	5950na	15215va
		15320va		
0300	0400	Uganda, Radio	4976do	5026do
0300	0400	UK, BBC World Service	3255af	5975om
		6005af	6190af	6195eu
		9410eu	9750af	11760me
		11765af	12035af	12095as
		15310as	15420af	15280as
		17790as	21660as	15575me
0300	0400	UK, Sudan Radio Service	9625va	
0300	0400	Ukraine, Radio Ukraine Intl	7440na	
0300	0400	USA, AFRTS	4319usb	5446usb
		7590usb	7812usb	12133usb
		12133usb	12579usb	13362usb
		12579usb	13362usb	13855usb
0300	0400	USA, KAIJ Dallas TX	5755na	
0300	0400	USA, KTVN Salt Lake City UT	7505na	
0300	0400	USA, KWHR Noolehu HI	17510as	
0300	0400	USA, WBCQ Kennebunk ME	5105na	7415na
		9330na		
0300	0400	USA, WBOH Newport NC	5920am	
0300	0400	USA, WEWN Birmingham AL	5810va	7425va
		13615va		
0300	0400	USA, WHRA Greenbush ME	5850na	
0300	0400	USA, WHRI Noblesville IN	7490am	9515am
0300	0400	USA, WHRI Noblesville IN	7315am	
0300	0400	USA, WINB Red Lion PA	9320am	
0300	0400	USA, WJIE Louisville KY	13595am	
0300	0400	USA, WMLK Bethel PA	7385am	
0300	0400	USA, WMLK Bethel PA	9955am	
0300	0400	USA, WTJC Newport NC	9370na	
0300	0400	USA, WWCR Nashville TN	3210na	5070na
		5935na		
0300	0400	USA, WWRB Monchester TN	3185na	5050na
		5085na	5745na	6890na
0300	0400	USA, WYFR Okeechobee FL	5985na	6065no
		9505na	11835na	11855na
		4965af		
0300	0400	Zombia, Christian Voice		
0300	0400	Zimbabwe, ZBC Corp		4965af
0330	0345	Israel, Kol Israel	7545va	5975do
0330	0357	Czech Rep, Radio Prague Intl	9445va	11600vo
0330	0358	Vietnam, Voice of	6175am	
0330	0400	Hungary, Radio Budapest	6025eu	9775na
0330	0400	UAE, Emirates Radio	12005na	13675na
		15400na		
0330	0400	USA, Voice of America	7290af	12080af
		17895af		
0330	0400	USA, Voice of America	4930af	6080af
		9885af		

SHORTWAVE GUIDE

0400 UTC - 11PM EST / 10PM CST / 8PM PST

0400	0430	Australia, Radio	9660as	12080as	13630pa
		15240pa	15515pa	17750pa	21725pa
0400	0430	France, Radio France Intl	9805af	11700af	
0400	0430	USA, Voice of America	4930af	4960af	
		6080af	7290af	9575af	9885af
		11835af	12080af	17895af	
0400	0456	Romania, Radio Romania Intl	9780va	11820va	
		15140va	17860va		
0400	0457	Netherlands, Radio	6165na	9590na	
0400	0459	New Zealand, Radio NZ Intl	15720pa		
0400	0500	Anguilla, Caribbean Beacon	6090am		
0400	0500	Australia, ABC NT Alice Springs	4835do	2310irr	
0400	0500	Australia, ABC NT Katherine	5025do		
0400	0500	Australia, ABC NT Tennant Creek	4910do		
0400	0500	Australia, Voice Intl	13685as		
0400	0500	Canada, CBC NQ SW Service	9625na		
0400	0500	Canada, CFRX Toronto ON	6070do		
0400	0500	Canada, CKZN St John's NF	6160do		
0400	0500	Canada, CKZU Vancouver BC	6160do		
0400	0500	China, China Broadcast Network	9690na	9590na	
		9755na			
0400	0500	Costa Rica, University Network	5030va	6150va	
		7375va	9725va		
0400	0500	Cuba, Radio Havana	6000na	9820na	
0400	0500	Germany, Deutsche Welle	7170af	11945as	
		15445as			
0400	0500	Guyana, Voice of	3291do		
0400	0500	Malaysia, Radio	7295as		
0400	0500	Malaysia, Voice of	6175as	9750as	15295as
0400	0500	Namibia, Namibian BC Corp	6060do	6175do	3270do
					3290do
0400	0500	Nigeria, Radio/Kaduna	6090do		
0400	0500	Papua New Guinea, Wantok Radio	Light	7120va	
0400	0500	Russia, Voice of	5900na	7180na	15545na
		15555na	15595na	17660na	
0400	0500	Rwanda, Radio	6055do		
0400	0500	Sierra Leone, Radio UNAMSIL	6137do		
0400	0500	Singapore, Mediacorp Radio	6150do		
0400	0500	South Africa, Channel Africa	3345af		
0400	0500	Uganda, Radio	4976do	7196do	
0400	0500	UK, BBC World Service	3255af	6005af	
		6195eu	7160af	9410va	11760eu
		9410va	11760me	11765af	12035af
		15310as	15280as	15360as	15420af
		15575me	17760as	17790as	21660as
0400	0500	UK, Sudan Radio Service	9625va		
0400	0500	USA, AFRTS	4319usb	5446usb	5765usb
		7590usb	7812usb	12133usb	12579usb
		12133usb	12579usb	13362usb	13855usb
0400	0500	USA, KAIJ Dallas TX	5755na		
0400	0500	USA, KTBN Salt Lake City UT	7505na		
0400	0500	USA, KWHR Naalehu HI	17510as		
0400	0500	USA, WBCQ Kennebunk ME	9330na	5105na	7415na
0400	0500	USA, WBOH Newport NC	5920am		
0400	0500	USA, WEWN Birmingham AL	13615va	5810va	7425va
0400	0500	USA, WHRA Greenbush ME	5850na		
0400	0500	USA, WHRI Noblesville IN	5835am	7465am	
0400	0500	USA, WHRI Noblesville IN	5835am		
0400	0500	USA, WJIE Louisville KY	13595am		
0400	0500	USA, WMLK Bethel PA	9265eu	9955eu	
0400	0500	USA, WMLK Bethel PA	7385am		
0400	0500	USA, WTJC Newport NC	9370na		
0400	0500	USA, WWCR Nashville TN	3210na	5070na	
		5765na	5935na		
0400	0500	USA, WWRB Manchester TN	3185na	5050na	
		5085na	5745na	6890na	
0400	0500	USA, WYFR Okeechobee FL	6065na	6855eu	
		7355eu	9505eu	9715eu	
0400	0500	Zambia, Christian Voice	4965af		
0400	0500	Zimbabwe, ZBC Corp	5975do		
0430	0500	Australia, Radio	9660as	12080as	13630pa
		15240pa	15415pa	15515va	17750pa
		21725pa			
0430	0500	Nigeria, Radio/Ibadan	6050do		
0430	0500	Nigeria, Radio/Kaduna	4770do		
0430	0500	Nigeria, Radio/Lagos	3326do	4990do	
0430	0500	Serbia & Montenegro, Intl Radio		9580va	
0430	0500	Swaziland, TWR	3200af	4775af	
0430	0500	USA, Voice of America	4930af	4960af	
		7290af	9575af	11835af	12080af
		17895af			
0445	0500	Italy, RAI Intl	6110af	7235af	9800af
0455	0500	Vatican City, Vatican Radio	11625af	13765af	

0500 UTC - 12AM EST / 11PM CST / 9PM PST

0500	0507	twthfas	Canada, CBC NQ SW Service	9625na	
0500	0520		Vatican City, Vatican Radio	4005eu	5885eu
			7250eu		
0500	0530		Australia, Radio	9660as	12080as
					13630pa

0500	0530		15160pa	15240pa	15515va	17750pa
0500	0530	vi	France, Radio France Intl		11995af	13680af
0500	0530		Rwanda, Radio	6055do		
			UK, BBC World Service		6005af	6190af
			7160af	11765af	11940af	11955me
			11765af	12035af	12095va	15280as
			15310as	15420af	15575me	17760as
			17790as	21660as		
0500	0530		UK, BBC World Service		6005af	6195af
			7160af	9410va	11765af	11940af
			11955as	15280as	15310as	15360as
			17640af	17760as	17790as	17885af
			21660as			
0500	0530		Vatican City, Vatican Radio		9660af	
0500	0555		South Africa, Channel Africa		9685af	
0500	0600		Anguilla, Caribbean Beacon		6090am	
0500	0600		Australia, ABC NT Alice Springs		4835do	2310irr
0500	0600		Australia, ABC NT Katherine		5025do	
0500	0600		Australia, ABC NT Tennant Creek			4910do
0500	0600		Australia, Voice Intl		13685as	
0500	0600	DRM	Austria, Virgin Radio		9720eu	
0500	0600		Bhutan, BBS	6035as		
0500	0600		Canada, CFRX Toronto ON	6070do		
0500	0600		Canada, CKZN St John's NF	6160do		
0500	0600		Canada, CKZU Vancouver BC	6160do		
0500	0600		China, China Broadcast Network			6190na
			9560na	9590af	11710af	11880as
			15350as	15465as	17050af	17540as
0500	0600		Costa Rica, University Network	5030va	6150va	
			7375va	9725va		
0500	0600		Cuba, Radio Havana		6000va	6060va
			9550va	11760va		
0500	0600		France, Radio France Intl		13680va	
0500	0600		Germany, Deutsche Welle		9630af	9700af
			15410af	17800af		
0500	0600		Guyana, Voice of	3291do		
0500	0600		Japan, Radio	5975eu	6110na	7230eu
			15195as	17810as	21755pa	
0500	0600		Malaysia, Radio	7295as		
0500	0600		Malaysia, Voice of	6175as	9750as	15295as
0500	0600	vi	Namibia, Namibian BC Corp	6060do	6175do	3270do
						3290do
0500	0600		New Zealand, Radio NZ Intl		11820pa	
0500	0600		Nigeria, Radio/Ibadan		6050do	
0500	0600		Nigeria, Radio/Kaduna		4770do	6090do
0500	0600		Nigeria, Radio/Lagos		3326do	4990do
0500	0600		Nigeria, Voice of	15120af		
0500	0600	vi	Papua New Guinea, Wantok Radio	Light	7120va	
0500	0600		Russia, Voice of	17665pa	21790pa	
0500	0600		Sierra Leone, Radio UNAMSIL	6137do		
0500	0600		Singapore, Mediacorp Radio	6150do		
0500	0600		South Africa, Channel Africa	7240af		
0500	0600		Swaziland, TWR	3200af	4775af	9500af
0500	0600	vi	Uganda, Radio	4976do	5026do	7196do
0500	0600		UK, BBC World Service		6195eu	11760me
			12095eu	15565eu	15575me	
0500	0600	vi/ mtwhf	UK, Sudan Radio Service		11795va	
0500	0600		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0500	0600		USA, KAIJ Dallas TX	5755na		
0500	0600		USA, KTBN Salt Lake City UT	7505na		
0500	0600		USA, KWHR Naalehu HI	9510as	17510as	
0500	0600		USA, Voice of America	4930af	6080af	
			6180af	7290af	12080af	13645af
0500	0600		USA, WBCQ Kennebunk ME	9330na	7415na	
0500	0600		USA, WBOH Newport NC	5920am		
0500	0600		USA, WEWN Birmingham AL	13615va	5850va	7425va
0500	0600		USA, WHRA Greenbush ME	5850na		
0500	0600		USA, WHRI Noblesville IN	5835am	7465am	
0500	0600		USA, WJIE Louisville KY	13595am		
0500	0600		USA, WMLK Bethel PA	9265eu	9955eu	
0500	0600		USA, WMLK Bethel PA	7385am		
0500	0600		USA, WRMI Miami FL	7385am		
0500	0600		USA, WTJC Newport NC	9370na		
0500	0600		USA, WWCR Nashville TN	3210na	5070na	
			5765na	5935na		
0500	0600		USA, WWRB Manchester TN	3185na	5050na	
			5085na	5745na	6855eu	
0500	0600		USA, WYFR Okeechobee FL	6065na	6855eu	
			7355eu	9505eu	9715eu	
0500	0600		Zambia, Christian Voice	4965af		
0500	0600		Zimbabwe, ZBC Corp	5975do		
0500	0600		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	15515va	17750pa
			21725pa			
0500	0600		Nigeria, Radio/Ibadan	6050do		
0500	0600		Nigeria, Radio/Kaduna	4770do		
0500	0600	vi	Nigeria, Radio/Lagos	3326do	4990do	
0505	0520	m	Austria, Radio Austria Intl		17870me	
0505	0530	as	Austria, Radio Austria Intl		17870me	
0515	0600		Zambia, Christian Voice		9555af	
0525	0600	vi	Ghana, Ghana BC Corp		3366do	4915do
0530	0600		Australia, Radio	9660as	12080as	13630as
			15160pa	15240va	15415as	15515pa
			17750as			
0530	0600		Thailand, Radio	17690va		
0530	0600		UK, BBC World Service		6005af	6190af
			7160af	9410af	11765af	11940af
			11955as	15310as	15360as	15420af
		</				

0600 UTC - 1AM EST / 12AM CST / 10PM PST

0600	0605	vi	Croatia, Croatian Radio	13820na	
0600	0615	as	South Africa, TWR	11640af	
0600	0630		France, Radio France Intl	11665af	15160af
			17800af		
0600	0645	mtwhf	South Africa, TWR	11640af	
0600	0655		South Africa, Channel Africa	15440af	
0600	0700		Anguilla, Caribbean Beacon	6090am	
0600	0700		Australia, ABC NT Alice Springs		2310irr
			4835do		
0600	0700		Australia, ABC NT Katherine	5025do	
0600	0700		Australia, ABC NT Tennant Creek		4910do
0600	0700		Australia, Radio	9660as	12080as
			15160pa	15240va	15415as
			17750va		15515pa
0600	0700		Australia, Voice Intl	15335os	
0600	0700	DRM	Austria, Virgin Radio	9720eu	
0600	0700		Canada, CFRX Toronto ON	6070do	
0600	0700		Canada, CFYP Calgary AB	6030do	
0600	0700		Canada, CKZN St John's NF	6160do	
0600	0700		Canada, CKZU Vancouver BC	6160do	
0600	0700		China, China Broadcast Network		9590af
			11710af	11870me	11880as
			15350as	15465as	17490eu
			17540as		17505af
0600	0700		Costa Rica, University Network	5030va	6150va
			7375va	9725va	11870va
0600	0700		Cuba, Radio Havana	6000va	6060va
			9550va	11760va	
0600	0700		Germany, Deutsche Welle	6140eu	7170af
			15275af	17860af	
0600	0700	vi	Ghana, Ghana BC Corp	3366do	4915do
0600	0700		Guyana, Voice of	3291do	
0600	0700		Japan, Radio	7230eu	11715as
			11760as	13630va	15195as
			21755pa		17870pa
0600	0700		Liberia, ELWA	4760do	
0600	0700		Malaysia, Radio	7295as	
0600	0700		Malaysia, Voice of	6175as	9750as
0600	0700	vi	Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
0600	0700		New Zealand, Radio NZ Intl	11820pa	
0600	0700		Nigeria, Radio/Ibadan	6050do	
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do
0600	0700		Nigeria, Radio/Lagos	3326do	4990do
0600	0700		Nigeria, Voice of	15120af	
0600	0700	vi	Papua New Guinea, Wantok Radio Light		7120va
0600	0700		Russia, Voice of	17665pa	21790pa
0600	0700	DRM	Russia, Voice of	15780eu	
0600	0700		Sierra Leone, Radio UNAMSIL	6137do	
0600	0700	irreg/ vi	Sierra Leone, SLBS 3316do		
0600	0700		Singapore, Mediacorp Radio	6150do	
0600	0700	vi	Solomon Islands, SIBC	5020do	9545do
0600	0700		South Africa, Channel Africa	7240af	
0600	0700		Swaziland, TWR	4775af	9500af
0600	0700		UK, BBC World Service	6120af	7160af
			9410va	11765as	11940af
			12095as	15310as	15360as
			15565as	15575me	15400af
			21660as		17790as
0600	0700	as	UK, BBC World Service	17885af	
0600	0700		USA, AFRTS	4319usb	5446usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13855usb
0600	0700		USA, KAIJ Dallas TX	5755na	
0600	0700		USA, KTBN Salt Lake City UT	7505na	
0600	0700		USA, KWHR Naalehu HI	9510as	13700as
0600	0700		USA, Voice of America	6080af	6180af
			7290af	12080af	13645af
0600	0700		USA, WBCQ Kennebunk ME	7415na	
0600	0700		USA, WBOH Newport NC	5920am	
0600	0700		USA, WEWN Birmingham AL	5850va	7425va
			7570va		
0600	0700		USA, WHRA Greenbush ME	7490na	
0600	0700		USA, WHRI Noblesville IN	7315am	7465am
0600	0700		USA, WJIE Louisville KY	13595am	
0600	0700		USA, WMLK Bethel PA	9265eu	9955eu
0600	0700		USA, WRMI Miami FL	7385am	
0600	0700		USA, WTJC Newport NC	9370na	
0600	0700		USA, WWCR Nashville TN	3210na	5070na
			5765na	5935na	
0600	0700		USA, WWRB Manchester TN	3185na	
0600	0700		USA, WYFR Okeechobee FL	5810eu	7355eu
			9680eu	11530eu	11580eu
0600	0700	vi	Vanuatu, Radio	4960do	
0600	0700		Yemen, Rep of Yemen Radio	9780me	
0600	0700		Zambia, Christian Voice	9555af	
0600	0700	vi	Zimbabwe, ZBC Corp	5975do	
0630	0645		Vatican City, Vatican Radio	4005af	5885af
			7250af	9645eu	11740ca
0630	0656		Romania, Radio Romania Intl	9655eu	11830eu
0630	0700		Bulgaria, Radio	11600eu	13600eu
0630	0700	as	Germany, Bible Voice Broadcasting		5945eu
0630	0700		Vatican City, Vatican Radio	11625af	13765ca

0645	0700	s	15570va	
0645	0700	s	Albania, TWR	11865eu
			Monaco, TWR	9870eu

0700 UTC - 2AM EST / 1AM CST / 11PM PST

0700	0705		New Zealand, Radio NZ Intl	11820pa	
0700	0727		Czech Rep, Radio Prague Intl	9880eu	11600eu
0700	0730		Slovakia, Radio Slovakia Intl	9440as	15460pa
0700	0730		UK, BBC World Service	11760me	15575me
0700	0800	mtwhf	Albania, TWR	11865eu	
0700	0800		Anguilla, Caribbean Beacon	6090am	
0700	0800		Australia, ABC NT Alice Springs		2310irr
			4835do		
0700	0800		Australia, ABC NT Katherine	5025do	
0700	0800		Australia, ABC NT Tennant Creek		4910do
0700	0800		Australia, HCJB	11750au	
0700	0800		Australia, Radio	9660as	12080as
			15160pa	15240va	15415as
0700	0800		Australia, Voice Intl	15335as	
0700	0800	DRM	Austria, Virgin Radio	9720eu	
0700	0800		Canada, CFRX Toronto ON	6070do	
0700	0800		Canada, CFYP Calgary AB	6030do	
0700	0800		Canada, CKZN St John's NF	6160do	
0700	0800		Canada, CKZU Vancouver BC	6160do	
0700	0800		China, China Broadcast Network		11880as
			13710eu	15350as	15465as
			17370eu	15350as	17490eu
0700	0800		Costa Rica, University Network	5030va	6150va
			7375va	9725va	11870va
0700	0800		Eqt Guinea, Radio Africa	15190af	
0700	0800		France, Radio France Intl	15605af	
0700	0800	as	Germany, Bible Voice Broadcasting		5945eu
0700	0800		Germany, Deutsche Welle	6140eu	
0700	0800	vi	Ghana, Ghana BC Corp	3366do	4915do
0700	0800		Guyana, Voice of	3291do	5950do
0700	0800	vi/as	Italy, IRRS	13840va	
0700	0800		Liberia, ELWA	4760do	
0700	0800		Liberia, Star Radio	9525af	
0700	0800		Malaysia, Radio	7295as	
0700	0800		Malaysia, Voice of	6175as	9750as
0700	0800		Monaco, TWR	9870eu	15295as
0700	0800	mtwhfa	Myanmar, Radio	9730do	
0700	0800	vi	Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
0700	0800		Nigeria, Radio/Ibadan	6050do	
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do
0700	0800		Nigeria, Radio/Lagos	3326do	4990do
0700	0800	vi	Papua New Guinea, Wantok Radio Light		7120va
0700	0800		Russia, Voice of	17495pa	17635pa
0700	0800	DRM	Russia, Voice of	15780eu	21790pa
0700	0800		Sierra Leone, Radio UNAMSIL	6137do	
0700	0800	irreg/ vi	Sierra Leone, SLBS 3316do		
0700	0800		Singapore, Mediacorp Radio	6150do	
0700	0800	vi	Solomon Islands, SIBC	5020do	9545do
0700	0800		South Africa, Channel Africa	7240af	
0700	0800	DRM	Sri Lanka, Deutsche Welle	21675as	
0700	0800		Swaziland, TWR	4775af	6120af
0700	0800		Swaziland, TWR	4775af	6120af
0700	0800		Taiwan, Radio Taiwan Intl	5950na	9500af
0700	0800		UK, BBC World Service	6005af	6190af
			11940af	11765af	11955as
			15310as	15360as	15400af
			17760as	17790as	15485af
0700	0800		USA, AFRTS	4319usb	5446usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	12579usb
0700	0800		USA, KAIJ Dallas TX	5755na	
0700	0800		USA, KTBN Salt Lake City UT	7505na	
0700	0800		USA, KWHR Naalehu HI	9510as	13700as
0700	0800		USA, Voice of America	6080af	7290af
			13645af		
0700	0800		USA, WBOH Newport NC	5920am	
0700	0800		USA, WEWN Birmingham AL	5850va	7475va
			7570va		
0700	0800		USA, WHRI Noblesville IN	7315am	7465am
0700	0800		USA, WJIE Louisville KY	13595am	
0700	0800		USA, WMLK Bethel PA	9265eu	9955eu
0700	0800		USA, WRMI Miami FL	7385am	
0700	0800		USA, WTJC Newport NC	9370na	
0700	0800		USA, WWCR Nashville TN	3210na	5070na
			5765na	5935na	
0700	0800		USA, WWRB Manchester TN	3185na	
0700	0800		USA, WYFR Okeechobee FL	5985va	6855va
			7355va	9505va	9715va
0700	0800	vi	Vanuatu, Radio	4960do	
0700	0800		Zambia, Christian Voice	9555af	
0706	0800		New Zealand, Radio NZ Intl	9885pa	
0715	0750	a	Albania, TWR	11865eu	
0715	0750	a	Monaco, TWR	9870eu	
0730	0800		Georgia, Radio Georgia	11805eu	
0730	0800	as	Guam, TWR/KTWR	15255as	
0730	0800	as	UK, BBC World Service	15575me	17885af
0740	0800	mtwhf	Guam, TWR/KTWR	15225as	

SHORTWAVE GUIDE

0800 UTC - 3AM EST / 2AM CST / 12AM PST

0800	0815	a	Germany, Bible Voice Broadcasting	5945eu	
0800	0820	mtwhfs	Albania, TWR	11865eu	
0800	0820	s	Monaco, TWR	9870eu	
0800	0830		Australia, ABC NT Katherine	5025do	
0800	0830		Australia, ABC NT Tennant Creek	4910do	
0800	0830		Australia, Radio	5995as 9580as 9590as	
			9710as 12080pa 13630pa	15240pa	
			17750pa		
0800	0830	as	Australia, Radio	15415va	
0800	0830	s	Germany, Bible Voice Broadcasting	5945eu	
0800	0830		Liberia, ELWA	4760do	
0800	0830		Malaysia, Voice of	6175as 9750as	
0800	0830		Myanmar, Radio	9730do	
0800	0830		Swaziland, TWR	4775af 6120af	9500af
0800	0900		Anguilla, Caribbean Beacon	6090am	
0800	0900		Australia, ABC NT Alice Springs	4835do	2310irr
0800	0900		Australia, HCJB	11750au	
0800	0900		Australia, Voice Intl	15335as	
0800	0900	DRM	Austria, Virgin Radio	9720eu	
0800	0900		Bhutan, BBS	6035as	
0800	0900		Canada, CFRX Toronto ON	6070do	
0800	0900		Canada, CFVP Calgary AB	6030do	
0800	0900		Canada, CKZN St John's NF	6160do	
0800	0900		Canada, CKZU Vancouver BC	6160do	
0800	0900		China, China Broadcast Network	13710eu 15350as 15465as	11880as 17490eu
			17540as		
0800	0900		Costa Rica, University Network	5030va 7375va 9725va	6150va 11870va
0800	0900		Eqt Guinea, Radio Africa	15190af	
0800	0900		Germany, Deutsche Welle	6140eu	
0800	0900	vl	Ghana, Ghana BC Corp	3366do	4915do
0800	0900	mtwhf	Guam, TWR/KTWR	11840as	15225as
0800	0900		Guyana, Voice of	3291do	5950do
0800	0900		Indonesia, Voice of	15150af	9525as 11785pa
			15150af		
0800	0900	vl/as	Italy, IRRS	13840va	15725af
0800	0900		Liberia, Star Radio	9525af	
0800	0900		Malaysia, Radio	7295as	
0800	0900		Malaysia, Voice of	15295as	
0800	0900		New Zealand, Radio NZ Intl	9885pa	
0800	0900		Nigeria, Radio/Ibadan	6050do	
0800	0900		Nigeria, Radio/Kaduna	4770do	6090do
0800	0900		Nigeria, Radio/Lagos	3326do	4990do
0800	0900	vl	Pakistan, Radio	15100eu	15190eu 17835eu
0800	0900		Papua New Guinea, Catholic Radio	4960do	
0800	0900		Papua New Guinea, NBC	4890do	
0800	0900	vl	Papua New Guinea, Wantok Radio Light	7120va	
0800	0900		Russia, Voice of	17495pa 17635pa	21790pa
0800	0900	DRM	Russia, Voice of	15780eu	
0800	0900		Sierra Leone, Radio UNAMSIL	6137do	
0800	0900	irreg/ vl	Sierra Leone, SLBS 3316do		
0800	0900		Singapore, Mediacorp Radio	6150do	
0800	0900	vl	Solomon Islands, SIBC	5020do	9545do
0800	0900	s	South Africa, Radio League	7205af	17565af
0800	0900		South Korea, Radio Korea Intl	9570as	9640eu
0800	0900	DRM	Sri Lanka, Deutsche Welle	21675as	
0800	0900		Taiwan, Radio Taiwan Intl	9610pa	
0800	0900		UK, BBC World Service	6190af	11760me
			11940af 11955as 15310as 15360as		
			15400af 15485af 15575me 17640eu		
			17760as 17790as 17830af 17885af		
			21470af 21660as		
0800	0900		USA, AFRTS	4319usb 5446usb 5765usb	
			7590usb 7812usb 12133usb 12579usb		
			12133usb 12579usb 13362usb 13855usb		
0800	0900		USA, KAIJ Dallas TX	5755na	
0800	0900		USA, KNLS Anchor Point AK	11870as	
0800	0900		USA, KTBN Salt Lake City UT	7505na	
0800	0900		USA, KWHR Naalehu HI	9510as	13700as
0800	0900		USA, Voice of America	6080af	7290af
			13645af		
0800	0900		USA, WBOH Newport NC	5920am	
0800	0900		USA, WEWN Birmingham AL	5850va	7425va
			7570va		
0800	0900		USA, WHRI Noblesville IN	7315am	7520am
0800	0900		USA, WJIE Louisville KY	13595am	
0800	0900		USA, WMLK Bethel PA	9265eu	9955eu
0800	0900		USA, WRMI Miami FL	7385am	
0800	0900		USA, WTJC Newport NC	9370na	
0800	0900		USA, WWCR Nashville TN	3210na	5070na
			5765na 5935na		
0800	0900	s	USA, WWRB Manchester TN	9320na	
0800	0900		USA, WWRB Manchester TN	3185na	5085na
0800	0900		USA, WYFR Okeechobee FL	5950af	5985af
			6855af 9930af		
0800	0900	vl	Vanuatu, Radio	4960do	
0800	0900		Zambia, Christian Voice	9555af	
0815	0900	as	Guam, TWR/KTWR	11840as	
0830	0900		Australia, ABC NT Katherine	2485do	
0830	0900		Australia, ABC NT Tennant Creek		2325do
0830	0900		Australia, Radio	5995as 9580as 9590as	
			9710as 12080pa 13630pa	15240pa	
			15415pa 17750pa		

0900 UTC - 4AM EST / 3AM CST / 1AM PST

0900	0915	vl	Ghana, Ghana BC Corp	3366do	4915do
0900	0927		Czech Rep, Radio Prague Intl	21745va	
0900	0930		Australia, Radio	9580as 9590as	15240as
0900	0930	as	Australia, Radio	15415va	
0900	0930		Guam, TWR/KTWR	11840as	
0900	1000		Anguilla, Caribbean Beacon	6090am	
0900	1000		Australia, ABC NT Alice Springs	4835irr	2310do
0900	1000		Australia, ABC NT Katherine	2485do	
0900	1000		Australia, ABC NT Tennant Creek		2325do
0900	1000		Australia, Voice Intl	11955as	
0900	1000	DRM	Austria, Asian Sound	11815eu	
0900	1000		Canada, CFRX Toronto ON	6070do	
0900	1000		Canada, CFVP Calgary AB	6030do	
0900	1000		Canada, CKZN St John's NF	6160do	
0900	1000		Canada, CKZU Vancouver BC	6160do	
0900	1000		China, China Broadcast Network	17490eu 17690pa	15210pa
			17490eu 17690pa		
0900	1000		Costa Rica, University Network	5030va 7375va 9725va	6150va 11870va 13750va
0900	1000		Eqt Guinea, Radio Africa	15190af	
0900	1000		Germany, Deutsche Welle	6140eu	
0900	1000		Guyana, Voice of	3291do	5950do
0900	1000	vl/as	Italy, IRRS	13840va	15725af
0900	1000		Malaysia, Radio	7295as	
0900	1000		Malaysia, Voice of	15295as	
0900	1000	vl	Namibia, Namibian BC Corp	6060do 6175do	3270do 3290do
0900	1000	DRM	Netherlands, Radio	7240eu	
0900	1000		New Zealand, Radio NZ Intl	9885pa	
0900	1000		Nigeria, Radio/Ibadan	6050do	
0900	1000		Nigeria, Radio/Kaduna	4770do	6090do
0900	1000		Nigeria, Radio/Lagos	3326do	4990do
0900	1000	vl	Pakistan, Radio	15100eu	17835eu
0900	1000		Papua New Guinea, Catholic Radio	4960do	
0900	1000		Papua New Guinea, NBC	4890do	
0900	1000	vl	Papua New Guinea, Wantok Radio Light	7120va	
0900	1000	vl	Rwanda, Radio	6055do	
0900	1000	irreg/ vl	Sierra Leone, Radio UNAMSIL	6137do	
0900	1000		Sierra Leone, SLBS 3316do		
0900	1000		Singapore, Mediacorp Radio	6150do	
0900	1000	vl	Solomon Islands, SIBC	5020do	9545do
0900	1000	DRM	Sri Lanka, Deutsche Welle	21675as	
0900	1000		UK, BBC World Service	6190af	6195va
			9605as 9740as 15310as 15360as	15400af 15485af	
			15575me 17640eu 17760as 17790as	21470af 21660as	
			17830af 17885af 21470af 21660as		
			USA, AFRTS	4319usb 5446usb 5765usb	
			7590usb 7812usb 12133usb 12579usb		
			12133usb 12579usb 13362usb 13855usb		
0900	1000		USA, KAIJ Dallas TX	5755na	
0900	1000		USA, KTBN Salt Lake City UT	7505na	
0900	1000		USA, KWHR Naalehu HI	9510as	9930as
0900	1000		USA, Voice of America	9520va	15205va
			17745va		
0900	1000		USA, WBOH Newport NC	5920am	
0900	1000		USA, WEWN Birmingham AL	5850na	7425na
0900	1000		USA, WHRI Noblesville IN	7520am	9495am
0900	1000		USA, WJIE Louisville KY	7490am	13595am
0900	1000		USA, WRMI Miami FL	9955am	
0900	1000		USA, WTJC Newport NC	9370na	
0900	1000		USA, WWCR Nashville TN	3210na	5070na
			5765na 5935na		
0900	1000	s	USA, WWRB Manchester TN	9320na	
0900	1000		USA, WWRB Manchester TN	3185na	5085na
0900	1000		USA, WYFR Okeechobee FL	5985af	6855af
			9755af		
0900	1000	vl	Vanuatu, Radio	4960do	
0900	1000		Zambia, Christian Voice	9555af	
0905	1000	vl/s	Greece, Voice of	9420eu 15650eu 21530eu	11645eu 15630eu
0930	0945		Israel, Kol Israel	15640va	
0930	1000		Australia, Radio	9580as	9590as 15240as
			15415pa		
0930	1000	s	UAE, Radio UNMEE	21460af	
0930	1000		Vatican City, Vatican Radio	5885eu	

1000 UTC - 5AM EST / 4AM CST / 2AM PST

1000	1030		Australia, Voice Intl	13685as	
1000	1030		Guam, AWR/KSDA	11930as	
1000	1030		Mongolia, Voice of	12085as	
1000	1057		Netherlands, Radio	7315va 12065va	9790va
			12065va 13820va		
1000	1059		New Zealand, Radio NZ Intl	9885pa	
1000	1100		Anguilla, Caribbean Beacon	11775am	
1000	1100		Australia, ABC NT Alice Springs	4835irr	2310do
1000	1100		Australia, ABC NT Katherine	2485do	
1000	1100		Australia, ABC NT Tennant Creek		2325do
1000	1100		Australia, HCJB	15425as	
1000	1100		Australia, Radio	9580as 9590as	15240as

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1000	1100	DRM	15415pa			
1000	1100		Austria, Asian Sound	11815eu		
1000	1100		Canada, CFRX Toronto ON	6070do		
1000	1100		Canada, CFVP Calgary AB	6030do		
1000	1100		Canada, CKZN St John's NF	6160do		
1000	1100		Canada, CKZU Vancouver BC	6160do		
1000	1100		China, China Broadcast Network	17490eu	17690pa	15210pa
1000	1100		Costa Rica, University Network	5030va	6150va	
1000	1100		7375va	9725va	11870va	13750va
1000	1100	s	Germany, Bible Voice Broadcasting		5910eu	
1000	1100	DRM	Germany, Deutsche Welle	6140eu		
1000	1100		Guyana, Voice of	3291do	5950do	
1000	1100		India, All India Radio	13695as	15020as	
1000	1100		15410as	17800as	17895as	
1000	1100	vl/as	Italy, IRRS	13840va	15725al	
1000	1100		Japan, Radio	6120na	9695as	11730as
1000	1100		17585eu	17720va	21755pa	
1000	1100		Malaysia, Radio	7295as		
1000	1100		Malaysia, Voice of	15295as		
1000	1100	DRM	Netherlands, Radio		7240eu	
1000	1100		Nigeria, Voice of	15120af		
1000	1100		North Korea, Voice of		3560as	11710as
1000	1100		11735as	13650ca	15180ca	
1000	1100		Papua New Guinea, Catholic Radio			4960do
1000	1100		Papua New Guinea, NBC		4890do	
1000	1100	vl	Papua New Guinea, Wantok Radio Light			7120va
1000	1100		Singapore, Mediacorp Radio		6150do	
1000	1100	vl	Solomon Islands, SIBC		5020do	9545do
1000	1100		South Africa, Channel Africa		11825af	
1000	1100	DRM	UK, BBC World Service		7320eu	
1000	1100		UK, BBC World Service		6190af	6195va
1000	1100		9605as	11760me	11940af	15310as
1000	1100		15360as	15485af	15575me	17640eu
1000	1100		17640me	17760as	17790as	17885af
1000	1100		21470af	21660as		
1000	1100	as	UK, BBC World Service		15400af	17830af
1000	1100		USA, AFRTS		4319usb	5446usb
1000	1100		7590usb	7812usb	12133usb	12579usb
1000	1100		12133usb	12579usb	13362usb	13855usb
1000	1100		USA, KAIJ Dallas TX		5755na	
1000	1100		USA, KNLS Anchor Point AK		9795as	
1000	1100		USA, KTNB Salt Lake City UT		7505na	
1000	1100		USA, KWHR Naalehu HI		9930as	
1000	1100		USA, Voice of America		9705va	15205va
1000	1100		17745va			
1000	1100		USA, WBOH Newport NC		5920am	
1000	1100		USA, WEWN Birmingham AL		5745na	7425na
1000	1100		USA, WHRI Noblesville IN		7520am	9495am
1000	1100		USA, WIN8 Red Lion PA		9320am	
1000	1100		USA, WJIE Louisville KY		7490am	
1000	1100		USA, WRMI Miami FL		9955am	
1000	1100		USA, WTJC Newport NC		9370na	
1000	1100		USA, WWCR Nashville TN		5070na	5765na
1000	1100		5935na	15825na		
1000	1100	s	USA, WWRB Manchester TN		9320na	
1000	1100		USA, WWRB Manchester TN		3185na	5085na
1000	1100		USA, WYFR Okeechobee FL		5950na	5985na
1000	1100		6855na	9755na		
1000	1100		Zambia, Christian Voice		9555af	
1030	1045	mtwhf	Ethiopia, Radio		5990af	9704af
1030	1057		Czech Rep, Radio Prague Intl		9880eu	11615eu
1030	1058		Vietnam, Voice of		7285as	
1030	1100		Iran, Voice of the Islamic Rep		15660as	17660as

1100 UTC - 6AM EST / 5AM CST / 3AM PST

1100	1104	vl	Pakistan, Radio	15100eu	15190eu	17835eu
1100	1127		Iran, Voice of the Islamic Rep		15660as	17660as
1100	1128		Vietnam, Voice of		9840as	7220as
1100	1130		Australia, Radio		5995as	6020as
1100	1130		9560as	9580as	9590as	12080as
1100	1130		15240pa			
1100	1130		UK, BBC World Service		6190af	11940af
1100	1130		15400af	15485af	17830af	17885af
1100	1130		21470af			
1100	1157		Netherlands, Radio		11675na	
1100	1159	a	Germany, Universal Life		6055me	
1100	1200		Anguilla, Caribbean Beacon		11775am	
1100	1200		Australia, ABC NT Alice Springs		4835irr	2310do
1100	1200		Australia, ABC NT Katherine		2485do	
1100	1200		Australia, ABC NT Tennant Creek			2325do
1100	1200		Australia, HCJB		15425as	
1100	1200		Australia, Voice Intl		13685as	
1100	1200	DRM	Austria, Asian Sound		11815eu	
1100	1200	as	Canada, CBC NQ SW Service		9625na	
1100	1200		Canada, CFRX Toronto ON		6070do	
1100	1200		Canada, CFVP Calgary AB		6030do	
1100	1200		Canada, CKZN St John's NF		6160do	
1100	1200		Canada, CKZU Vancouver BC		6160do	
1100	1200		China, China Broadcast Network			11750na
1100	1200		13650eu	17490eu		
1100	1200		Costa Rica, University Network		5030va	6150va
1100	1200		7375va	9725va	11870va	13750va

1100	1200		Ecuador, HCJB	12005am	21455am	
1100	1200	DRM	Germany, Deutsche Welle		6140eu	
1100	1200		Germany, Overcomer Ministries			6110eu
1100	1200		Italy, IRRS		13840va	15725al
1100	1200	vl/as	Italy, IRRS		13840va	15725al
1100	1200	vl	Japan, Radio		6120na	9695as
1100	1200		Malaysia, Radio		7295as	
1100	1200		Malaysia, Voice of		15295as	
1100	1200		New Zealand, Radio NZ Intl			9520pa
1100	1200		Nigeria, Voice of		15120af	
1100	1200		Papua New Guinea, Catholic Radio			4960do
1100	1200		Papua New Guinea, NBC		4890do	
1100	1200	vl	Papua New Guinea, Wantok Radio Light			7120va
1100	1200		Singapore, Radio Singapore Intl			6080as
1100	1200		6150as			
1100	1200		South Africa, Channel Africa		11825af	
1100	1200		Taiwan, Radio Taiwan Intl		7445as	
1100	1200	DRM	UK, BBC World Service		7320eu	
1100	1200		UK, BBC World Service		6195as	9740as
1100	1200		11760me	11865am	15310as	15575me
1100	1200		17640va	17760as	17790as	
1100	1200		Ukraine, Radio Ukraine Intl		15675eu	
1100	1200		USA, AFRTS		4319usb	5446usb
1100	1200		7590usb	7812usb	12133usb	12579usb
1100	1200		12133usb	12579usb	13362usb	13855usb
1100	1200		USA, KAIJ Dallas TX		5755na	
1100	1200		USA, KTNB Salt Lake City UT		7505na	
1100	1200		USA, KWHR Naalehu HI		11555as	
1100	1200		USA, Voice of America		9705va	15205va
1100	1200		17745va			
1100	1200		USA, WBOH Newport NC		5920am	
1100	1200		USA, WEWN Birmingham AL		5745na	11530na
1100	1200		13615na			
1100	1200		USA, WHRI Noblesville IN		7520am	9495am
1100	1200		USA, WIN8 Red Lion PA		9320am	
1100	1200		USA, WJIE Louisville KY		7490am	
1100	1200		USA, WRMI Miami FL		9955am	
1100	1200		USA, WTJC Newport NC		9370na	
1100	1200		USA, WWCR Nashville TN		5070na	5765na
1100	1200		5935na	15825na		
1100	1200	s	USA, WWRB Manchester TN		9320na	
1100	1200		USA, WWRB Manchester TN		3185na	5085na
1100	1200		USA, WYFR Okeechobee FL		5950va	5985va
1100	1200		7355va	9550va	9625va	9755va
1100	1200		Zambia, Christian Voice		9555af	
1125	1200		Vatican City, Vatican Radio		15595me	
1130	1159	a	Germany, Universal Life		6055me	
1130	1200		Australia, Radio		5995as	6020as
1130	1200		9560as	9580as	9590as	12080as
1130	1200		Bulgaria, Radio		11700eu	15700eu
1130	1200	t	UAE, Radio UNMEE		21550af	
1130	1200		UK, BBC World Service		6190af	11940af
1130	1200		15485af	17830af	17885af	21470af
1130	1200		Vatican City, Vatican Radio		17515me	
1145	1200	vl	Libya, Voice of Africa		17695af	21675af
1145	1200		21695af			

1200 UTC - 7AM EST / 6AM CST / 4AM PST

1200	1215	vl	Cambodia, National Radio		11940as	
1200	1230		France, Radio France Intl		17815af	21620af
1200	1230		Malaysia, Voice of		15295as	
1200	1230		UAE, AWR Africa		15135as	
1200	1259		Canada, Radio Canada Intl			9660as
1200	1259		New Zealand, Radio NZ Intl			9520pa
1200	1259		Poland, Radio Polonia			9525eu
1200	1300		Anguilla, Caribbean Beacon		11775am	
1200	1300		Australia, ABC NT Alice Springs			2310do
1200	1300		4835irr			
1200	1300		Australia, ABC NT Katherine		2485do	
1200	1300		Australia, ABC NT Tennant Creek			2325do
1200	1300		Australia, Radio		5995as	6020as
1200	1300		9560as	9580as	9590as	12080as
1200	1300		Australia, Voice Intl		13685as	
1200	1300	DRM	Austria, Classic Gold		11815eu	
1200	1300	as	Canada, CBC NQ SW Service		9625na	
1200	1300		Canada, CFRX Toronto ON		6070do	
1200	1300		Canada, CFVP Calgary AB		6030do	
1200	1300		Canada, CKZN St John's NF		6160do	
1200	1300		Canada, CKZU Vancouver BC		6160do	
1200	1300	mtwhf	Canada, Radio Canada Intl		9515am	13655am
1200	1300		17800am			
1200	1300		China, China Broadcast Network			9730as
1200	1300		9760pa	11760pa	11980as	13650eu
1200	1300		13790eu	17490eu		
1200	1300		Costa Rica, University Network		9725va	11870va
1200	1300		13750va			
1200	1300		Ecuador, HCJB	12005am	21455am	
1200	1300	vl/a	Italy, IRRS		15725va	
1200	1300		Malaysia, Radio		7295as	
1200	1300	DRM	Netherlands, Radio		7240na	
1200	1300		Nigeria, Voice of		15120af	
1200	1300		Papua New Guinea, Catholic Radio			4960do
1200	1300		Papua New Guinea, NBC		4890do	
1200	1300	vl	Papua New Guinea, Wantok Radio Light			7120vo

1200	1300		Singapore, Radia Singapore Intl	6150as	6080as
1200	1300		South Korea, Radia Korea Intl	9650va	
1200	1300		Taiwan, Radia Taiwan Intl	7130as	
1200	1300	DRM	UK, BBC World Service	7320eu	
1200	1300		UK, BBC World Service	6190af	9605am
			11760me	11865am	11940af
			15485af	15565eu	15575me
			17640me	17830me	17885af
1200	1300		USA, AFRTS	4319usb	5446usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13855usb
1200	1300		USA, KAIJ Dallas TX	5755na	
1200	1300		USA, KNLS Anchor Point AK	9615as	
1200	1300		USA, KTBN Salt Lake City UT	7505na	
1200	1300		USA, KWHR Naalehu HI	11555as	
1200	1300		USA, Voice of America	6160va	9645va
			9760va	15240va	
1200	1300		USA, WBCQ Kennebunk ME	17495na	
1200	1300		USA, WBOH Newport NC	5920am	
1200	1300		USA, WEWN Birmingham AL	5745na	11530na
			13615na		
1200	1300		USA, WHRA Greenbush ME	15310na	
1200	1300	as	USA, WHRI Nablesville IN	9840am	11785am
1200	1300		USA, WINB Red Lion PA	9320am	
1200	1300		USA, WJIE Louisville KY	7490am	
1200	1300		USA, WRMI Miami FL	7385am	
1200	1300		USA, WTJC Newport NC	9370na	
1200	1300		USA, WWCR Nashville TN	7465na	13845na
			9985na	15825na	
1200	1300	s	USA, WWRB Manchester TN	9320na	
1200	1300		USA, WYFR Okeechobee FL	5950na	5985na
			17505na	17750na	
1200	1300		Uzbekistan, Radio Tashkent	7285as	11905as
			15295as	17775as	
1200	1300		Zambia, Christian Voice	9555af	
1205	1220	m	Austria, Radio Austria Intl	6155va	13730va
			17715va		
1215	1230	twhf	Austria, Radio Austria Intl	17715va	
1215	1300		Egypt, Radio Cairo	17835as	
1230	1245	mtwhf	Guam, TWR/KTWR	11750as	
1230	1258		Vietnam, Voice of	9840as	12020as
1230	1300		Bangladesh, Bangla Betar	7185as	
1230	1300		Sweden, Radio	13580va	15735va
1230	1300		Thailand, Radio	9600va	
1230	1300		Turkey, Voice of	15225eu	15535va
1235	1300	as	Austria, Radio Austria Intl	17715va	
1245	1300	twhf	Austria, Radio Austria Intl	6155eu	13730eu
			17715va		

1300 UTC - 8AM EST / 7AM CST / 5AM PST

1300	1327		Czech Rep, Radio Prague Intl	13580eu	21745af
1300	1329		Canada, Radio Canada Intl	9660as	15170as
1300	1330	DRM	Canada, Radio Canada Intl	7240eu	
1300	1330		Ecuador, HCJB	12005am	21455am
1300	1330		Egypt, Radio Cairo	17835as	
1300	1330		Uzbekistan, Radio Tashkent	11905as	
1300	1335		Turkey, Voice of	15225eu	15535va
1300	1356		Romania, Radio Romania Intl	11830eu	15105eu
1300	1357	DRM	China, China Broadcast Network	11810va	7250va
			17800am		
1300	1400		Anguilla, Caribbean Beacon	11775am	
1300	1400		Australia, Radio	5995as	6020as
			9580pa	9590pa	9560pa
1300	1400		Australia, Voice Intl	13685as	
1300	1400	DRM	Austria, Premiur	11815eu	
1300	1400	as	Canada, CBC NQ SW Service	9625na	
1300	1400		Canada, CFRX Toronto ON	6070do	
1300	1400		Canada, CFVP Calgary AB	6030do	
1300	1400		Canada, CKZN St John's NF	6160do	
1300	1400		Canada, CKZU Vancouver BC	6160do	
1300	1400	as	Canada, Radio Canada Intl	9515am	13655am
			17800am		
1300	1400		China, China Broadcast Network	9650am	
			11760pa	11900pa	11980as
			15260am	17490eu	17625ca
1300	1400		Costa Rica, University Network	9725va	11870va
			13750va		
1300	1400		Germany, Deutsche Welle	6140eu	
1300	1400	vl/a	Italy, IRRS	15725va	
1300	1400		Jordan, Radia	11690na	
1300	1400		Malaysia, Radio	7295as	
1300	1400	DRM	Netherlands, Radio	7240eu	
1300	1400		New Zealand, Radio NZ Intl	6095pa	
1300	1400		Nigeria, Voice of	15120af	
1300	1400		North Korea, Voice of	4405eu	9335eu
			11710na	13760na	15245eu
1300	1400		Papua New Guinea, Catholic Radio	4960do	
1300	1400		Papua New Guinea, NBC	4890do	
1300	1400	vl	Papua New Guinea, Wantok Radio Light	7120va	
1300	1400		Singapore, Radio Singapore Intl	6150as	6080as
1300	1400		South Korea, Radio Korea Intl	9570as	9770as
1300	1400	DRM	UK, BBC World Service	7320eu	

1300	1400		UK, BBC World Service	6190af	6195as
			9740as	11760me	11940af
			15310as	15420af	15485af
			15575me	17640va	17640as
			17830af	17885af	21470af
1300	1400		USA, AFRTS	4319usb	5446usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13855usb
1300	1400		USA, KAIJ Dallas TX	5755na	
1300	1400		USA, KTBN Salt Lake City UT	7505na	
1300	1400		USA, KWHR Naalehu HI	11555as	
1300	1400		USA, WBCQ Kennebunk ME	17495na	
1300	1400		USA, WBOH Newport NC	5920am	
1300	1400		USA, WEWN Birmingham AL	5745na	11530na
			13615na		
1300	1400		USA, WHRA Greenbush ME	15310na	
1300	1400	mtwhf	USA, WHRI Nablesville IN	9840am	11785am
1300	1400		USA, WINB Red Lion PA	9320am	
1300	1400		USA, WJIE Louisville KY	7490am	
1300	1400		USA, WRMI Miami FL	7385am	
1300	1400		USA, WTJC Newport NC	9370na	
1300	1400		USA, WWCR Nashville TN	7465na	13845na
			9985na	15825na	
1300	1400		USA, WYFR Okeechobee FL	11910va	11830va
			11910va	17750va	
1300	1400		Zambia, Christian Voice	9555af	
1330	1400	s	Australia, HCJB	15405as	
1330	1400	irreg	Cuba, Radio Havana	13680va	9550va
			13680va		12000va
1330	1400		Guam, AWR/KSDA	11980as	
1330	1400	mwhta	Guam, AWR/KSDA	15275as	
1330	1400		India, All India Radio	13710as	9690as
			13710as		11620as
1330	1400		Laos, National Radio	7145as	
1330	1400		Sweden, Radio	15240na	15735va
1330	1400		Uzbekistan, Radio Tashkent	7285as	15295as
			17775as		

1400 UTC - 9AM EST / 8AM CST / 6AM PST

1400	1415		Russia, FEBA	9500as	
1400	1430		Australia, HCJB	15405as	
1400	1430		Australia, Radio	5995as	6080as
			9590as	9625pa	7240as
1400	1430	mtwhf	Germany, Deutsche Welle	15725na	
1400	1430		Oman, Radio Oman	15140as	
1400	1430		Thailand, Radio	9830va	
1400	1430	DRM/f	UK, Radio France Intl	9770eu	
1400	1430	DRM/a	UK, Radio NZ Intl	9770eu	
1400	1459	as	Canada, Radio Canada Intl	17800am	9515am
			17800am		13655am
1400	1500		Anguilla, Caribbean Beacon	11775am	
1400	1500		Australia, Voice Intl	15205as	
1400	1500	as	Canada, CBC NQ SW Service	9625na	
1400	1500		Canada, CFRX Toronto ON	6070do	
1400	1500		Canada, CFVP Calgary AB	6030do	
1400	1500		Canada, CKZN St John's NF	6160do	
1400	1500		Canada, CKZU Vancouver BC	6160do	
1400	1500		China, China Broadcast Network	11675as	9590as
			13740na	13790na	13760af
1400	1500	DRM	China, China Broadcast Network	9610va	
1400	1500		Costa Rica, University Network	9725va	11870va
			13750va		
1400	1500		France, Radio France Intl	7180va	15615va
1400	1500		Germany, Deutsche Welle	6140eu	
1400	1500		Germany, Overcomer Ministries	13810me	6110eu
1400	1500	vl/a	Greece, Voice of	9375eu	9420eu
			12105eu	15630eu	15650eu
1400	1500		India, All India Radio	13710as	9690as
			13710as		11620as
1400	1500	vl/a	Italy, IRRS	15725va	
1400	1500		Japan, Radio	7200as	11730as
1400	1500		Jordan, Radio	11690na	11840pa
1400	1500		Malaysia, Radio	7295as	
1400	1500		Netherlands, Radio	7240eu	9345va
			11835va		9890va
1400	1500		New Zealand, Radio NZ Intl	6095pa	
1400	1500		Nigeria, Voice of	15120af	
1400	1500	vl	Papua New Guinea, Wantok Radio Light	7120va	
1400	1500	DRM	Russia, Voice of	9480eu	
1400	1500		Russia, Voice of	6205as	7390as
			11755as	15605as	17645as
1400	1500		Singapore, Mediacorp Radio	6150do	
1400	1500		South Africa, Channel Africa	11825af	
1400	1500		Taiwan, Radio Taiwan Intl	7320eu	15265as
1400	1500	DRM	UK, BBC World Service	7320eu	
1400	1500		UK, BBC World Service	6190af	6195as
			7105as	9740as	11760me
			15310as	15485af	15565va
			17790os	17830af	21470af
1400	1500		USA, AFRTS	4319usb	5446usb
			7590usb	7812usb	12133usb
					12579usb

1400	1500	12133usb	12579usb	13362usb	13855usb		
1400	1500	USA, KAIJ Dallas TX		13815na			
1400	1500	USA, KJES Vado NM		11715na			
1400	1500	USA, KNLS Anchar Point AK		9555as			
1400	1500	USA, KTBN Salt Lake City UT		7505na	15590na		
1400	1500	USA, KWHR Naalehu HI		11555as			
1400	1500	USA, Voice of America		6160va	7125va		
		9760va	15185va				
1400	1500	USA, WBCQ Kennebunk ME		17495na			
1400	1500	USA, WBOH Newpart NC		5920am			
1400	1500	USA, WEWN Birmingham AL		9955na	11530na		
		15745na					
1400	1500	USA, WHRA Greenbush ME		15310na			
1400	1500	USA, WHRI Nablesville IN		9840am	15285am		
1400	1500	USA, WINB Red Lian PA		13570am			
1400	1500	USA, WJIE Louisville KY		7490am			
1400	1500	USA, WRMI Miami FL		7385am			
1400	1500	USA, WTJC Newpart NC		9370na			
1400	1500	USA, WWCR Nashville TN		9985na	12160na		
		13845na	15825na				
1400	1500	USA, WYFR Okeechabee FL		11830va	11910va		
		13695va	17750va				
1400	1500	Zambia, Christian Voice		9555af			
1415	1430	Nepal, Radio	3230as	5005as	6100as		
		7165as					
1430	1500	Australia, HCJB	15390as				
1430	1500	Australia, Radio	5995as	6080as	7240as		
		9475as	9590pa	9625pa			
1430	1500	a	Germany, Pan American BC	15650as			
1430	1500	DRM	UK, Radio Australia	9770eu			
1430	1500	DRM/f	UK, Radio Korea Intl	9770eu			

1500 UTC - 10AM EST / 9AM CST / 7AM PST

1500	1515	Russia, FEBA	7320as				
1500	1528	Vietnam, Voice of	9550va	9840va	12020va		
		13860va					
1500	1530	Mangolia, Voice of	12015eu				
1500	1530	UK, BBC World Service		6190af	6195as		
		7105as	11690af	11860af	11940af		
		12095af	15310as	15400af	15420af		
		15485af	17790as	17790as	21470af		
		21490af	21660af				
1500	1555	South Africa, Channel Africa		17770af			
1500	1557	Canada, Radio Canada Intl		11675as	15360as		
		17720as					
1500	1557	Netherlands, Radio		9345va	9890va		
		11835va					
1500	1559	as	Canada, Radio Canada Intl	9515am	13655am		
			17800am				
1500	1600	Anguilla, Caribbean Beacon		11775am			
1500	1600	Australia, Radio	5995as	6080as	7240as		
		9475as	9590pa	9625pa			
1500	1600	Australia, Voice Intl		15205as			
1500	1600	as	Canada, CBC NQ SW Service	9625na			
1500	1600	Canada, CFRX Toronto ON		6070do			
1500	1600	Canada, CFVP Calgary AB		6030do			
1500	1600	Canada, CKZN St John's NF		6160do			
1500	1600	Canada, CKZU Vancouver BC		6160do			
1500	1600	China, China Broadcast Network			6100af		
		7160as	11775as	11965eu	13640eu		
		13685af	13740na	17490eu	17630af		
1500	1600	DRM	China, China Broadcast Network		9610va		
1500	1600	Costa Rica, University Network	9725va	11870va			
		13750va					
1500	1600	a	Germany, Bible Voice Broadcasting		17510as		
1500	1600	Germany, Deutsche Welle		6140eu			
1500	1600	Germany, Overcomer Ministries		6110eu			
		13810me					
1500	1600	vl/ as	Greece, Voice of	9375va	9420va	9775va	
			12105va	15630va			
1500	1600	Guam, TWR/KTWR	12105as				
1500	1600	Japan, Radio	6190as	7200as	9505va		
		11730as					
1500	1600	Jordan, Radio	11690na				
1500	1600	Malaysia, Radio	7295as				
1500	1600	New Zealand, Radio NZ Intl		6095pa			
1500	1600	North Korea, Voice of		3560af	4405eu		
		9335eu	11710na	13760va	15245va		
1500	1600	vl	Papua New Guinea, Wantok Radio Light		7120va		
1500	1600	Russia, Voice of	4965me	4975me	7315af		
		7325me	9810eu	11980eu	11985me		
1500	1600	Singapore, Mediacorp Radio		6150do			
1500	1600	South Africa, Channel Africa		11825af			
1500	1600	UK, BBC World Service		15565eu	15575me		
1500	1600	UK, Radio Taiwan Intl		9770eu			
1500	1600	DRM/f	UK, Sudan Radio Service		15530va		
1500	1600	vl/ mtwhf	USA, AFRTS	4319usb	5446usb	5765usb	
			7590usb	7812usb	12133usb	12579usb	
			12133usb	12579usb	13362usb	13855usb	
1500	1600	USA, KAIJ Dallas TX		13815na			
1500	1600	USA, KJES Vado NM		11715na			
1500	1600	USA, KTBN Salt Lake City UT		15590na			
1500	1600	USA, KWHR Naalehu HI		11555as			
1500	1600	USA, Voice of America		7125va	9825va		

		9850af	15195va	15445va	15580af		
		17715va					
1500	1600	mtwhf	USA, Voice of America	9645va	13690va		
			15105va				
1500	1600	USA, WBCQ Kennebunk ME		17495na			
1500	1600	USA, WBOH Newpart NC		5920am			
1500	1600	USA, WEWN Birmingham AL		9955na	11530na		
			15745na				
1500	1600	USA, WHRA Greenbush ME		17640na			
1500	1600	USA, WHRI Nablesville IN		12020am	15285am		
1500	1600	as	USA, WINB Red Lian PA	9740am			
1500	1600	mtwhf	USA, WINB Red Lian PA	13570am			
1500	1600	USA, WJIE Louisville KY		7490am			
1500	1600	USA, WRMI Miami FL		7385am			
1500	1600	USA, WTJC Newpart NC		9370na			
1500	1600	USA, WWCR Nashville TN		9985na	12160na		
			13845na	15825na			
1500	1600	USA, WYFR Okeechabee FL		11830va	11910va		
			15520va	15770va			
1500	1600	Zambia, Christian Voice		9555af			
1505	1520	m	Austria, Radio Austria Intl	13775na			
1505	1530	as	Austria, Radio Austria Intl	13775na			
1515	1530	twhf	Austria, Radio Austria Intl	13775na			
1515	1600		Russia, FEBA	7320as			
1530	1600	mtwhf	Germany, Bible Voice Broadcasting		17510as		
1530	1600		Iran, Voice of the Islamic Rep	9635as	11650as		
1530	1600	f	Russia, FEBA	9850as			
1530	1600		Russia, TWR	7535eu	7560as		
1530	1600	mtwhf	South Korea, Radio Korea Intl	15725na			
1530	1600		UAE, AWR Africa	15225as			
1530	1600		UK, BBC World Service	6190af	11940af		
			12095af	15400af	15485af	21470af	
			21660af				
1530	1600		USA, Voice of America	6160va	9590va		
			9760va	9845va	12040va	15550va	
1530	1600		Vatican City, Vatican Radio	12065as	13765as		
			15235as				
1535	1300	as	Austria, Radio Austria Intl	13775na			
1540	1600	mtwhf	Germany, Bible Voice Broadcasting		13590me		
1545	1600	m	Austria, Radio Austria Intl	13775na			
1545	1600	twhf	Austria, Radio Austria Intl	13775na			
1545	1600	as	Germany, Bible Voice Broadcasting		13590me		

1600 UTC - 11AM EST / 10AM CST / 8AM PST

1600	1615	mtwhf	Germany, Bible Voice Broadcasting		13590me		
1600	1615		Pakistan, Radio	4790va	5027af	5080va	
			11570va	15100va			
1600	1627		Czech Rep, Radio Prague Intl		5930eu	17485af	
1600	1627		Iran, Voice of the Islamic Rep		9635as	11650as	
1600	1628		Vietnam, Voice of	7280va	9550va	9730va	
			11630va	13860va			
1600	1630	a	Germany, Pan American BC		13820me		
1600	1630		Guam, AWR/KSDA	11640as	11680as		
1600	1630		Guam, TWR/KTWR	12105as			
1600	1630		Hungary, Radio Budapest		6025eu	9565eu	
1600	1630		Jordan, Radio	11690na			
1600	1630		Myanmar, Radio	9730do			
1600	1645		Russia, FEBA	9850as			
1600	1650		New Zealand, Radio NZ Intl		6095pa		
1600	1700		Anguilla, Caribbean Beacon		11775am		
1600	1700		Australia, Radio	5995as	6080as	7240as	
			9475as	9710as			
1600	1700		Australia, Voice Intl		11840as	13635as	
			15205as				
1600	1700	DRM/s	Austria, CVC International		9705eu		
1600	1700	a	Canada, CBC NQ SW Service		9625na		
1600	1700		Canada, CFRX Toronto ON		6070do		
1600	1700		Canada, CFVP Calgary AB		6030do		
1600	1700		Canada, CKZN St John's NF		6160do		
1600	1700		Canada, CKZU Vancouver BC		6160do		
1600	1700		China, China Broadcast Network			6100af	
			9570af	11900af	11940eu	11965eu	
			13760eu	17490eu			
1600	1700	DRM	China, China Broadcast Network			17510va	
1600	1700		Costa Rica, University Network		11870va	13750va	
1600	1700		Ethiopia, Radio	5990af	7110af	7165af	
			9560af	9704af	11800af		
1600	1700		France, Radio France Intl		7170af	15160af	
			15605af	17605af	17850af		
1600	1700	as	Germany, Bible Voice Broadcasting			13590me	
1600	1700		Germany, Deutsche Welle		6140as	7225as	
			17595as				
1600	1700		Germany, Overcomer Ministries			9845eu	
1600	1700	vl	Greece, Voice of	7475va	9420va	12105va	
			15630va	17705va			
1600	1700		Malaysia, Radio	7295as			
1600	1700		North Korea, Voice of		3560va	9990me	
			11545va				
1600	1700	vl	Papua New Guinea, Wantok Radio Light		7120va		
1600	1700		Russia, Voice of	6070va	9405as	11640as	
			11985af	12055va	12115va	15540va	
1600	1700		South Korea, Radio Korea Intl		5975va	9870va	
1600	1700		Taiwan, Radio Taiwan Intl		11815as		
1600	1700		UK, BBC World Service		3915as	5975as	

			6190af	6195as	7160as	9410eu	
			9510as	11940af	12095va	15105as	
			15310as	15400af	15420af	15485af	
			15565va	17790as	17820af	17830af	
			21470af	21490af	21660af		
1600	1700	DRM/f	UK, NHK/Radio Japan		9770eu		
1600	1700	vl/ mtwhf	UK, Sudan Radio Service		15530va		
1600	1700		UK, Voice Africa	13820af			
1600	1700		USA, AFRTS	4319usb	5446usb	5765usb	
				7590usb	7812usb	12133usb	12579usb
				12133usb	12579usb	13855usb	
1600	1700		USA, KAIJ Dallas TX		13815na		
1600	1700		USA, KJES Vado NM		11715na		
1600	1700		USA, KTBN Salt Lake City UT		15590na		
1600	1700		USA, KWHR Naalehu HI		11555as		
1600	1700		USA, Voice of America	4930af	6160va		
				7125va	9700va	9760va	9825va
				9850af	12080va	13600va	15195va
				15445va	15580af	17895va	
1600	1700		USA, WBCQ Kennebunk ME		9330na	17495na	
1600	1700		USA, WBOH Newport NC		5920am		
1600	1700		USA, WEWN Birmingham AL		11530va	13615va	
				15685va	15745va		
1600	1700		USA, WHRA Greenbush ME		17640na		
1600	1700		USA, WHRI Noblesville IN		12020am	15285am	
1600	1700	as	USA, WINB Red Lion PA		9740am		
1600	1700	mtwhf	USA, WINB Red Lion PA		13570as		
1600	1700		USA, WJIE Louisville KY		7490am		
1600	1700	mtwhfa	USA, WMLK Bethel PA		9265eu		
1600	1700		USA, WRMI Miami FL		7385am		
1600	1700		USA, WTJC Newport NC		9370na		
1600	1700		USA, WWCN Nashville TN		9985na	12160na	
				13845na	15825na		
1600	1700		USA, WWRB Manchester TN		9320na	12170na	
1600	1700	mtwhf	USA, WWRB Manchester TN		15250na		
1600	1700		USA, WYFR Okeechobee FL		6085va	11830va	
				11865va	13695va	15520va	17750va
				18980va	21455va	21525va	
1600	1700		Zambia, Christian Voice		4965af		
1615	1630		Vatican City, Vatican Radio		4005eu	5885eu	
				7250eu	9645me	15595me	
1615	1700	as	UK, BBC World Service		11690af		
1630	1645	h	Germany, Bible Voice Broadcasting			13590me	
1630	1700		Egypt, Radio Cairo	11880af			
1630	1700	t	Germany, Bible Voice Broadcasting			13590me	
1630	1700		Guam, AWR/KSDA	11975as			
1630	1700		Slovakia, Radio Slovakia Intl		5920eu	7345eu	
1651	1700		New Zealand, Radio NZ Intl		6095pa		

1700 UTC - 12PM EST / 11AM CST / 9AM PST

1700	1710	mtwh	Moldova, Radio PMR		5960eu		
1700	1720	f	Moldova, Radio PMR		5960eu		
1700	1727		Czech Rep, Radio Prague Intl		5930eu	17485af	
1700	1728		Vietnam, Voice of	9725eu			
1700	1730		France, Radio France Intl		15605af	17605af	
1700	1730	DRM	Netherlands, Radio		5955eu		
1700	1730		Swaziland, TWR	3200af			
1700	1745		UK, BBC World Service		3255af	6005af	
				6190af	9630af	12095af	15105af
				15400af	15420af	17820af	17830af
				21470af			
1700	1750		New Zealand, Radio NZ Intl		6095pa		
1700	1755		South Africa, Channel Africa		15325af		
1700	1759		Poland, Radio Polonia		5965eu	7285eu	
1700	1800		Anguilla, Caribbean Beacon		11775am		
1700	1800		Australia, Radio	5995as	6080as	9475as	
				9580as	9710as		
1700	1800		Australia, Voice Intl		11840as	13635as	
				15205as			
1700	1800	a	Canada, CBC NQ SW Service		9625na		
1700	1800		Canada, CFRX Toronto ON		6070do		
1700	1800		Canada, CFPV Calgary AB		6030do		
1700	1800		Canada, CKZN St John's NF		6160do		
1700	1800		Canada, CKZU Vancouver BC		6160do		
1700	1800		China, China Broadcast Network			9695eu	
				11940eu	13760eu		
1700	1800	DRM	China, China Broadcast Network			12080va	
1700	1800		Costa Rica, University Network	11870va		13750va	
1700	1800		Egypt, Radio Cairo	11880af			
1700	1800		Eq Guinea, Radio Africa		15190af		
1700	1800	wf	Germany, Bible Voice Broadcasting		13590me		
1700	1800	as	Germany, Bible Voice Broadcasting		9430me		
1700	1800	DRM	Germany, Deutsche Welle		6140eu		
1700	1800		Germany, Overcomer Ministries		9845eu		
1700	1800	vl	Greece, Voice of	7475va	9420va	12105va	
				15630va	17705va		
1700	1800		Japan, Radio	9535va	11970eu	15355af	
1700	1800		Malaysia, Radio	7295as			
1700	1800		Nigeria, Voice of	15120va			
1700	1800	vl	Papua New Guinea, Wantok Radio Light		7120va		
1700	1800		Russia, Voice of	7390eu	9405as	9820eu	
				9890eu	11510af	11985af	
1700	1800	as	Russia, Voice of	11675eu			
1700	1800		UK, BBC World Service		3915as	5975as	

			6195eu	7160as	9510as	12095va	
			15310as	15565va			
1700	1800	vl/ mtwhf	UK, Sudan Radio Service		11715va		
1700	1800		UK, Voice Africa	13820af			
1700	1800		USA, AFRTS	4319usb	5446usb	5765usb	
				7590usb	7812usb	12133usb	12579usb
				12133usb	12579usb	13362usb	13855usb
1700	1800		USA, KAIJ Dallas TX		13815na		
1700	1800		USA, KTBN Salt Lake City UT		15590na		
1700	1800		USA, KWHR Naalehu HI		11555as		
1700	1800		USA, Voice of America	6160va	7125va		
				9345va	9850af	15410af	15580af
1700	1800		USA, WBCQ Kennebunk ME		9330na	17495na	
1700	1800		USA, WBOH Newport NC		5920am		
1700	1800		USA, WEWN Birmingham AL		11530va	13615va	
				15685va	15745va		
1700	1800		USA, WHRA Greenbush ME		17640na		
1700	1800		USA, WHRI Noblesville IN		15285am	15785am	
1700	1800	as	USA, WINB Red Lion PA		9740am		
1700	1800	mtwhf	USA, WINB Red Lion PA		13570as		
1700	1800		USA, WJIE Louisville KY		7490am		
1700	1800	mtwhfa	USA, WMLK Bethel PA		9265eu		
1700	1800		USA, WRMI Miami FL		7385am		
1700	1800		USA, WTJC Newport NC		9370na		
1700	1800		USA, WWCN Nashville TN		9985na	12160na	
				13845na	15825na		
1700	1800	mtwhf	USA, WWRB Manchester TN		9320na	11920na	
1700	1800		USA, WWRB Manchester TN		12170na		
1700	1800		USA, WYFR Okeechobee FL		3955va	13695va	
				17795va	18980va	21455va	21680va
1700	1800		Zambia, Christian Voice		4965af		
1730	1745	vi	Israel, Kol Israel	9345va	11590va	15640va	
1730	1745	mtwhf	Libya, Voice of Africa		11860af		
			UK, United Nations Radio		7150af	15495me	
				17810af			
1730	1800		Bulgaria, Radio	9500eu	11500eu		
1730	1800		Guam, AWR/KSDA	9385me			
1730	1800		Liberia, ELWA	4760do			
1730	1800		Philippines, Radio Pilipinas		11720va	15190va	
				17720va			
1730	1800		Swaziland, TWR	3200af	9500af		
1730	1800		Sweden, Radio	6065va			
1730	1800	mtwhf	USA, Voice of America		4930af	11975af	
				17895af			
1730	1800		Vatican City, Vatican Radio		11625af	13765af	
				15570af			
1740	1800	as	USA, Voice of America		4930af	11975af	
				17895af			
1745	1800		India, All India Radio		7410eu	9445af	
				9950eu	11620eu	11935af	13605af
				15075af	15155af	17670af	
1745	1800	vl	Libya, Voice of Africa		15220af	15615af	
				15660af	17695af		
1745	1800		UK, BBC World Service		3255af	6190af	
				12095af	15105af	15400af	15420af
				17820af	17830af	21470af	
1751	1800		New Zealand, Radio NZ Intl		9630pa		

1800 UTC - 1PM EST / 12PM CST / 10AM PST

1800	1810		Zanzibar, Radio Tanzania		11735af		
1800	1815	a	Germany, Bible Voice Broadcasting			11965as	
1800	1828		Vietnam, Voice of	7280va	9730va		
1800	1830	w f	Austria, AWR Europe		15280af		
1800	1830	DRM/a	Canada, Voice of NASB		11900na		
1800	1830		Egypt, Radio Cairo	11880af			
1800	1830	as	Germany, Bible Voice Broadcasting		6015eu		
1800	1830	s	Germany, Universal Life		15675af		
1800	1830		South Africa, AWR Africa		3215af	3345af	
1800	1830		Swaziland, TWR	3200af			
1800	1830		UK, BBC World Service		3255af	5975as	
				6190af	9510as	12095va	15400af
				15420af	17830af	21470af	
1800	1850		New Zealand, Radio NZ Intl		9630pa		
1800	1856		Romania, Radio Romania Intl		9635eu	11830eu	
1800	1857		Netherlands, Radio		6020af	9895af	
				11655af			
1800	1859		Canada, Radio Canada Intl		9530af	9780af	
				13730af	15255af	15420af	
1800	1900		Anguilla, Caribbean Beacon		11775am		
1800	1900	mtwhf	Argentina, RAE	9690eu	15345eu		
1800	1900		Australia, Radio	6080as	7240as	9475as	
				9580as	9710as		
1800	1900		Australia, Voice Intl		11685as		
1800	1900		Canada, CFRX Toronto ON		6070do		
1800	1900		Canada, CFPV Calgary AB		6030do		
1800	1900		Canada, CKZN St John's NF		6160do		
1800	1900		Canada, CKZU Vancouver BC		6160do		
1800	1900		China, China Broadcast Network			9695eu	
				11940eu	13760eu		
1800	1900	DRM	China, China Broadcast Network			12080va	
1800	1900		Costa Rica, University Network	11870va		13750va	
1800	1900		Eq Guinea, Radio Africa		15190af		

1800	1900	a	Germany, Bible Voice Broadcasting	9430me	
1800	1900		Germany, Overcomer Ministries	13810me	
1800	1900		India, All India Radio	7410eu	9445af
			9950eu	11620eu	11935af
			15075af	15155af	13605af
			17670af		
1800	1900		Liberia, ELWA	4760do	
1800	1900		Malaysia, Radio	7295as	
1800	1900		Nigeria, Voice of	15120va	
1800	1900		North Korea, Voice of	4405eu	13760eu
			15245eu		
1800	1900	vl	Papua New Guinea, Wantok Radio Light	7120va	
1800	1900		Philippines, Radio Pilipinas	11720va	15190va
			17720va		
1800	1900		Russia, Voice of	9480eu	9745af
			11510af		9890eu
1800	1900		Taiwan, Radio Taiwan Intl	3965eu	
1800	1900		UK, BBC World Service	6195eu	9410eu
			12095me	15310me	
1800	1900		USA, AFRTS	4319usb	5446usb
			7590usb	7812usb	5765usb
			12133usb	12133usb	12579usb
			12133usb	12579usb	13362usb
			13815no	13815no	13855usb
1800	1900		USA, KAIJ Dallas TX	13815no	
1800	1900		USA, KTBN Salt Lake City UT	15590na	
1800	1900		USA, Voice of America	4930af	9850of
			11975of	15410of	17895af
1800	1900		USA, WBCQ Kennebunk ME	7415no	9330no
			17495no		
1800	1900		USA, WBOH Newport NC	5920am	
1800	1900		USA, WEWN Birmingham AL	11530va	13615va
			15685va	15745va	
1800	1900		USA, WHRA Greenbush ME	17640na	
1800	1900		USA, WHRI Noblesville IN	15285am	15785om
1800	1900	as	USA, WINB Red Lion PA	9740am	
1800	1900	mtwhf	USA, WINB Red Lion PA	13570am	
1800	1900		USA, WJIE Louisville KY	7490am	
1800	1900	mtwhfa	USA, WMLK Bethel PA	9265eu	
1800	1900		USA, WMLK Bethel PA	15265eu	
1800	1900		USA, WRMI Miami FL	7385am	
1800	1900		USA, WTJC Newport NC	9370na	
1800	1900		USA, WWCN Nashville TN	9975na	12160na
			13845na	15825na	
1800	1900		USA, WWRB Manchester TN	9320na	11920na
			12170na		
1800	1900	mtwhf	USA, WWRB Manchester TN	15250na	
1800	1900		USA, WYFR Okeechobee FL	13695eu	13780eu
			13800eu	17525eu	18980va
1800	1900		Yemen, Rep of Yemen Radio	9780me	
1815	1830	vl	Zambia, Christian Voice	4965af	
			Libya, Voice of Africa	9485af	11635af
			11715af	11860af	15660af
			17185as	17695af	
1815	1900		Bangladesh, Bangla Betar	7185as	
1830	1845		Sweden, IBRA Radio	9485eu	
1830	1900	vl	Greece, Voice of	7475va	12105va
			15630va	17705va	
1830	1900		Serbia & Montenegro, Intl Radio	6100eu	
1830	1900		Slovakia, Radio Slovakia Intl	5920eu	6055eu
1830	1900		South Africa, AWR Africa	9590af	
1830	1900		Turkey, Voice of	9785eu	
1830	1900		UK, BBC World Service	3255af	3915as
			6005af	6190af	9630af
			12095af	15400af	15420af
			21470af	17830af	
1845	1858	mtwhfa	Albania, Radio Tirana	6115eu	7210eu
1845	1900		Congo, RTV Congolaise	4765af	5985af
1851	1900		New Zealand, Radio NZ Intl	11725pa	

1900 UTC - 2PM EST / 1PM CST / 11AM PST

1900	1915		Congo, RTV Congolaise	4765af	5985af
1900	1920		Turkey, Voice of	9785eu	
1900	1925		Israel, Kol Israel	11590vo	15615va
1900	1928		Hungary, Radio Budapest	3975eu	6025eu
1900	1928		Vietnam, Voice of	7280va	9730va
1900	1930	s	Germany, Bible Voice Broadcasting	6015me	
1900	1930	a	Germany, Bible Voice Broadcasting	9430af	
1900	1930	s	Germany, Universal Life	13820me	
1900	1930		Lithuania, Radio Vilnius	9710eu	
1900	1930		Philippines, Radio Pilipinas	11720va	15190va
			17720va		
1900	1945		India, All India Radio	7410eu	9445af
			9950eu	11620eu	11935af
			15075af	15155af	13605af
			17670af		
1900	2000		Anguilla, Caribbean Beacon	11775om	
1900	2000		Australia, Radio	6080as	9500as
			9580as	9710as	
1900	2000		Australia, Voice Intl	11685as	
1900	2000		Canada, CFRX Toronto ON	6070do	
1900	2000		Canada, CFYP Calgary AB	6030do	
1900	2000		Canada, CKZN St John's NF	6160do	
1900	2000		Canada, CKZU Vancouver BC	6160do	
1900	2000		Canada, Radio Canada Intl	17765am	
1900	2000		China, Chino Broadcast Network	7295va	
			9440af	11940eu	
1900	2000	DRM	China, China Broadcast Network	12080va	
1900	2000		Costa Rica, University Network	11870va	13750va

1900	2000		Eqt Guinea, Radio Africa	15190af	
1900	2000		Germany, Deutsche Welle	13780af	15520af
1900	2000		Germany, Overcomer Ministries		13810me
1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do
1900	2000	vl	Italy, IRRS	5775va	
1900	2000		Liberia, ELWA	4760do	
1900	2000		Malaysia, Radio	7295as	
1900	2000	vl	Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
1900	2000		Netherlands, Radio	7120af	9895af
			11655af	17810af	
1900	2000	as	Netherlands, Radio	15315na	17660na
			17735na		
1900	2000		New Zealand, Radio NZ Intl	11725pa	
1900	2000		Nigeria, Radio/lbadan	6050do	
1900	2000		Nigeria, Radio/Kaduna	4770do	6090do
1900	2000		Nigeria, Radio/Logos	3326do	4990do
1900	2000		Nigeria, Voice of	7255va	
1900	2000		North Korea, Voice of	4405eu	9975eu
			11910eu	11535eu	
1900	2000		Popuo New Guinea, Catholic Radio	4960do	
1900	2000		Popuo New Guinea, NBC	4890do	
1900	2000	vl	Papua New Guinea, Wantok Radio Light	7120va	
1900	2000		Russia, Voice of	7380eu	9890eu
1900	2000		Sierra Leone, Rodio UNAMSIL	6137do	
1900	2000	irreg/ vl	Sierra Leone, SLBS 3316do		
1900	2000	vl	Solomon Islands, SIBC	5020do	9545do
1900	2000	m	South Africa, Radio League	3215of	
1900	2000		South Korea, Radio Korea Intl	5975va	7275eu
1900	2000	a	Sri Lanka, SLBC	6010eu	
1900	2000		Swaziland, TWR	3200af	
1900	2000		Thailand, Radio	7155eu	
1900	2000	vl	Uganda, Radio	4976do	5026do
1900	2000		UK, BBC World Service	3255af	6005af
			6190af	6195eu	9630af
			12095af	15310me	15400af
			15400af	17830af	
1900	2000		USA, AFRTS	4319usb	5446usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13362usb
			13815na	13815na	13855usb
1900	2000		USA, KAIJ Dallas TX	13815na	
1900	2000		USA, KJES Vado NM	15385na	
1900	2000		USA, KTBN Salt Lake City UT	15590na	
1900	2000		USA, Voice of America	4930af	6040af
			9670va	9850af	11975af
			13760af	15410af	13635va
			15445af	15580af	
1900	2000		USA, WBCQ Kennebunk ME	7415na	9330na
			17495na		
1900	2000		USA, WBOH Newport NC	5920am	
1900	2000		USA, WEWN Birmingham AL	11530va	13615va
			15685va	15745va	
1900	2000		USA, WHRA Greenbush ME	15665na	
1900	2000		USA, WHRI Noblesville IN	15285am	15785am
1900	2000	as	USA, WINB Red Lion PA	9740am	
1900	2000	mtwhf	USA, WINB Red Lion PA	13570am	
1900	2000		USA, WJIE Louisville KY	7490am	
1900	2000	mtwhfa	USA, WMLK Bethel PA	9265eu	
1900	2000		USA, WMLK Bethel PA	15265eu	
1900	2000		USA, WRMI Miami FL	7385am	
1900	2000		USA, WTJC Newport NC	9370na	
1900	2000		USA, WWCN Nashville TN	9975na	12160na
			13845na	15825na	
1900	2000		USA, WWRB Manchester TN	9320na	11920na
			12170na		
1900	2000	mtwhf	USA, WWRB Manchester TN	15250na	
1900	2000		USA, WYFR Okeechobee FL	3230af	6085af
			13695af	13800af	17795af
			18930af	18980va	17845af
1900	2000		Zambia, Christian Voice	4965af	
1900	2000	vl	Zimbabwe, ZBC Corp	5975do	
1915	1930	vl	Libya, Voice of Africa	11635af	11715af
1925	1945		Armenia, Voice of	4810eu	9965as
1930	1945	vl	Libya, Voice of Africa	11715af	
1930	2000	mtwhf	Belarus, Radio	7105eu	7280eu
1930	2000	as	Germany, Bible Voice Broadcasting	9430af	
1930	2000		Iran, Voice of the Islamic Rep	7205eu	9800eu
			9925af	11860af	
1930	2000		Sweden, Radio	6065va	
1930	2000	ws	UK, Salama Radio	11885va	
1935	1955		Italy, Rai Intl	5960eu	9845eu
1945	2000	DRM	Canada, Vatican Radio	9800na	
1945	2000	vl	Rwanda, Radio	6055do	
1950	2000		Vatican City, Vatican Radio	4005eu	5885eu
			7250eu	9645eu	

2000 UTC - 3PM EST / 2PM CST / 12PM PST

2000	2015	s	Germany, Pan American BC	9430af	
2000	2027		Czech Rep, Radio Prague Intl	5930eu	11600va
2000	2027		Iran, Voice of the Islamic Rep	7205eu	9800eu
			9925af	11860af	
2000	2030		Australia, Voice Intl	11685as	
2000	2030	DRM	Canada, Vatican Radio	9800na	
2000	2030		Mongolia, Voice of 12015eu		
2000	2030		Swaziland, TWR	3200af	
2000	2030	ws	UK, Salama Radio	11885va	

2000	2030		USA, Voice of America	4930af	4940af	
			9850af 11975af	13670af	15410af	
			15445af			
2000	2030		Vatican City, Vatican Radio	9755af	11625af	
			13765af			
2000	2050		New Zealand, Radio NZ Intl	11725pa		
2000	2057	as	Netherlands, Radio	15315na	17660na	
			17735na			
2000	2059		Canada, Radio Canada Intl	5850eu	11765eu	
			15325eu			
2000	2059	mtwhf	Spain, Radio Exterior Espana	9570af	15290eu	
2000	2100		Anguilla, Caribbean Beacon	11775am		
2000	2100		Australia, ABC NT Alice Springs		2310da	
			4835irr			
2000	2100		Australia, ABC NT Katherine	2485da		
2000	2100		Australia, ABC NT Tennant Creek		2325da	
2000	2100		Australia, Radio	9500pa	11650as	11660as
			12080as			
2000	2100		Canada, CFRX Taranto ON	6070da		
2000	2100		Canada, CFVP Calgary AB	6030da		
2000	2100		Canada, CKZN St John's NF	6160da		
2000	2100		Canada, CKZU Vancouver BC	6160da		
2000	2100		Canada, Radio Canada Intl	17765am		
2000	2100		China, China Broadcast Network		5960eu	
			7285eu 7295va	9600eu	9855eu	
			11640af 11790eu	13630af		
2000	2100	DRM	China, China Broadcast Network		12080va	
2000	2100		Costa Rica, University Network	13750va		
2000	2100		Eqt Guinea, Radio Africa	15190af		
2000	2100		Germany, Deutsche Welle	7130af	11865af	
			13780af 15205af			
2000	2100		Germany, Overcomer Ministries		13810me	
2000	2100	vi	Ghana, Ghana BC Corp	3366da	4915da	
2000	2100		Indonesia, Voice of	9525as	11785pa	
			15150al			
2000	2100	vi	Italy, IRRS	5775va		
2000	2100		Liberia, ELWA	4760da		
2000	2100		Malaysia, Radio	7295as		
2000	2100	vi	Namibia, Namibian BC Corp	3270da	3290da	
			6060da 6175da			
2000	2100		Nigeria, Radio/Ibadan	6050do		
2000	2100		Nigeria, Radio/Kaduna	4770da	6090da	
2000	2100		Nigeria, Radio/Lagos	3326da	4990da	
2000	2100		Nigeria, Voice of	7255va		
2000	2100		Papua New Guinea, Catholic Radio		4960da	
2000	2100		Papua New Guinea, NBC	4890da		
2000	2100	vi	Papua New Guinea, Wantak Radio Light		7120va	
2000	2100		Russia, Voice of	7310eu	7330eu	
2000	2100		Sierra Leone, Radio UNAMSIL	6137do		
2000	2100	vi	Salamon Islands, SIBC	5020do	9545do	
2000	2100		South Africa, AWR Africa	7175af		
2000	2100		South Africa, Channel Africa	3345af		
2000	2100	vi	Uganda, Radio	4976do	7196do	
2000	2100		UK, BBC World Service	3255af	6005af	
			6195af 9410af	9630af	12095af	
			15400af 17830af			
2000	2100		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb 7812usb	12133usb	12579usb	
			12133usb 12579usb	13855usb		
2000	2100		USA, KAIJ Dallas TX		13815na	
2000	2100		USA, KJES Vado NM		15385na	
2000	2100		USA, KTBN Salt Lake City UT		15590na	
2000	2100		USA, Voice of America	6040va	9670va	
			13635va			
2000	2100		USA, WBCQ Kennebunk ME	7415na	9330na	
			17495na			
2000	2100		USA, WBOH Newport NC	5920am		
2000	2100		USA, WEWN Birmingham AL	11530va	13615va	
			15745va 17595va			
2000	2100		USA, WHRA Greenbush ME	15665na		
2000	2100		USA, WHRI Noblesville IN	15285am	15785am	
2000	2100		USA, WINB Red Lion PA	13570am		
2000	2100		USA, WINB Red Lion PA	13570am		
2000	2100		USA, WJIE Louisville KY	7490am		
2000	2100	mtwhfa	USA, WMLK Bethel PA	9265eu		
2000	2100		USA, WMLK Bethel PA	15265eu		
2000	2100		USA, WRMI Miami FL	7385am		
2000	2100		USA, WTJC Newport NC	9370na		
2000	2100		USA, WWCR Nashville TN	9975na	12160na	
			13845na 15825na			
2000	2100		USA, WWRB Manchester TN	9320na	11920na	
			12170na			
2000	2100	mtwhf	USA, WWRB Manchester TN	15250na		
2000	2100		USA, WYFR Okeechobee FL	3230va	13800va	
			15195va 17725af	17750va	17795va	
			17845va 18980va			
2000	2100		Zambia, Christian Voice	4965af		
2000	2100	vi	Zimbabwe, ZBC Corp	5975do		
2005	2100		Syria, Radio Damascus	9330eu	12085eu	
			13610al			
2025	2045		Italy, RAI Intl	6050af	11875af	
2030	2045	vi	Libya, Voice of Africa		11635af	
2030	2045		Thailand, Radio	9680eu		
2030	2058		Vietnam, Voice of	7280va	9550va	7280va
			9550va 11630va			
2030	2100	DRM	Canada, Radio Netherlands	9800na		

2030	2100		Cuba, Radio Havana	9505va	11760va
2030	2100		Egypt, Radio Cairia	15375af	
2030	2100		Turkey, Voice of	9730va	
2030	2100		USA, Voice of America	4930af	9850af
			11975af 12140as	13670af	15410af
			15445af		
2030	2100		Uzbekistan, Radio Tashkent	5060eu	9715eu
			11905eu		
2045	2100		India, All India Radio	7410eu	9445eu
			9910pa 9950eu	11620pa	11715pa
2051	2100		New Zealand, Radio NZ Intl	15720pa	

2100 UTC - 4PM EST / 3PM CST / 1PM PST

2100	2120		Turkey, Voice of	9730as	
2100	2130		Australia, ABC NT Katherine	2485da	
2100	2130		Australia, ABC NT Tennant Creek		2325da
2100	2130	s	Belarus, Radio	7105eu	7280eu
2100	2130	a	Canada, CBC NQ SW Service	9625na	
2100	2130		China, China Broadcast Network		11640af
			13630af		
2100	2130		Cuba, Radio Havana	9505va	11760va
2100	2130		Serbia & Montenegro, Intl Radio		6100eu
2100	2130	mtwhf	UK, BBC World Service	11675am	
2100	2145		Nigeria, Radio/Ibadan	6050da	
2100	2157	DRM	China, China Broadcast Network		12080va
2100	2159		Canada, Radio Canada Intl	17765am	
2100	2159	DRM	Canada, Radio Canada Intl	9800na	
2100	2159	as	Spain, Radio Exterior Espana	9570va	9840va
2100	2200		Anguilla, Caribbean Beacon	11775am	
2100	2200		Australia, ABC NT Alice Springs		2310da
			4835irr		
2100	2200		Australia, Radio	9660as	11650as
			12080pa 13630pa	15515pa	11660as
2100	2200		Austria, AWR Europe	9715af	
2100	2200		Bulgaria, Radio	5800eu	7500eu
2100	2200		Canada, CFRX Taranto ON	6070do	
2100	2200		Canada, CFVP Calgary AB	6030da	
2100	2200		Canada, CKZN St John's NF	6160da	
2100	2200		Canada, CKZU Vancouver BC	6160da	
2100	2200		Costa Rica, University Network	13750va	
2100	2200		Egypt, Radio Cairia	15375af	
2100	2200		Eqt Guinea, Radio Africa	15190af	
2100	2200		Germany, Deutsche Welle	9440af	11865af
			15205af		
2100	2200		Germany, Overcomer Ministries		13810me
2100	2200	vi	Ghana, Ghana BC Corp	3366do	4915da
2100	2200		Guyana, Voice of	3291do	5950do
2100	2200		India, All India Radio	7410eu	9445eu
			9910pa 9950eu	11620pa	11715pa
2100	2200	vi/as	Italy, IRRS	5775va	
2100	2200		Japan, Radio	6035pa	6055eu
			11855af 17825na	21670pa	6180eu
2100	2200		Liberia, ELWA	4760do	
2100	2200		Liberia, Star Radio	11965af	
2100	2200		Malaysia, Radio	7295as	
2100	2200	vi	Namibia, Namibian BC Corp	3270do	3290do
			6060do 6175do		
2100	2200		New Zealand, Radio NZ Intl	15720pa	
2100	2200		Nigeria, Radio/Kaduna	4770da	6090da
2100	2200		Nigeria, Radio/Lagos	3326do	4990do
2100	2200		North Korea, Voice of	4405eu	13760eu
			15245eu		
2100	2200		Papua New Guinea, Catholic Radio		4960do
2100	2200		Papua New Guinea, NBC	4890do	
2100	2200	vi	Papua New Guinea, Wantak Radio Light		7120va
2100	2200	vi	Rwanda, Radio	6055do	
2100	2200		Sierra Leone, Radio UNAMSIL	6137do	
2100	2200	irreg/vi	Sierra Leone, SLBS	3316do	
2100	2200		South Africa, Channel Africa	3345af	
2100	2200		South Korea, Radio Korea Intl	3955eu	
2100	2200		Syria, Radio Damascus	9330eu	12085eu
			13610al		
2100	2200		UK, BBC World Service	3255af	3915as
			5965as 6005af	6110as	6190af
			6195as 9410af	9605af	15390am
			15400af		
2100	2200		Ukraine, Radio Ukraine Intl	7490eu	
2100	2200		USA, AFRTS	4319usb	5446usb
			7590usb 7812usb	12133usb	12579usb
			12133usb 12579usb	13362usb	13855usb
2100	2200		USA, KAIJ Dallas TX		13815na
2100	2200		USA, KTBN Salt Lake City UT		15590na
2100	2200		USA, Voice of America	4930af	11975af
			12140as 15410af	15445af	
2100	2200		USA, WBCQ Kennebunk ME	7415na	9330na
			17495na		
2100	2200		USA, WBOH Newport NC	5920am	
2100	2200		USA, WEWN Birmingham AL	11530va	13615va
			15745va 17595va		
2100	2200		USA, WHRA Greenbush ME	11765na	
2100	2200		USA, WHRI Noblesville IN	15285am	15785am
2100	2200		USA, WINB Red Lion PA	13570am	
2100	2200		USA, WJIE Louisville KY	7490am	
2100	2200		USA, WMLK Bethel PA	9265eu	

2100	2200		USA, WRMI Miami FL	7385am	
2100	2200		USA, WTJC Newport NC	9370na	
2100	2200		USA, WWCR Nashville TN	9975na	12160na
			13845na 15825na		
2100	2200		USA, WWRB Manchester TN	9320na	11920na
			12170na		
2100	2200	mtwhf	USA, WWRB Manchester TN	15250na	
2100	2200		USA, WYFR Okeechobee FL	11565va	13800va
			17725va 17795va	17845va	18980va
2100	2200		Zambia, Christian Voice	4965of	
2100	2200	vi	Zimbabwe, ZBC Corp	5975do	
2105	2159		Spain, Radio Exterior Espana	9570va	9840va
2115	2130	vi	Libya, Voice of Africa	11635af	
2115	2200		Egypt, Radio Cairo 9990eu		
2130	2145	ff	UK, BBC World Service	11720am	
2130	2156		Romania, Radio Romania Intl	7165eu	9535eu
			9645eu 11940na		
2130	2158	mtwhfa	Albania, Radio Tirana	7120eu	
2130	2200		Australia, ABC NT Katherine	5025do	
2130	2200		Australia, ABC NT Tennant Creek		4910do
2130	2200	mtwhfa	Canada, CBC NQ SW Service	9625na	
2130	2200		Sweden, Radio 6065va	7420va	
2130	2200		Uzbekistan, Radio Tashkent	5060eu	9715eu
			11905eu		

2200 UTC - 5PM EST / 4PM CST / 2PM PST

2200	2205		Syria, Radio Damascus	9330eu	12085eu
2200	2230	DRM	Canada, Deutsche Welle	9800na	
2200	2230		Hungary, Radio Budapest	6025eu	9735eu
2200	2230		India, All India Radio	7410eu	9445eu
			9910pa 9950eu	11620pa	11715pa
			9675do		
2200	2230	mtwhfs	Papua New Guinea, NBC		7230pa
2200	2230		Serbia & Montenegro, Intl Radio		
2200	2245		Egypt, Radio Cairo 9990eu		
2200	2250		Turkey, Voice of	9830va	
2200	2300		Anguilla, Caribbean Beacon	6090am	
2200	2300		Australia, ABC NT Alice Springs		2310do
			4835sirr		
2200	2300		Australia, ABC NT Katherine	5025do	
2200	2300		Australia, ABC NT Tennant Creek		4910do
2200	2300		Australia, Radio 13630as	13630as	15230as
			15240pa 15515pa	21740pa	
2200	2300	smtwhf	Canada, CBC NQ SW Service	9625na	
2200	2300		Canada, CFRX Toronto ON	6070do	
2200	2300		Canada, CFVP Calgary AB	6030do	
2200	2300		Canada, CKZN St John's NF	6160do	
2200	2300		Canada, CKZU Vancouver BC	6160do	
2200	2300		China, China Broadcast Network		7175eu
2200	2300		Costa Rica, University Network	13750va	
2200	2300		Eqt Guinea, Radio Africa	15190af	
2200	2300		Germany, Deutsche Welle	7115as	9720as
2200	2300	vi	Ghana, Ghana BC Corp	3366do	4915do
2200	2300		Guyana, Voice of	3291do	
2200	2300	vi	Malaysia, Radio 7295as		
2200	2300		Namibia, Namibian BC Corp	3270do	3290do
			6060do 6175do		
2200	2300		New Zealand, Radio NZ Intl	15720pa	
2200	2300		Nigeria, Radio/Ibadan	6050do	
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do
2200	2300		Nigeria, Radio/Lagos	3326do	4990do
2200	2300		Papua New Guinea, Catholic Radio		4960do
2200	2300	vi	Papua New Guinea, Wantok Radio Light		7120va
2200	2300		Sierra Leone, Radio UNAMSIL	6137do	
2200	2300	irreg/ vi	Sierra Leone, SLBS 3316do		
2200	2300	vi	Solomon Islands, SIBC	5020do	9545do
2200	2300		Taiwan, Radio Taiwan Intl	15600eu	
2200	2300		UK, BBC World Service	5965as	5975am
			6195as 7105as	9605va	9740as
			11955as 15400af		
2200	2300		USA, AFRTS	4319usb	5446usb 5765usb
			7590usb 7812usb	12133usb	12579usb
			12133usb 12579usb	13362usb	13855usb
2200	2300		USA, KAIJ Dallas TX	13815na	
2200	2300		USA, KTBN Salt Lake City UT	15590na	
2200	2300		USA, Voice of America	7215va	12140as
			15185va 15290va	15305va	17740va
			17820va		
2200	2300		USA, WBCQ Kennebunk ME	5105na	7415na
			9330na 17495na		
2200	2300		USA, WBOH Newport NC	5920am	
2200	2300		USA, WEWN Birmingham AL	9355va	9975va
2200	2300		USA, WHRA Greenbush ME	11765na	
2200	2300	mtwhfa	USA, WHRI Noblesville IN	9495am	
2200	2300		USA, WINB Red Lion PA	13570am	
2200	2300		USA, WJIE Louisville KY	7490om	13595am
2200	2300	as	USA, WRMI Miami FL	7385am	
2200	2300		USA, WRMI Miami FL	9955am	
2200	2300		USA, WTJC Newport NC	9370na	
2200	2300		USA, WWCR Nashville TN	7465na	9985na
			12160na 13845na		
2200	2300		USA, WWRB Manchester TN	6890no	11920na
2200	2300		USA, WYFR Okeechobee FL	11740va	15770va
2200	2300		Zambia, Christian Voice	4965af	
2205	2230		Italy, RAI Intl	11895as	

2215	2230	vi	Croatia, Croatian Radio		9925na
2223	2228		Libya, Voice of Africa		7320af
2230	2257		Czech Rep, Radio Prague Intl		7345na 9415na
2230	2259		Canada, Radio Canada Intl		9525as 9870as
			12035as		
2230	2300	s	Australia, HCJB	15525as	
2230	2300	DRM	Canada, Radio Sweden		9800na
2230	2300		Guam, AWR/KSDA	11850as	15320as
2230	2300		USA, Voice of America		9570va 13755va
			15145va		
2245	2300		India, All India Radio		9705as 9950as
			11620as 11645as		13605as

2300 UTC - 6PM EST / 5PM CST / 3PM PST

2300	0000		Anguilla, Coribbean Beacon	6090am	
2300	0000		Australia, ABC NT Alice Springs		2310do
			4835sirr		
2300	0000		Australia, ABC NT Katherine	5025do	
2300	0000		Australia, ABC NT Tennant Creek		4910do
2300	0000		Bulgaria, Radio 9700na	11700na	
2300	0000	DRM	Canada, BBC World Service	9800na	
2300	0000	smtwhf	Canada, CBC NQ SW Service	9625na	
2300	0000		Canada, CFRX Toronto ON	6070do	
2300	0000		Canada, CFVP Calgary AB	6030do	
2300	0000		Canada, CKZN St John's NF	6160do	
2300	0000		Canada, CKZU Vancouver BC	6160do	
2300	0000		China, China Broadcast Network		5915as
			5990am 6145na	7180as	13680na
2300	0000		Costa Rica, University Network	13750va	
2300	0000		Cuba, Radio Havana	9550na	12000na
			13680na		
2300	0000		Egypt, Radio Cairo 11885na		
2300	0000		Germany, Deutsche Welle	15135as	5955as 9890as
2300	0000	vi	Ghana, Ghana BC Corp		3366do 4915do
2300	0000		Guyana, Voice of	3291do	
2300	0000		India, All India Radio		9705as 9950as
			11620as 11645as		13605as
2300	0000		Malaysia, Radio 7295as		
2300	0000	vi	Namibia, Namibian BC Corp	3270do	3290do
			6060do 6175do		
2300	0000		New Zealand, Radio NZ Intl	15720pa	
2300	0000		Papua New Guinea, Catholic Radio		4960do
2300	0000		Papua New Guinea, NBC	9675do	
2300	0000	vi	Papua New Guinea, Wantok Radio Light		7120va
2300	0000		Sierra Leone, Radio UNAMSIL	6137do	
2300	0000	irreg/ vi	Sierra Leone, SLBS 3316do		
2300	0000		Singapore, Mediacorp Radio	6150do	
2300	0000	vi	Solomon Islands, SIBC	5020do	9545do
2300	0000		UK, BBC World Service	5975am	
2300	0000		USA, AFRTS	4319usb	5446usb 5765usb
			7590usb 7812usb	12133usb	12579usb
			12133usb 12579usb	13362usb	13855usb
2300	0000		USA, KAIJ Dallas TX	13815na	
2300	0000		USA, KTBN Salt Lake City UT	15590na	
2300	0000		USA, Voice of America	12140as	
2300	0000		USA, WBCQ Kennebunk ME	5105na	7415na
			9330na		
2300	0000		USA, WBOH Newport NC	5920am	
2300	0000		USA, WEWN Birmingham AL	9355va	9975va
2300	0000		USA, WHRA Greenbush ME	7520na	
2300	0000	mtwhfa	USA, WHRI Noblesville IN	9495am	
2300	0000		USA, WINB Red Lion PA	9320am	
2300	0000		USA, WJIE Louisville KY	7490am	13595am
2300	0000		USA, WRMI Miami FL	7385am	
2300	0000	as	USA, WRMI Miami FL	9955am	
2300	0000		USA, WTJC Newport NC	9370na	
2300	0000		USA, WWCR Nashville TN	5070na	7465na
			9985na 12160na		
2300	0000		USA, WWRB Manchester TN	3185na	5050na
			5085na 5745na	6890na	
2300	0000		USA, WYFR Okeechobee FL	11740va	15255va
			17750va		
2300	0000		Zambia, Christian Voice	4965af	
2300	2315		Nigeria, Radio/Kaduna	4770do	6090do
2300	2315		Nigeria, Radio/Lagos	3326do	
2300	2330		Australia, Radio 9660as	12080as	13620as
			13630pa 15230pa	15240pa	21740pa
2300	2330		UK, BBC World Service	3915as	5965as
			6195as 9605as	9740as	11945as
			11955as 15280as		
2300	2330		USA, Voice of America	9570va	13755va
			15145va		
2300	2356		Romania, Radio Romania Intl	6140eu	7265eu
			9645eu 11940na		
2330	0000		Australia, Radio 9660as	12080as	13620as
			13630pa 15230pa	15415pa	17750pa
			17795pa 21740pa		
2330	0000		Burma, Dem Voice of Burma	9435eu	
2330	0000		Lithuania, Radio Vilnius	9875na	
2330	0000		UK, BBC World Service	9740as	11945as
			11955as 15280as		
2330	0000		USA, Voice of America	7260va	13725va
2330	2358		Vietnam, Voice of	9840as	12020va

Monitoring the Army Ranger Training

When there is a major conflict somewhere in the world, a special group of U.S. Army soldiers will always be among the first on the scene to set the battlefield. That unit is the U.S. Army Rangers, among the most elite, if not *the* most elite combat soldiers in the world.

To become a Ranger, the U.S. Army soldier must go through a rigorous training program, and when that training is completed the soldier is assigned to the 75th Ranger Regiment, which is a Special Operations Force of the United States Army Special Operations Command (USASOC).

The 75th Ranger Regiment is composed of three Ranger battalions and is the premier light-infantry unit of the United States Army. Headquartered at Fort Benning, Georgia, the 75th Ranger Regiment's mission is to plan and conduct special missions in support of U.S. policy and objectives. The three Ranger battalions that comprise the 75th Ranger Regiment are geographically dispersed. Their locations are:

- 1st Battalion, 75th Ranger Regiment, Hunter Army Airfield, Georgia
- 2nd Battalion, 75th Ranger Regiment, Fort Lewis, Washington
- 3rd Battalion, 75th Ranger Regiment, Fort Benning, Georgia

As mentioned, to become an Army Ranger the soldier has to go through a demanding training regime. There are three phases of Army Ranger training conducted at three different bases.

The first phase of training starts at Fort Benning, Georgia. The Benning phase of Ranger training is designed to assess and then to develop the military skills, physical, and mental endurance a soldier must have to successfully accomplish combat missions. It is also designed to teach the Ranger student how to properly sustain himself, his subordinates, and maintain his equipment under difficult field conditions during the subsequent phases of Ranger training.

The second phase of training is conducted at Camp Merrill, near Dahlongega, Georgia. During the Mountain phase, students receive instruction on military mountaineering tasks as well as techniques for employing a squad and platoon for continuous combat patrol operations.

At the conclusion of the Mountain phase, the students move by bus or parachute assault into the third and final (Florida) phase of

Ranger training, conducted at Camp Rudder, near Eglin Air Force Base, Florida.

This capstone phase of Ranger School emphasizes the development of the Ranger student's combat arms functional skills. They learn to operate effectively under conditions of extreme mental and physical stress. This is accomplished through practical exercises in extended platoon level patrol operations in a Jungle/Swamp environment.

If you live in the southeastern United States, you can monitor Ranger training activity on your scanner (depending on your location) at some or all of the bases listed in our *MT* Ranger frequency list, Table One. So load up our Range frequency list, buckle up and stand by for some action listening in the *Milcom* bands.

FAA ARTCC Frequency List

In this month's FAA Air Route Traffic Control Center report, we are going to take a look at the Fort Worth and Houston Centers in Table Two. For the background on the Air Route Traffic Control Centers, see the June 2005 issue of *MT*.

Until next month, 73 and good hunting.

T1: U.S. Army Ranger Training Frequency List

FORT BENNING LOCAL FREQUENCIES			
Presel	Name (VHF/UHF)	VHF	UHF FM
1	Lawson AAF (LSF) ATIS/Metro	134.375	343.200
2	Lawson AAF (LSF) Ground	121.050	254.250
3	Lawson AAF (LSF) Tower	119.050	269.525
4	Lawson AAF (LSF) Range Control/Air-Air	139.375	249.500
5	Lawson AAF (LSF) Raven Internal	141.050	280.500
6	Lawson AAF (LSF) Base Operations	134.100	245.700
7	Columbus Metro Airport (CSG) ATIS	127.750	
8	Columbus Metro Airport (CSG) Tower	120.100	257.800
9	Atlanta Approach/Departure Control (001-150)	126.500	353.750
10	Atlanta Approach/Departure Control (241-360)	125.500	323.100
11	Atlanta Approach/Departure Control (151-240)	126.025	285.525
12	Atlanta VFR	121.000	287.500
13	Middle Georgia Reg Airport (MCN) Approach (> 5000)	124.200	279.600
14	Atlanta ARTCC (VCNTY GVL)	134.800	307.900
15	Camp Merrill, GA (7A7) Air to Air	139.300	227.200
16	Middle Georgia Reg Airport (MCN) RCD (GVL FSS)	122.550	
17	Macon Radio (FSS)	122.200	
18	Eglin Approach Control (North)	125.100	281.450
19	Eglin Mission Control	135.250	315.000
20	Flight Watch (Weather)	122.000	262.300

ADDITIONAL LAWSON AAF FREQUENCIES:			
ALCP141.800	340.800		
Army Operations		372.200	
Clearance Delivery	121.700	251.150	
Helicopter		41.500 (NFM)	

PMSV	127.400		
Precision Approach Radar (Primary)	132.400	226.600	
Precision Approach Radar (Secondary)	133.525	237.200	

FLORIDA RANGER CAMP (Camp Rudder - 6th RTB)			
Auxiliary Field 6	138.100	371.100 (76th Ranger TOC)	
Noble Hamlet		51.000 (Primary)/41.000 (Alternate)	
Eglin Approach (South)	132.100	281.450	
Eglin Tower	118.200	360.600	
Eglin Ground	121.800	353.650	
Eglin ATIS	134.625	355.800	
Eglin Clearance Delivery	127.700	273.500	
Eglin Base Operations	122.850	377.200	
ROCC	126.250		
Eglin Metro		342.500	
Hurlburt Tower	126.500	291.100	
Choctaw Tower/Advisory	126.200	315.600	
Crestview CTAF	122.950		
EMT/Fire Department	123.600		

Callsigns:

72	OPFOR
72C1	OPFOR for "C" Company, 1st Platoon... etc.
73	PI "runner"
74	Assistant Primary Instructor
75	Primary Instructor (PI)
76	RTB TOC
86	Bravo Company Commander (also, A6, C6, etc.)
B14	Bravo Company, 1st Platoon Squad Leader Walker
B15	Bravo Company, 1st Platoon PSG Walker
B26	Bravo Company, 2nd Platoon Leader... etc.
Dive Team	Self-explanatory
Dust-off	MEDEVAC
Gator 3	S-3 (Training OIC)
Gator 3 Air	S-3 Air
Gator 3N	S-3 Air NCOIC
Gator 5	Executive Officer (XO)
Gator 6	RTB Commander
Gator 7	RTB CSM
Gator Air	S-3 Air
Gator Doc	Physicians Assistant
H6	HHC Commander (all backside support: divers, OPFOR, boats)
MED 1	FLA1 (ground ambulance)
MED 2	FLA2 (ground ambulance)
Safety Boat 1	Self-explanatory
Watertown Base	Senior Boat Leader or a C2 boat operator

MOUNTAIN RANGER CAMP (Camp Merrill, GA - 5th RTB)			
Mountain Ranger 08		34,100/38.500	
Camp Merrill (7A7) Air-to-Air	139.300	227.200	
Macon Radio		122.550	

Unit Frequencies:

498th Medevac Internal	49.650
Pathfinder	41,000/43.650
4th RTB	44,900/33.100

EGLIN FREQUENCY CARD - FLORIDA RANGER Camp (FL34)

Eglin Mission Control (Primary)	118.650	315.000
Eglin Mission Control (Alternate)	135.250	290.900
Eglin VFR Corridor	124.050	
Eglin Approach North	125.100	281.450
Eglin Approach South	132.100	360.600
Eglin ATIS	134.625	273.500
Eglin Clearance Delivery	127.700	377.200
Eglin Tower	118.200	353.650
Eglin Dispatch (Base Ops)	122.850	372.200
Eglin Metro		342.500
Hurlburt Tower	126.500	291.100
Hurlburt Ground	139.600	275.800
Hurlburt ATIS		360.675
Hurlburt Metro		390.750
Destin Tower	122.800	
Panama City Tower	120.500	
Choctaw Tower	121.400	315.500

Crestview CTAF	122.950	
Tyndall Approach	124.150	341.700
Pensacola Approach	119.000	269.375
Pensacola TRACON	124.050	
Pensacola Tower	119.900	257.800
Pensacola Ground	121.900	348.600
Gainesville Radio	122.200/122.450	
Medevac	149.825	
Medevac Internal		41.350
Ft. Walton Hospital/EMT/FD	155.340	
Pensacola Baptist	155.340	

T2: Fort Worth and Houston Centers

FORT WORTH ARTCC

Abilene, TX	127.450/380.050	Low Discrete: Approach/Departure Services
	134.250/290.550	High
	282.200	Low
	317.700	Low
Ardmore, OK	128.100/327.150	Low Discrete: Approach/Departure Services
	132.975/270.000	High
Big Spring, TX	133.700/350.200	Low Discrete: Approach/Departure Services
	124.875/307.200	Low Discrete: Approach/Departure Services
Blue Ridge, TX	127.600/254.300	Low Discrete: Approach/Departure Services
	127.450/380.050	Low Discrete: Approach/Departure Services
	346.300	Low: Special Use Airspace (Brownwood MOA-1/2)
Clinton-Sherman, OK	126.300/339.800	Low
	128.400/290.200	Low Discrete: Approach/Departure Services
	132.450/363.100	High
Cumby, TX	126.575/322.450	High
	132.025/317.750	Low
	132.850/360.750	Low Discrete: Approach/Departure Services
Dublin, TX	127.150/314.000	Low Discrete: Approach/Departure Services
	128.325	High
	135.375/273.550	Low
	290.550	High
	351.900	High
El Dorado, AR	128.200/269.100	Low Discrete: Approach/Departure Services
	272.750	High: Special Use Airspace (Anne MOA)
Fort Worth, TX	134.400/380.300	Low
	243.000	Low/High
Frankston, TX	134.025/227.400	High
	135.250/265.100	Low Discrete: Approach/Departure Services
Gainesville, TX	124.750/377.100	Low Discrete: Approach/Departure Services
	126.775/348.850	Low
Hobbs, NM	133.100/385.600	Low Discrete: Approach/Departure Services
Keller (Ft Worth), TX	133.250/285.550	Low Discrete: Approach/Departure Services
	134.150	Low
	135.275	Low
	364.800	High: Special Use - TSU < Amber 3>
	377.100	Low
	380.200	Low
Lubbock, TX	120.775/327.100	High
	126.450/316.100	Low
	132.600/269.050	Low Discrete: Approach/Departure Services
	286.600 292.100	High: Special Use - T38 Military Aircraft (Reese AFB)
	276.000 295.900	High: Special Use - User Preferred Trajectories
Marshall, TX	128.125/281.550	Ultra High
	135.100/269.200	Low Discrete: Approach/Departure Services
	269.275	High
McAlester, OK	132.200/338.350	Low Discrete: Approach/Departure Services
	135.450/269.650	High
Midland A, TX	132.075/278.800	High
	133.100/385.600	Low Discrete: Approach/Departure Services
Midland B, TX	291.650	High
	364.800	High: Special Use - TSU < Amber 3>
Mineral Wells, TX	120.350/307.350	Low
	127.000/360.600	Low Discrete: Approach/Departure Services
Monroe, LA	126.325/346.250	Low Discrete: Approach/Departure Services

Oklahoma City, OK	132.450/363.100	High
	133.900/298.900	Low
Paducah, TX	120.775	High
	126.450/316.100	Low
	133.500/350.350	Low Discrete: Approach/Departure Services
	134.550	High
	327.100	High
	339.100	Low: Special Use Airspace
	348.650	High
Paris, TX	123.925	Low Discrete: Approach/Departure Services
	126.450/316.100	Low Discrete: Approach/Departure Services
Plainview, TX	126.450/316.100	Low Discrete: Approach/Departure Services
San Angelo, TX	120.275/319.250	High
	126.150/322.550	Low Discrete: Approach/Departure Services
Scurry, TX	126.725/298.850	Low Discrete
	135.750/379.250	High
Shreveport, LA	126.325/346.250	Low Discrete: Approach/Departure Services
	132.275	High
	133.875	High
	236.500	Low: Special Use - USAF Training (Barksdale AFB)
	243.000	Low/High
	269.275	High
	285.650	High
	364.800	High: Special Use - TSU < Amber 3>
Snyder, TX	132.600/362.300	Low
Texarkana, TX	123.925/263.050	Low Discrete: Approach/Departure Services
	126.575	High
	134.475	High
	284.600	High
	322.450	High
Tulsa, OK	364.800	High: Special Use - TSU < Amber 3>
Tyler, OK	134.025/251.150	High
	135.250/279.650	Low
Waco, TX	133.300/269.500	Low Discrete: Approach/Departure Services
	132.925	High
Wichita Falls # 1, TX	134.550	High
	278.500	High
	348.650	High
	364.800	High: Special Use - TSU < Amber 3>
	391.200	High: Special Use Airspace
Wichita Falls # 2, TX	127.950/360.700	High
	133.500/350.350	Low Discrete: Approach/Departure Services
	296.000	High: Special Use - User Preferred Trajectories
	384.900	High: Special Use Airspace
Unknown RCAG:	295.000 351.850	

HOUSTON ARTCC

Alexandria, LA	127.850/299.600	Low Discrete
	132.700/348.750	High
	288.100	Low/High
	321.300	High: Special Use - TSU < Amber 6>
Austin, TX	125.650/273.550	Low Discrete
	132.725/363.250	High
Beaumont, TX	126.950/363.050	Low
	133.800/351.800	Low Discrete: Approach/Departure Services
Cameron County, TX	132.650	Low/High Oceanic Control-Gulf of Mexico
College Station, TX	120.400/371.900	Low Discrete: Approach/Departure Services
	125.150	Low
	134.500	Low
	134.800	Low
	135.325/322.550	High
	269.600	Low
	307.800	Low
	319.150	Low
Fredericksburg, TX	132.725/363.250	High
	134.200/307.300	Low Discrete: Approach/Departure Services
Galveston, TX	133.800/351.800	Low Discrete
Galveston A, TX	133.400/306.300	Low Oceanic Control-Gulf of Mexico
Grand Isle, LA	132.175/353.550	High Oceanic Control-Gulf of Mexico
	134.900/290.450	Low Discrete: Approach/Departure Services
	370.900	High
	119.725/285.600	High
Hattiesburg, MS	126.800/281.500	Low Discrete: Approach/Departure Services

Houma, LA	132.650	Low/High Oceanic Control-Gulf of Mexico
Houston, TX	134.350/269.000	High
	321.300	High: Special Use - TSU < Amber 6>
Intracoastal City, LA	120.350	Low Oceanic Control-Gulf of Mexico
Kerrville, TX	134.950/269.400	Low Discrete: Approach/Departure Services
Kingsville, TX	128.300/291.600	Low Discrete: Approach/Departure Services
	133.750/273.600	High
	269.300	High: Special Use-User Preferred Trajectory (Oronge Grove NALF)
LaCombe, LA	126.875/281.500	Low
	321.300	High: Special Use - TSU < Amber 6>
Lafayette, LA	126.350/338.250	Low Discrete: Approach/Departure Services
	133.650/263.100	High
Lake Charles, LA	124.700/317.400	Low Discrete: Approach/Departure Services
	132.950/360.650	High
	126.750/354.000	High
Laredo, TX	127.800/307.200	Low Discrete: Approach/Departure Services
	128.600/319.100	Low
	295.700	High: Special Use Airspace (Crystal MOA)
Lometa, TX	132.350/317.500	Low Discrete: Approach/Departure Services
	372.000	Low: Special Use Airspace (Brady MOA)
Lufkin, TX	126.950/287.850	Low: Approach/Departure Services
	132.775	High
	133.575	High
	134.800/269.600	Low Discrete: Approach/Departure Services
	335.650	High
	353.850	High
McComb, MS	133.500/343.950	Low Discrete: Approach/Departure Services
Mobile, AL	125.775/322.400	High
	127.650/288.150	Low Discrete: Approach/Departure Services
	132.600/387.050	Low: Approach/Departure Services
	277.400	High: Special Use - T38 Military Aircraft
Natchez, MS	125.750/291.700	Low Discrete: Approach/Departure Services
New Orleans, LA	126.350/338.250	Low: Approach/Departure Services
	127.000/317.775	Low Discrete
Newton, TX	126.950/363.050	Low Discrete
	134.800/269.600	Low
Palacios, TX	128.600/360.800	Low Discrete: Approach/Departure Services
	132.150/279.600	Low
Rocksprings, TX	125.750/346.400	Low Discrete: Approach/Departure Services
	132.400/299.200	High
	267.900 322.700	High: Special Use - T38 Military Aircraft (Laughlin AFB)
Rockport, TX	128.150/350.300	Low Discrete: Approach/Departure Services
	134.600/322.500	Low: Approach/Departure Services
	135.475/291.750	High
San Antonio, TX	125.250/291.700	High
	132.800/343.700	Low Discrete: Approach/Departure Services
	134.950/285.400	Low
	304.800	Low: Special Use - T38 Military Aircraft (Randolph AFB)
	321.300	High: Special Use - TSU < Amber 6>
San Antonio A, TX	120.600/335.600	Low
	126.425/371.850	High
	134.600/322.500	Low Discrete: Approach/Departure Services
	135.650/254.375	High
	264.700	High: Special Use - User Preferred Trajectories
	301.400	High: Special Use - T38 Military Aircraft (Randolph AFB)
Sealy, TX	119.175/360.800	Low
	126.425/371.850	High
	132.150/379.600	Low Discrete: Approach/Departure Services
Uvalde, TX	126.100/327.000	Low: Approach/Departure Services
	134.950/269.400	Low Discrete: Approach/Departure Services
Vermillion, LA	120.350	Low Oceanic Control-Gulf of Mexico
Victoria, TX	135.050/353.600	Low Discrete: Approach/Departure Services

The Straight Dope on the DEA



With all of the interest in Homeland Security these days, we sometimes forget that there are many other federal agencies still hard at work. It may seem like the Drug Enforcement Administration has been out of the spotlight, but the DEA remains a very active and interesting federal monitoring target, especially since there are growing concerns that some terrorist organizations are attempting to organize connections with drug smugglers.

The Drug Enforcement Administration is part of the Department of Justice and was formed in 1973. The DEA evolved from other federal agencies, including the Bureau of Narcotics and the Bureau of Prohibition, both part of the Treasury Department and the Bureau of Drug Abuse Control, part of the Department of Health, Education and Welfare. You can find out more about the history of the DEA at their web site, <http://www.dea.gov/>

I recall first tuning the DEA in when the Bearcat 210 programmable scanners were new, probably around 1977. The frequencies in the 406 to 420 MHz band were unusual for me at the time, and not many radios would tune that end of the band. DEA communications were very open and uncensored in those days, probably because they didn't think anyone could hear them! Today, even with the option of digital encryption and Nextel, many DEA surveillance operations can be overheard in the clear mode, although some areas do keep the encryption on most of the time. However, they do know we are listening and go to great lengths to keep names, locations, and other specific information off of the radio channels.

The DEA uses a fairly standard nationwide radio channel plan in the federal UHF band, although some local operations often utilize specialized tactical frequencies. When using analog radios they will have a CTCSS tone of 156.7 Hz, but more and more cities seem to be switching over to APCO P-25 digital mode. If they are not using encryption, they can be received with the Radio Shack or Uniden models of digital scanners.

As you look over the frequency list below, you will notice that there are specific channels set aside for HIDTA operations. HIDTA stands for High Intensity Drug Trafficking Area and is a program that concentrates resources on major

drug trafficking areas in the United States. HIDTA operations normally involve federal support of local police operations that are involved in drug enforcement. You can find out more about the HIDTA program at the DEA web site, <http://www.usdoj.gov/dea/programs/hidta.htm>

Here is the most recent DEA frequency list that I have been able to compile, and if there is any information about what the frequencies are used for, I've included that also.

Drug Enforcement Administration Active Frequencies

- 408.2750
- 408.3000
- 408.3750
- 411.1250 – input to 419.2500
- 411.1750
- 412.0000 – HIDTA Ch 6
- 412.1250 – HIDTA Ch.10
- 412.4500
- 412.4750
- 412.5250 – input to 414.5500
- 413.6250
- 413.6750
- 413.7000
- 413.7500
- 413.9750 – input to 417.7500 & 419.2250
- 414.0000 – simplex
- 414.0250 – HIDTA Ch.3 simplex
- 414.0500 – HIDTA Ch.4 simplex
- 414.0750
- 414.1250
- 414.1500 – HIDTA Ch.5 simplex
- 414.1750
- 414.2000
- 414.2250
- 414.2750
- 414.3250
- 414.3500 – HIDTA Ch.7
- 414.4000
- 414.4250 – input to 419.2750
- 414.4500 – HIDTA Ch.8
- 414.4750 – HIDTA Ch.9
- 414.5000 – HIDTA Ch 2
- 414.5250 – input to 419.3000
- 414.5500 – HIDTA Ch 1
- 414.5750
- 414.6000 – input to 419.2000
- 415.0000
- 415.6000 – input to 418.8250
- 416.0500 – input to 418.6250
- 416.1000
- 416.1500
- 416.2000 – input to 418.9500
- 416.2750
- 416.3250 – input to 418.9000
- 416.3750 – input to 418.7750
- 417.0250 – input to 418.9750
- 417.0500
- 417.0750
- 417.1000
- 417.1250 – input to 412.0000
- 417.1500 – simplex

- 417.1750 – input to 412.
- 417.2000 – simplex
- 417.2750 – simplex
- 417.3250 – simplex
- 417.4000 – input to 419.0000
- 417.4500 – simplex
- 417.5000 – simplex
- 417.5500 – simplex
- 417.7500
- 418.0000
- 418.0500 – simplex (federal itinerant)
- 418.0750 – Interagency Common
- 418.1250
- 418.1750 – simplex
- 418.2000 – simplex
- 418.2250 – simplex
- 418.3250
- 418.5000 – simplex
- 418.5750 – simplex (federal itinerant)
- 418.6250 – DEA Ch.1
- 418.6500 – simplex
- 418.6750 – DEA Ch.4 simplex
- 418.7000 – simplex
- 418.7500 – DEA Ch.3 simplex
- 418.7750 – simplex
- 418.8000 – simplex
- 418.8250 – DEA Ch.5
- 418.8500
- 418.8750 – simplex
- 418.9000 – DEA Ch.2
- 418.9250
- 418.9500 – DEA Ch.6
- 418.9750 – DEA Ch.8
- 419.0000
- 419.2000
- 419.2250 – simplex
- 419.2500
- 419.2750
- 419.3000
- 419.3250 – input to 414.3500
- 419.3750 – input to 414.4500
- 419.4000 – input to 414.4750
- 419.4250 – input to 414.5000
- 419.4500
- 419.5000
- 419.5250 – DEA Ch.10

Are any of these frequencies active in your area? Are they still analog or have they moved to P-25 digital? Do you have any additions or corrections? Please let us know at the *Fed Files!*

Many frequency lists (including *Grove's Federal Frequency Directory*) have listed many frequencies in the 162-174 MHz federal VHF band as being used by the DEA. I personally have never heard any confirmed DEA activities on these VHF frequencies, but they may be used for other purposes, including body mics or vehicle tracking devices. Here are some of the VHF frequencies allocated to the DEA:

DEA VHF Frequencies

- 162.7875, 164.8625, 165.4125, 165.5125, 165.5625, 165.5875, 165.8500, 166.4625,

168.8625, 170.5750, 170.9000, 171.4500,
171.6000, 171.6500, 172.0000, 172.1000,
172.2000, 172.3000

The DEA often works with local or regional law enforcement task forces around the country. They often share communications resources, so it's not unusual to hear DEA units showing up on local or state law frequencies or radio systems. Many major metropolitan areas with 800 MHz trunking systems have talk-groups assigned to federal task force operations, including the DEA and HIDTA. Sometimes, although rarely heard, local task forces have been known to show up on DEA channels. I have even heard some operations where state narcotics surveillance was using a VHF frequency while patched together with DEA surveillance on a UHF frequency.

Besides operating within the United States, the DEA also has 80 foreign offices in 58 different countries. They work with the governments of the countries where drugs are grown or manufactured and have been known to operate with radios in these foreign outposts. These foreign offices often use HF or short wave communications for contact with the DEA offices in the US. From the *Grove Federal Frequency Directory, Second Edition*, here are some identified DEA HF frequencies. All frequencies are in kilohertz (kHz) and require a receiver capable of HF SSB reception:

DEA on HF

4991.0	14690.0
5277.0	17171.0
5696.0	18171.0
5841.0	18666.0
7300.0	19131.0
7657.0	23402.5
9497.0	23675.0
11073.5	23805.0
11076.0	25385.0
14350.0	26946.0
14686.0 - Primary HF frequency for DEA	

As was reported in the May 2005 *Fed Files*, the DEA utilizes many forms of aircraft to help with their surveillance and intelligence missions. Helicopters or fixed-wing DEA aircraft usually are heard using the FLINT call sign, but the BOISE call sign as also been known to be involved with counter-narcotics missions. Many of the aircraft using the BOISE calls are C-26 military aircraft operated by the National Guard and equipped with a high resolution K-87 film or digital camera system. There are units of the National Guard under the Counter-narcotic Directorate that service the DEA and other agencies.

You can read about some of the mission requirements at this web site, <http://www.ngbpdc.ngb.army.mil/pubfiles/10/101101.pdf> You may or may not hear any active communications from these BOISE flights as they operate. They are often on photo intelligence missions and not actively involved in surveillance or arrest operations.

❖ Mum's the Word!

I would like to offer a bit of advice about listening in to the DEA, the FBI, and other fed-

eral law enforcement agencies. Although federal agents have access to voice encryption on their radios, you will still often be able to hear surveillances, arrests, or other undercover operations while they happen. It should be obvious to all scanner listeners that you should keep what you hear private and not divulge these operations to others, especially while the activity is still going on. This could mean the difference between life and death for those involved in these operations!

But isn't this a contradiction to us asking for reports on what you are hearing? Not at all, as we are asking for the technical aspects of what you have heard on your scanner, such as a frequency, squelch tone and a general idea of what the frequency was being used for. Sensitive information that might be heard about suspects or agents identities should always be kept confidential.

❖ VA Medical Centers Revisited

Since our last listing of Department of Veterans Affairs frequencies, I have received more information on frequencies used by VA Medical Centers around the country. It is apparent that as the VA facilities purchase new radios, they are moving towards the P-25 digital as a standard. I want to thank all those who have contributed to our database.

PITTSBURGH, PA

163.2625 MHz, P-25 - VA Hospital Police
164.0625 MHz, 127.3 pl - VA Hospital Operations
164.2125 MHz, 114.8 pl - VA Hospital Maintenance
164.8750 MHz, 103.5 pl - VA Hospital
166.0125 MHz, P-25 - VA Hospital Police (input to 163.2625 MHz)
166.2250 MHz, 123.0 pl & 141.3 pl - VA Hospital

PHILADELPHIA, PA

409.3250 MHz, P-25 - VA Police

ORLANDO, FL - Update

162.3500 MHz, 131.8 pl - VAMC Maintenance (input to 163.2625 MHz)
163.2375 MHz, 131.8 pl - VAMC Police with phone patch
163.2625 MHz, 131.8 pl - VAMC Maintenance

ASHEVILLE, NC

408.0000 MHz, P-25 - VAMC Maintenance
409.4375 MHz, P-25 - VAMC Police
417.0000 MHz, P-25 - VAMC Police (input to 409.4375 MHz)

CINCINNATI, OH

408.2375 MHz, P-25 - VA Police

❖ APHIS - What's That?

A recent posting on the Fedcom Internet e-mail list at QTH.net asked about the Animal and Plant Health Inspection Service and the US Department of Agriculture. The post mentioned seeing a mobile inspection vehicle used by the USDA and APHIS folks and wondered what frequencies to try.

APHIS originated as part of the US Department of Agriculture, with the duty of inspecting

inbound plants and animals to this country. They were often stationed at seaports or airports and could be heard on a variety of frequencies. The APHIS division of the USDA was transferred to the Department of Homeland Security in March of 2003. Also the USDA Plum Island Animal Disease Research Center was transferred to DHS around the same time. You can find out more at this USDA web site, http://www.aphis.usda.gov/lpa/pubs/fsheet_faqs_notice/fs_aphis_homeland.html.

Here are some frequencies that have been used by the APHIS operations around the country. Most of the APHIS operations are at International airports and Ports of Entry into the United States. See if any of them are being used near you!

Animal and Plant Health Inspection Service

163.1000, 164.1250, 164.1500, 164.3250,
164.6250, 164.8000, 164.8250, 164.9125,
164.9375, 166.5625, 166.6750, 168.3500,
169.1500, 169.1750, 169.1875, 169.8750,
169.9500, 169.9750, 170.0000, 170.4500,
170.4750, 170.5000, 170.5250, 171.4250,
171.4750, 171.5000, 171.5250, 171.5625,
171.5750, 171.7000, 411.2250, 411.2500,
411.2750, 411.3000, 411.3250, 411.5250,
412.4000, 413.2000, 414.6500, 415.2250,
415.2500, 415.2750, 415.3000, 415.3250,
415.4250, 415.4500, 415.5250

That's all for this edition of *Fed Files*. I want to thank all the *Fed Files* and *MT* readers for your support in 2005. Keep the e-mails coming and we'll see you next in 2006!

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.

Full 800 MHz Scanners



NEW
AOR AR-8200MKIII
Wideband portable receiver
- 0.5 to 3000 MHz continuous, (unblocked)
- NFM, WFM, NAM, WAM, USB, LSB & CW
- Alphanumeric memory identification
- Spectrum scan
- Ni-MH Battery
- Flexible dynamic memory
- Optional CTCSS & Extra memory boards

\$649 US



YUPITERU MVT-7300
Wideband handheld receiver
- 531kHz - 1320MHz (Unblocked for Cell)
- FM, WFM, AM, NAM, USB, LSB, CW
- Fully adjustable step sizes
- 30 channels/steps per second
- 1000 memory channels (10 banks 100)
- 10 user programmable search bands

\$349 US



ICOM IC-R3 (unblocked)
"Portable receiver with built-in TV receiver!"
- Modes of operation AM, FM, WFM, AM
- Wide frequency coverage, 0.5 to 2450 MHz
- 450 memory ch. 6 character alphanumeric
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Finding VHF Aircraft Frequencies

One aspect of monitoring which is essential to all the various radio listening hobbies is to find active frequencies of interest. Aircraft communications listening is no exception. In this issue, we will explore some ways to find VHF aeronautical frequencies and to learn what is on them by using resources such as your own scanner, AirNav.com, the *Airport / Facility Directory (A/FD)*, an online subscription service, Yahoo! Groups, and *Monitoring Times*.

Useful to many listeners may be a one-page overview of the VHF 118-137 MHz aero band found at <http://www.faa.gov/ats/aaf/asr/library/rfi/605032A/graphics/Apx2Pg1.pdf> Printing it out may be helpful. "ATC" in the list means Air Traffic Control.

For scanner shopping and aircraft listening, keep in mind that a scanner must include the above-mentioned aeronautical band among the bands it receives, because not all scanner models do. For military aero listening, it must also include the 225-400 MHz band.

❖ Finding Frequencies with Your Scanner

Preprogrammed Search: Some scanner models have a preprogrammed service search feature which can include searches for active frequencies in the aircraft, public safety, marine, railroad, weather, etc. bands. This can be handy for discovering frequencies for those new to scanning, for those who travel with their scanners, and for those who have recently relocated. Sometimes, even experienced scanner listeners can get into scanning ruts and using these preprogrammed service searches from time to time can turn up new and interesting frequencies. The front panel of your scanner will indicate which, if any, preprogrammed searches are available.

User-Programmable Search: Many scanners have a user-programmable search



This Radio Shack PRO-2045 (discontinued) is an example of a scanner with a tuning knob. One can manually tune up and down through frequencies, through a search range, and through programmed channels. It is a very handy but uncommon feature.

range feature which allows the user to enter the lower and upper frequency search limits. The scanner then sequentially progresses through the frequencies in that search range, repeating the search over and over while stopping on any active ones.

Programming in the entire 118-137 MHz range is too great of a frequency span, at least for metro-area listeners. It is far more practical to tailor searches to a few MHz of the band at a time. Discovered frequencies of interest can be programmed in along the way, or later, after taking good notes during the search process.

Tuning Knob Search: Some scanners – and receivers like the Icom R7000 (discontinued) – have tuning knobs, rather than just buttons. This hands-on way of searching, or "tuning around," to find new frequencies has a real appeal and utility value to many listeners. It also facilitates moving easily up or down to known nearby frequencies.

Interesting Search Range: The 121.6-123.575 MHz range, in particular, can turn up interesting things over time. Some of the things that may be found in this range are: flight test, gliders, aircraft with parachute jumpers, fire fighting aircraft, news helicopters, law enforcement, search & rescue, medical transport flights, Flight Service Stations (FSS - <http://www.faa.gov/atpubs/FSS/>), Unicom, and some Air Traffic Control. In busy areas, this range may be searched more effectively in two or three more narrow searches rather than all at once.

"Company Frequency" Search: Aircraft "company frequencies" in the 128.85-132 MHz range can be an interesting search as well, if you live within listening range of one or more airports with airliner and air freight flights. These frequencies are used by airline and air freight companies to communicate with their offices. Exchanges on the company frequencies can be quite routine – as in talking about flight arrival times, needed supplies, and specific passenger needs. They can also include maintenance issues, and aircraft and medical emergencies, at times necessitating phone patches to support personnel on the ground.

The link <http://www.freqofnature.com/index.php?pg=/aviation/company.html> offers good info and a company frequency list for Southern California that can serve as an example of what one might expect to find in this frequency range in a metro area.

Some listeners spend considerable time logging and figuring out all the company frequencies in their listening areas. It is one of

the specialty pursuits within the aero listening hobby that presents its own fascinations and challenges.

Listen to "Handoffs": Another source of frequencies by way of your scanner is to listen to "handoffs." Air Traffic Controllers, when communicating with Instrument Flight Rules (IFR) flights, will tell the pilot the next frequency to use to contact the next controller along the flight path. During the handoff, the controller will not only say the frequency but will mention the facility. Examples: "Contact Capitol Tower, one two five point seven," "Contact Travis Approach, one two six point six," "Contact Oakland Center, one three two point two."

❖ AirNav.com

One of the greatest frequency resources for VHF/UHF aircraft listeners is <http://www.airnav.com/> Click on the Airports tab. Then, in the search box, you can enter the three-letter airport identifier if you know it, like LAX for Los Angeles International Airport.

You can enter a city name like "Denver" which, in this case, will show twenty-seven public and private airports, each with a link leading to detailed airport information which, of course, includes airport, Approach/Departure, and other frequencies. To learn of all the airports in an entire state, click on "Browse by U.S. State."

A great feature is the airport radius search. Click on "Advanced Search." Here, you can

AIRNAV.COM

AIRPORT/FACILITY DIRECTORY



YAHOO! GROUPS

Google



These registered trademark logos represent valuable resources for the aircraft communications listeners as does the A/FD.

search a desired radius around an airport of your choice or around a Latitude/Longitude that you enter. As a bonus, the search result can be copied into a Microsoft Word document. The links remain active in the document and a shortcut to it can be placed on the Windows Desktop for easy access.

❖ Airport/Frequency Directory

Possibly the best printed source of VHF frequencies and airport information is the *Airport / Facility Directory (A/FD)*. It is intended for pilot use, which means that serious efforts are made to keep it accurate and up to date. It has information similar to that found at AirNav.com for each airport.

Unlike AirNav.com, the *A/FD* includes VHF Air Route Traffic Control Center (ARTCC) frequencies, FSS and with Remote Communications Outlet (RCO) frequencies by area, and an Enroute Flight Advisory Service (EFAS)



This map shows the states included in each volume of the *Airport / Facility Directory*. (Courtesy NACO)

map with frequencies.

The U.S. is covered by seven regional volumes of this publication at \$4.20 each. It is published every 56 days and is available individually or by subscription. For info, see: <http://www.naco.faa.gov/ecomp/Catalog.aspx?a=aero+nos+pub+afd> They may also be purchased from chart agents, see: <http://naco.faa.gov/agents.asp>

It's a shame that the *A/FD* is not downloadable in PDF format like some of the FAA publications which are found at <http://www.faa.gov/atpubs/> PDF files can be easily searched with Adobe Reader, the free program required to read PDF files. See: http://www.adobe.com/products/acrobat/readstep2_allversions.html

❖ An Online Subscription Service

Depending on your budget and the extent of your involvement in the scanning hobby, you may or may not be willing to pay a subscription fee to do online frequency searches. PerCon's *Spectrum Online* at <http://www.perconcorp.com/spectrumonline/> offers such a service for hobbyists among its products – A 6 month subscription is \$24.95 and it's \$45.95 for a 12 month subscription. The service is not limited to aircraft, as can be seen at the above link.

PerCon used to produce hobby-level CD ROM frequency databases, but they switched to online delivery. This allows for more frequent

updating and a multitude of searches. Search results can simply be presented on screen or exported to Microsoft Excel and other formats. Searches can be by city, county, state, call sign, DBA name, single frequency, frequency range, geographic box search, limited radius search, and more.

A very useful feature is that when doing a search, you can select Output Format – Brief w/ Links. This produces a search result where the Callsign, Company Name, City, County, and Lat/Long fields are clickable links. If you look up an ATC frequency, for example, in a city, county, or state, you can click on the Lat/Long link to find the other frequencies at that same transmitter site. This can assist in various ways, one of which is in helping to identify ATC VHF/UHF simulcast frequency pairs. If you click on a call sign for a particular location, it will then list all frequencies for that airport/facility.

The best way to find ARTCC frequencies is to use the "Callsign in the Region/US" search and enter the three-letter code for the Center, such as ZOA for Oakland Center. It returns VHF and UHF frequencies. Then, in the Company Name column for that search, clicking on the Oakland RCAG link yields all the transmitter locations within the Center by Lat/Long and whether each is used for a high or low altitude sector. For ARTCC identifiers and high altitude EFAS map, see: <http://www.cxoafss.jccbi.gov/efas.htm>

❖ Yahoo! Groups

Yahoo! Groups are free Internet discussion forums. There are tens of thousands of different groups and among them are many hobby radio listening groups. They can be great resources for frequency and other information related to our hobby.

Group members can ask and respond to questions, share opinions and exchange information. Input to a group is via an email post to the group. Output from the group is an email of each post which is sent to each member (or compiled into an optional "Daily Digest"). One can choose to not receive emails and go to the group site to read and respond to posts, but that is slower and more cumbersome and does not include posted photos if that feature is enabled.

If one uses an email program like Outlook Express, folders can be set up for each group and "Message Rules" can be created so that each group's email automatically filters into its own folder, thus keeping one's Inbox free of clutter and confusion.

Some groups are better than others in terms of activity, content, and how well they are moderated. Part of the fun is finding ones that are right for you.

How to find Yahoo! Groups: First, go to <http://groups.yahoo.com/> and enter search words into the "Find a Group" search box. Yahoo uses the words in each group's description in their look-up database. You need to use words that are most likely to be used in a group's description. Using just "aircraft" will result in anything aircraft, much of which will not relate to our hobby. Try only two or three

search words at a time with "scanners" and "frequencies" being key words. The search "scanner frequencies" brings up about 160 group listings. Other suggested search words used with either or both of the above are: aircraft, VHF, UHF, 118, 225, comms, HF, and Air Traffic Control.

In the search result list, under each group name, will be the number of members it has, which can indicate popularity. Click on the group name or on "more" to see a full group description. The "Message History" display will give you an idea of the level of activity. If a group looks inviting to you, click on "Join This Group!" This will start the sign-up process.

❖ Google for Frequencies

The Google search engine is an amazing resource, <http://www.google.com/> Innovative Google searches combined with patient sifting of search results can lead to frequencies and very useful information. Tip: Include selected words in sequence in quotes to tie the words together and focus the search more narrowly. For an example, try these two searches: "airline frequencies" with the quotes and without.

❖ Monitoring Times for Frequencies

Monitoring Times magazine has been and is an essential resource for frequencies, information, news, and new products info. If you are not a subscriber, what are you waiting for? Don't forget the *Monitoring Times* anthologies on searchable CD-ROMs by year; see <http://www.grove-ent.com/SFT27.html>

Hopefully, the above frequency source ideas will stimulate your quest for new frequencies and how to find out what's on them. Good luck!

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Daniel Sampson's
PRIME TIME SHORTWAVE
<http://www.primetimeshortwave.com>

Your guide for up-to-date English shortwave schedules sorted by time, country and frequency plus a DX media program guide and newsletter

Did You Know...

Not everyone is interested in the nitty-gritty details of beacon reception. For many, it is enough to know the location of a station and perhaps the name of the airport that it serves. Still, I find that many *MT* readers are accustomed to digging a bit deeper. For serious "ute" monitors, it is often the details that make the difference between an ordinary intercept and one that is worth putting down in the logbook.

This month, let's look at some little-known facts about beacons and discuss how these tidbits may affect your listening. Even if you're not a DX hound, the information should provide insight into why beacons operate the way they do.

❖ ID, Please

Did you know that many beacons can transmit additional information besides their identification? For example, to indicate that operation has switched to emergency (battery) power or to a backup transmitter, some stations automatically append a "dit" (Morse letter E) to their ID. Beacon ENS/400 kHz (Ensenada, Mexico) has sometimes been heard in this mode – sporting an ID of "ENS-E."

Several Canadian beacons also have a clever way of indicating their status. Normally, there is a 600 millisecond (ms) space between the end of the ID and the long dash heard on virtually all Canadian beacons. However, when there is an AC power failure and operation switches to battery power, the ID changes to three cycles of 600 ms spacing and three cycles of 1200 ms spacing.

Should a beacon's main transmitter fail and switch over to a reserve unit, the normal 600 ms spacing is extended to 1200 ms on every ID cycle, and will continue in this way until the problem is corrected.

Speaking of Canadian beacons, did you know there are a handful of special IDs reserved for *transportable* beacons? If you're lucky enough to hear UAA, UFF, UGG, UJJ, UKK, UNN, USS, UTT, UWW or UZZ you'll know you've tuned one in. Transportable beacons might be used at temporary airfields or for military operations. They can come up just about anywhere in the beacon band.

Finally, there are two common pitches used in North America: 400 Hz and 1020 Hz. With few exceptions, 400 Hz is used in Canada, and 1020 Hz is used in the United States. Telling the tones apart is easy, and can be a first indicator of a beacon's country of origin. U.S. Beacons

also omit the long dash-after-ID (DAID) that Canadian beacons are known by.

❖ It's Your Call

Did you ever wonder why beacons don't have conventional "K" or "W" call signs like most other radio stations? U.S. aviation beacons operate under the auspices of the FAA, which, as a government agency, does not come under FCC control. For this reason, you will not find aviation beacons listed in FCC databases that claim to cover the "whole spectrum." The *BeaconFinder II* directory, described elsewhere in this issue, lists all FAA beacons, and many other stations operating in the 0 and 535 kHz band.

❖ What Goes Up...

Many FAA beacons include a "V" shaped antenna that is typically orange in color. This antenna is not part of the longwave equipment, but is for a separate 75 MHz marker beacon housed in the same shelter as the LF equipment. Marker beacons transmit a tightly focused beam straight up to help pilots determine when they are directly over the beacon site.

❖ On the Road Again

Have you ever been traveling and come across what you suspect might be an LF beacon? Here's a trick that may help you find the answer: It is often possible to hear the second or third harmonic of a beacon using your car's AM radio. I used this trick while on vacation to hear EVB/417 kHz at New Smyrna Beach, Florida, near 834 kHz (417 kHz x 2 = 834 kHz). Of course, you must be quite close to the station (1/16 mile or so) for this to work.

❖ Loggings

Our loggings this month come from Ward Kremer (TN), who enjoys using very early wireless gear to tune for beacons. When I say old, I mean really *old* – as in WWI vintage! His main antenna is a beverage type, made from a very long wire fence. Ward reports that the antenna works especially well after a rainstorm when the posts have some conductivity to ground, which serves to lower the amount of natural static received.

I want to congratulate Ward on recently passing his amateur radio test and being granted the callsign KI4JHA. Ward says copying beacons on longwave was how he became proficient in Morse Code. Nice going!

T1. Selected DX Loggings (From Tennessee)

Freq.	ID	Location
230	MUN	Maturin, Venezuela
347	PA	Prince Albert, SK
348	PA	Paterks Fjordur, Iceland
343	SC	Scorbysund, Greenland
345	BGI	Adams, Barbados
344	LA	Langholdt, Iceland
344	ZIY	Georgetown, Cayman Islands
332	GRO	Rota Island, Northern Mariannas
380	UBX	Missouri, Cuba
380	UCY	Cayabo, Cuba
381	AB	Akraberg, Faroe Is. (Denmark)
380	FIL	Horta, Azores
380	UB	Tuktoyatkuk, NWT
375	ATU	Aitu, Alaska
375	BUN	Buena Ventura, Columbia
344	4E	#2 Round Platform, NS
343	SC	Scorbysund, Greenland

❖ Mailbag

From Jacques d'Avignon (ON), we receive word that Digital Radio Mondiale (DRM) has begun showing up on the longwave broadcast band. A German transmitter on 177 kHz is now operating full time using this mode. Spain will likely be next to use DRM on the Mediumwave band. Many DXers have complained about the interference DRM can cause to adjacent frequencies, so it will be interesting to see how this technology develops.

We reported some time ago about the ARRL's application to the FCC for an experimental license for group operation between 495 and 510 kHz. At last word, a callsign had been assigned (WD2XSH) but further processing was needed at the FCC before the actual license could be granted. (The license may well be active by now.)

The experiments involve a group of 23 operators scattered around the U.S. who will use up to 100 watts peak transmitter power and CW or PSK31 transmission modes. Participating sites are located in Arkansas, California, Colorado, Illinois, Louisiana, Massachusetts, Minnesota, Mississippi, New Hampshire, New Jersey, New York, North Carolina, Oregon, Rhode Island, Tennessee, Texas, Vermont and Virginia. A map of these locations, along with other program details, can be found at <http://www.500kc.com>.

It may be worth an occasional listen to 500 kHz and vicinity over the next few months. Ultimately, it is hoped that this largely "dormant" spectrum can be reassigned for use as an amateur band.

With the winter DXing season getting into high gear, I want to encourage everyone to set some time aside to log special family times, especially around the holidays. Have a happy Thanksgiving and I'll see you next month!

Free Radio Network Redesigns Pirate Radio Web

For many years the gold standard of pirate radio web sites has been the **Free Radio Network**. This wonderful web site is easy to access at the URL of <http://www.frn.net/> on your internet dial.

Webmeister John Cruzan has totally redesigned the FRN web site. Its graphics are improved, and it is somewhat easier to navigate. The site continues to have message centers for posting both shortwave and FM pirate loggings. It also serves as a blog for continuous discussion of unlicensed broadcasting issues.

Along with Nick Grace and Martin Schoech's truly stunning and outstanding clandestine radio web site found at <http://www.clandestineradio.com/>, the FRN web site is virtually required reading by all serious pirate radio listeners.



❖ Human Rights Radio Reactivates

Mbanna Kantako, one of the earliest pioneers of the micropower FM pirate movement, has returned to the airwaves in Springfield, IL. Kantako, a blind civic activist in Springfield has been busted by the FCC on multiple occasions. But, his spokesman Mike Townsend reports that Kantako reactivated a micropower pirate station called **Human Rights Radio** on 106.5 MHz in late March from his traditional Springfield location. Kantako also hosts a local cable television program called **Raw African Power (R.A.P.)** in Springfield. Has anybody been hearing this reactivated FM pirate?

❖ WBCQ Special Mobile Broadcasts

During August, licensed station WBCQ in Monticello, Maine, originated some special programming produced on the motor vessel *Katie* anchored in Boston Harbor. The station says that these pirate-like broadcasts actually originated from the licensed Monticello transmitter, but veteran DXer Jerry Berg received a QSL for these special broadcasts with a return

address of Radio Free Mt. Airy, 28723 Ridge Rd., Mt. Airy, MD 21771 on the envelope. It is clear that Alan Weiner still is full of surprises at his licensed station. That includes this licensed shortwave broadcaster's normal daily operations on the former pirate frequency of 7415 kHz.

❖ What We Are Hearing

Monitoring Times readers heard these stations on or near the primary North American pirate frequency of 6925 kHz.

Captain Morgan- The Captoin mixes Twilight Zone TV audio in with his rock music programming. (None, says to send loggings to ACE and the Free Radio Network, and has QSLed lately)

Ground Zero Radio- An abandoned ICBM missile silo is the announced transmitter location for Dave Gunn's broadcasts. Rock music and war themes dominate the shows. (Elkhorn)

Grasscutter Radio- Rock music and pirate radio advocacy, and two-way QSO conversations with other pirates are still their normal broadcast content. (Uses grasscutterrado@yahoo.com e-mail)

KCBM- Their Ken and Barry show is best heard in the western part of the USA, and they claim to transmit from California on the unusual frequency of 6990 kHz. As we see here this month they have an attractive QSL. (Asks for reports via the Free Radio Network web site)



KSUR- This one has been recently identified by several MT readers. They mix rock music with Detroit Lions football audio, believe it or not. (Uses radioksur@yahoo.com e-mail)

James Bond Radio- This mysterious operation blends soul music and audio related to the James Bond spy movies, but so far it provides no means for its listeners to react to the shows. (None)

Pirate Radio Boston- Their New England focus often shows up in the playlist of their rock music broadcasts. (Uses pirateradioboston@yahoo.com e-mail)

Robot Radio- The announcer on this new one often talks over the rock music selections in their playlist. (None announced)

Sunshine Radio- Their female announcer, an unusual gender among pirate radio announcers, always programs rock music. (Uses the address from Grasscutter Radio; grasscutterrado@yahoo.com e-mail)

The Crystal Ship- The Poet still appears on a variety of unusual frequencies that include 6854, 6875, 6925, 7545, 7825, 8000, and 9057 kHz. Rock music and political commentary dominate his shows. (Belfast and uses tcshortwave@yahoo.com e-mail)

Tu Nueve Kosmos- This South American pirate sometimes transmits directly from South America, but sometimes it uses North American pirate relays. Donny Flex is the host at this one. (Uses tunavekosmos@hotmail.com e-mail)

Undercover Radio- Dr. Benway's recent rock music programming was announced to be coming from a mobile transmitter. This moves his announced "the

middle of nowhere" location even farther to remote areas. (Merlin and uses undercoverradio@mail.com e-mail)

Voice of Captain Ron Shortwave- Not to be confused with Captain Morgan or other pirate captains, Ron generally plays rock music on his station. (Uses captainronswr@yahoo.com e-mail)

Voice of Laryngitis- This classic pirate station has returned with their hilarious original comedy from Genghis and Stanley Huxley. Some programming is reruns of old shows, but new material is usually mixed in. (None, but try Belfast)

VUDU- Voodoo Radio transmits complex rock music compositions that are supplemented by dramas. (Elkhorn)

Weather Radio- A mysterious pirate continues to relay NOAA weather radio broadcasts from various USA cities. We still know little about this one, but it has been widely heard. (Unknown)

WHGW- They feature rock music, old time radio shows, and digital mode broadcasts. Thus, their format is certainly not boring. (Uses whgw6925@myway.com e-mail)

WHYP- James Brownard is still the main force in contemporary North American pirate radio. His rock and comedy is mixed in with ancient recorded weather reports for Lake Erie cities. (Providence and uses whypradio@gmail.com e-mail)

WMPR- If you hear instrumental dance music on the pirate bands, it probably is a "dance party" from this station. (None, has QSLed only at the Winter SWL Festival)

WSKO- Here's another new one. It has been operating on strange frequencies near 8001 kHz, but so far we know almost nothing about this rock music station. (None)

❖ QSLing Pirates

Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14895; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 69, Elkhorn, NE 68022; and PO Box 293, Merlin, Ontario N0P 1W0.

❖ Thanks

We thank this month's valuable contributors: John T. Arthur, Belfast, NY; Dave Balint, Wooster, OH; Jerry Berg, Lexington, MA; Artie Bigley, Columbus, OH; Ralph Brandi, Middletown, NJ; Rich D'Angelo, Wyomissing, PA; Harold Frodge, Midland, MI; William T. Hassig, Mt. Prospect, IL; Harry Helms, Wimberly, TX; Chris Lobdell, Stoneham, MA; Leonard Longwire, Chicago, IL; Greg Majewski, Oakdale, CT; Larry Magne, Penn's Park, PA; John Poet, QTH Unknown; Lee Reynolds, Lempster, NH; Walt Salmani, Victoria, British Columbia; Martin Schoech, Eisenach, Germany; John Sedlacek, Omaha, NE; Mike Townsend, Springfield, IL; Niel Wolfish, Toronto, Ontario; and Joe Wood, Greenback, TN.

Annual Holiday Wish List

Well, the frost is on the pumpkin and the malls are bedecked with decorations and playing all manner of festive music. That is usually a wake-up call for me to give you folks a few ideas in terms of gifts suitable to your favorite ham radio operator. As you well know from columns past, I am not above shaking things up a bit. With this in mind, hang on tight to your tinsel as I make a few suggestions that may be a bit out of the norm. Some may even apply to non-hams as well. For example...

❖ The Gift of Ham Radio

I am one of those folks who like giving as much as I like receiving during the holidays. With this in mind, let me share with you a gift I always give to one or two folks I know every holiday season. Throughout the year I keep track of friends, relatives and colleagues who say things such as "I've always wanted to become a ham." "It would be a lot of fun to talk to people around the world," or "I need a good hobby." If I see the right twinkle in their eye I'll make sure they find the following book in their pile of holiday goodies.

Now You're Talking All You Need for Your First Amateur Radio License 5th Edition

Larry D, Wolfgang WR1B
306 Pages \$19.95
ISBN: 0-87259-881-0
ARRL Order #8810
The American Radio Relay League
225 Main Street, Newington, CT 06111-1494
1-888-277-5289
<http://www.arrl.org/shop>

The American Radio Relay League has been providing materials to help people into the ham radio hobby since its earliest days. The *Now You're Talking* guide is quite literally the perfect tool, not just for mastering the information to pass the Technician's Class License, it is also a complete guide to setting up your first basic ham station. The current 5th Edition provides the theory and question pool necessary to easily make it through the 35 question Element 2 Tech Test. (Note: if you buy this book from any source other than the ARRL, be sure to check that you are getting the most current edition. The 5th Edition is the only one that will be accurate to the current Tech question pool that was put into the field since July 1, 2003.)

Earlier study guides "back in the day" stressed a great deal of theory that was often over the head of

someone just dipping their toe into ham radio waters. It has also long been known that some people do well enough by simply studying the question pool and then sitting for the test. In the *Now You're Talking* series, the League has struck a good balance between the two schools of thought. The basic theory related to the test information and good basic ham practice is presented in a fun and easy to read manner. At the end of each chapter, the reader is referred to the appropriate section of the question pool in order to practice the test questions while the foundation material is still clear in the reader's mind.

I have used the *Now You're Talking Guide* in classroom settings and have given it to folks for self study. I have also used it to personally "Elmer" folks. It works well in all three environments. By way of comparison, most of the folks I have given the book to for self study find themselves ready to sit for the test in about three or four weeks. I've had a few do it quicker – one friend in less than a week. Others took longer, but mostly because of time restraints put on them by the real world.

And, as I mentioned above, the book helps a newly minted ham make sense of what to do once they pass the test as well. I would have given a great deal for that information as I was starting out. You can give that information as a holiday gift.

So maybe you have a niece or nephew who is a pre-teen, or a friend at work who always seems to gravitate to your radios when he or she stops by your house. If you can't find somebody close, you can give a copy to your local school or library. Give someone the gift of ham radio this season.

❖ Christmas in a Kit

I have an odd personal tradition that has gone on around my house for the last seven or eight years or so. It all started when Dave Benson K1SWL (then NN1G) of Small Wonder Labs (<http://www.smallwonderlabs.com/>) sent me one of his new famous 40-40 One Board QRP transceivers to build and play with. Now, it just happened that the first time I got the chance to sit down and have some free soldering time once the kit came, was in that odd lull that happens in so many holiday households. You know – that time after the kids have risen early to rip through their presents only to head back for a bit of a nap after examining their gifts.

That Christmas year I found myself powered by two cups of coffee while my wife and kids all headed back to bed. What to do? I went down to the workbench where Dave's kit awaited me. An odd time of exceeding peace occurred, involving no creatures stirring (not even mice), some classic holiday music on the radio and the smell of melting solder.



Since that time, each year, the thing I look forward to most on that special day is that magic two or three hours down at the workbench. Yep, strange, but then again, you all know me by now. I'm just wired different is all. So what kit will I be looking for under my tree to take down the basement for that special holiday hot solder session this year?

The A.L.T. (Altoids Longwire Tuner)
\$25.00 US Funds only, plus \$4 s&h US & Canada,
and \$6 s&h for DX
Hendricks QRP Kits, Inc.
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Dos Palos, CA 93620
Phone: 209-704-3522
<http://www.qrpkits.com>

Another highly respected member of the QRP hobby community is Doug Hendricks K16DS. Doug has been the man responsible for seeing that the NORCAL QRP Club put out over 15 thousand kits over a period of more than 13 years. I've met Doug several times and I have never known anyone in the hobby so committed to low cost, fun to build radio kits. Doug recently got together with another noted "kit guy," Steve "Melt Solder" Weber KD1JV, and became the authorized kit producer for Steve's A.L.T. (Altoids Longwire Tuner). The kit is a one-board design, able to tune a longwire antenna across 40 through 10 meters. And, as the name suggests, the kit will fit just fine in one of those diminutive mint tins that can be purchased at any candy counter.

The ability to get a simple antenna up for either fun QRP or even emergency service is always enhanced by the use of a good tuning circuit. Weber's designs often break new ground, putting together a number of features in a small and practical package. The A.L.T. is no exception. For example, the design includes a resistive SWR bridge that makes use of a simple LED indicator. The design maintains its small footprint by utilizing some interesting components in unique ways. For example, switching inductance in and out is done by using SIP shorting blocks similar to those you might see on a computer motherboard.

This cooperative effort, utilizing Steve KDIJV's design and Doug K16DS's prowess at getting a low cost kit out to the radio hobby, make for a real winner. I look forward to Doug's future efforts with his new company. Meanwhile, I know where I'll be late Christmas morning.

❖ Getting on the MAKE:

Next comes a gift that is a breath of fresh air to not just the radio hobby community, but to anyone who just can't help tinkering, either mechanically or electronically.

As many of you know from my past columns and other writings, I do not use the word "hacker" as the pejorative that the popular press has turned it into. The term hacker, in certain circles, remains a positive way of confirming a person's skill at understanding the world around them and taking personal control over various aspects of it. With this in mind, let me tell you about a magazine that would make a great gift any time of the year for any dedicated hacker or tinkerer. It harkens back to some of the great construction magazines of the '60s that folks like me "of a certain age" grew up on.

MAKE:
Published Quarterly
Cover Price \$14.99
(Subscription offers on website listed below)
O'Reilly Media, Inc.
PO Box 17046
N. Hollywood, CA 91615-9587
<http://www.makezine.com>



Where to begin... How about with *MAKE*'s own statement of purpose: "The first magazine devoted to digital projects, hardware hacks, and D.I.Y. inspiration. *MAKE* brings the do-it-yourself mindset to all the technology in your life."

All I can add to that is "YEAH BUDDY!" *MAKE* has restored my faith in the fact that there are still a lot of folks who not only like to design and build things, they like to take existing technologies and use them in ways the original designers never even considered. In just reading through the first three issues in this, its premier year, I have, among other things – learned to gas weld, turn a computer mouse into a working robot, make biodiesel fuel, conduct legitimate cold fusion experiments, produce kite-based aerial photos, and dozens of other wonderful ideas.

Now, the purists among you might feel that this offering from the computer publishing house O'Reilly has little to do with ham radio. I would disagree. This magazine is about trying new things and doing things in new ways, many of which are directly applicable to ham radio. Technology, at this gut level, is infinitely transferable. It brings back a lot of the fun that has disappeared from the pages of commercial publications such as *Popular Science* and *Popular Mechanics*.

Many of the ideas and designs include in-depth information about the construction process, making no assumption on the reader as to prior knowledge. For example, one recent issue gave a whole section over to basic electronic "breadboarding" techniques. I have to admit that, even after years of practice, I still learned a thing or two from that article.

Above all, *MAKE* is just fun. I can't imagine

any radio hobbyist that wouldn't appreciate a year's subscription as a holiday gift. By the time you read this, you will probably find Issue #4 on your local newsstands (probably not too far down the rack from *Monitoring Times*).

So what else is there to consider in this traditional season of giving? How about a donation to your local ham radio emergency services organization? It doesn't have to be money. In many cases donations of equipment can be most welcome. Or maybe think about reaching out a bit further. I know there are quite a few hams along the Gulf Coast who lost the equipment they had to Hurricane Katrina. Maybe you or your local ham club might look into helping one or two of these OMs or YLs get back on the air. Like I said, in the proper spirit, giving is at least as much fun as receiving. Maybe even more so.

Regardless, have fun! I'll see you on the bottom end of 40 meters.

UNCLE SKIP'S CONTEST CALENDAR

ARRL Sweepstakes Contest (CW)
Nov 5, 2100 UTC - Nov 7, 0300 UTC

ARRL Sweepstakes Contest (SSB)
Nov 19, 2100 UTC - Nov 21, 0300 UTC

NA Collegiate ARC Championship (SSB)
Nov 19, 2100 UTC - Nov 21, 0300 UTC

CQ Worldwide DX Contest (CW)
Nov 26, 0000 UTC - Nov 27, 2400 UTC

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Feed Lines, Waveguides and Their Applications

What do terms like "feed line," "coaxial cable," "twin lead," "hardline," "ladder line," and "wave guide" mean? Let's take a look and see.

❖ Coaxial Cables

Feed lines are cables used to connect an antenna to a receiver or transmitter. The most common feed line is coaxial cable (fig. 1A), commonly called "coax." This cable has an outer metallic conductor comprised of a sheath of braided wires. The more metal used in the braid, the better the line is shielded from outside electrical noise and interference, and the less of its signal the line will lose to radiation. An inner conductor also runs throughout the cable's length. The inner and outer conductors are separated and insulated from each other by the cable's dielectric which is usually solid or foamed polyethylene. Typically a plastic jacket encloses the cable for protection from wear and weather.

The better the quality of the dielectric the less loss is introduced by the cable. The lowest-loss line, called "hardline," has foamed dielectric and a solid-aluminum outer conductor that gives excellent shielding but does not readily bend. Hardline is used where low-loss and/or minimum radiation or reception by the line is essential, such as in cable TV lines. Available types of coax vary in terms of their characteristic impedance, amount of loss signals undergo traversing the coax, power levels which the cable can handle, and the shielding effectiveness of their outer conductor.

❖ Single-Wire and Parallel-Wire Lines

The simplest feed line is a single wire run between an antenna and a receiver or transmitter. Unfortunately, this kind of line acts as an antenna as well as a feed line. That is, it radiates and receives as well as routing RF between the receiver or transmitter and the antenna to which it is connected. This changes the antenna's radiation and reception pattern, and is often undesirable. Although they have been popular in the past, single-conductor lines are used relatively little today.

Line consisting of two parallel conductors imbedded in a flat, polyethylene, dielectric strip is available with either 72-ohm or 300-ohm characteristic impedance: this is called "twin lead" (fig. 1B). Window line (fig. 1C) is constructed like twin-lead; however, to reduce losses it has rectangular holes in its dielectric. Window-line comes in 300-ohm, 450-ohm and 600 impedances.

Open-wire line (fig. 1D), also called "ladder line," has even lower losses than window-line, because it has almost no dielectric except for air. The conductors are held separate by small rods of dielectric at intervals along the line. Open-wire line comes in 450 and 600-ohm impedances, or you can make your own (see the *ARRL Antenna Book*).

Parallel-wire lines are not shielded, as is coax. However, if the lines are close together, their electrical and magnetic fields cancel one another so that much of the radiation from the line, and also electrical-noise pickup, are cancelled. Conversely, as the spacing between the conductors of parallel-wire line increases, the line's tendency to radiate and receive increases.

❖ Waveguides

Waveguides (fig. 1E) are hollow metal tubes, usually filled with dielectric such as air or inert gas. Coax and parallel-wire lines conduct RF energy as current; however, waveguides guide RF energy as electromagnetic waves. Sometimes referred to as "RF plumbing," waveguides can handle higher power levels than coax. On the negative side, waveguides are relatively inflexible, expensive, and require more effort to install than coax or parallel-wire lines.

Waveguides are seldom found in ordinary consumer equipment, and most *MT* readers will likely never work with a system using them. Waveguides are used primarily in the microwave bands where they have much less signal loss than coax. Applications for waveguides include earth-satellite uplinks; ground, airborne, and marine radar installations; and UHF-television transmitter systems.

❖ Baluns and Balance

Parallel-wire lines, such as twin lead, window line, and open-wire lines, are "balanced lines." That is, their conductors are equally exposed to electrical interaction (i.e., mutual induction effects) with the earth or other nearby conductors. In contrast to this, coax is unbalanced in that its center conductor is shielded from anything outside the line, but the outer conductor is not. Thus, coax is a good choice for antennas such as the ground plane antennas whose elements are unbalanced with respect to the earth. On the other hand, parallel-wire lines are a good choice for feeding horizontal, center-fed dipole antennas which are electrically-balanced with respect to earth.

Balanced circuits and unbalanced circuits can be adapted to one another by devices known as "baluns," (an acronym for "balanced to unbalanced"). A further function of some baluns is transforming impedance values up or down. For example, a balun with a four-to-one transformation ratio can be used to match the impedance of a 300-ohm folded-dipole (balanced) to a 75-ohm coax (unbalanced), as well as to adapt the balanced antenna to unbalanced coax.

As an aside here, it's worth remembering that most antennas' feed-point impedance varies significantly with their height above earth. And so, at various heights above earth, the feed point of the folded dipole in your backyard may actually be quite different from its free-space value of 300-ohms.

❖ Utilizing Feed Lines

Consider the terms "load" and "source." A

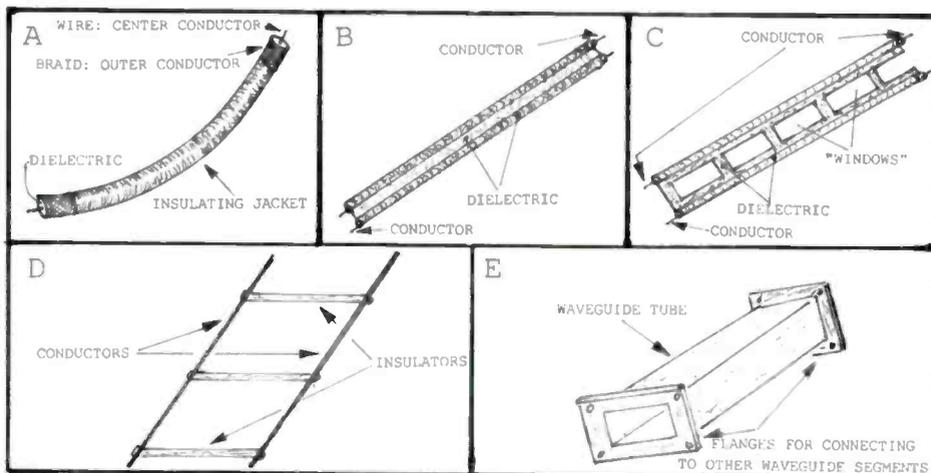


Fig. 1. Coaxial cable (A), twin lead (B), window line (C), ladder line (D), waveguide (E).

This Month's interesting Antenna-Related Web site:

L. B. Cebik gives a good discussion on using coax:
<http://www.cebik.com/a10/ant15.html>

"source" supplies RF current, and a "load" accepts that current. For instance, the transmitter output circuit is a source of RF current for a feed line feeding an antenna. The feed line then is the source of current for the transmitting antenna. For reception, the receiving antenna is the source of RF current and the feed line is its load. The receiver antenna-input circuit is then the load on the feed line. If maximum power is to be accepted by the load, then the impedance of both the source and load to which line is connected must be equal (match). Input and output circuits for most of today's consumer radio equipment is designed to have a 50-ohm impedance. For this reason, using 50-ohm feed line usually simplifies matching problems.

Matching circuits are often used to improve the match when mismatch exists. An antenna tuner is an example of a matching circuit.

current flow that they are often called "insulators." In practical terms, they do not conduct electricity to any useful degree. However, you now know that a piece of cloth, when wet, can actually work as an antenna. But how about using dry dielectric material to make an antenna? No? Hmmm."

Well, we don't have antennas made entirely of dielectric material, but dielectrics are functional elements in some so-called "dielectric antennas." The first such antenna system was devised by Hertz, the first person to convincingly demonstrate the action of radio waves to the world. He used a prism made of dielectric material (pitch) to direct RF waves to an antenna element.

Since Hertz's time, a number of microwave antennas that utilize a dielectric lens to focus RF energy have been developed. In the GHz region, dielectric materials are frequently utilized in antenna systems as lenses, or for element spacing and structural support. These antennas offer stable performance, and many are small enough to fit on the circuit board inside the case of a GPS receiver or cell phone. See <http://www.toko.co.jp/products/pdf/antenna/dat.pdf> for an example of these tiny "dielectric antennas." You can see examples of both rod and horn "dielectric antennas" at: http://esl.eng.ohio-state.edu/pdf/Poster_UWB_antenna_ccc.pdf

This Month:

Last month we discussed antennas that utilize water as their conducting elements. Yet in the early engineering development of waveguides, water was utilized as their dielectric! Dielectrics are insulators, not conductors, so what's going on

here? Is water a conductor, or is it a dielectric? Or is it some kind of semi-conductor, or semi-dielectric?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

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RADIO RIDDLES

Last month:

I wrote: "Dielectric materials, such as mica, cloth, paper or glass, offer so much resistance to

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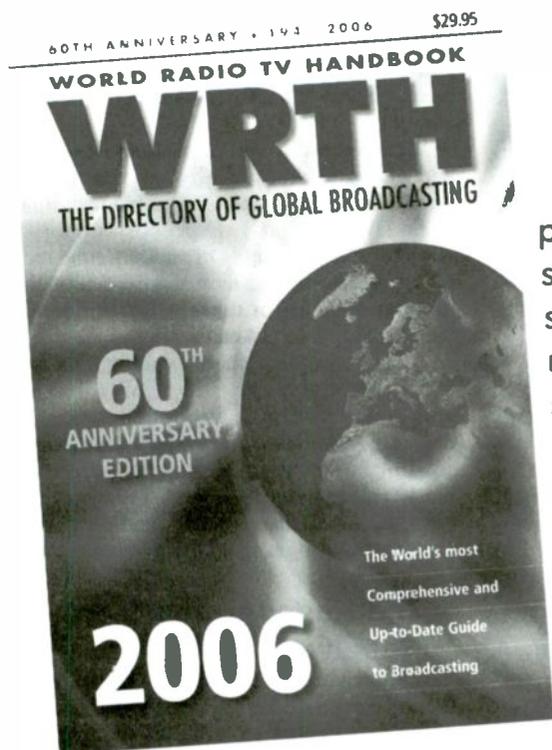
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The First Broadcast Receivers

Dogonne it! If you're one of the people who have been waiting on the edge of your chair for news of the HQ-120 restoration, I'm going to have to disappoint you again.

A week of vacation with my East Coast relatives, followed by five days at the Antique Wireless Association Conference near Rochester, New York, took a huge chunk out of the month. Factor in the time needed to plan and pack for the trips plus the time to drive to and from these places from my Chicago-area location and there wasn't much left.

❖ The AWA Conference

Perhaps I should start out with a little information about the Conference. This year, some 450 people from all over the world were in attendance – spending five days immersed in vintage radio, telephone, telegraph and other historic forms of communication. The theme of the Conference was Western Electric, a company noted for its long-time manufacture of telephone equipment.

However, the many Western Electric exhibits presented by the members in our special contest room included vacuum tubes, loudspeakers, broadcast microphones, and even a sewing machine and iron! A group of our neighbors to the north brought in a huge exhibit of items manufactured by Northern Electric, Western Electric's Canadian affiliate.

In addition to the twelve presentations and seminars, there was a busy flea market;

auctions of paper collectibles, vacuum tubes, and general equipment; an awards banquet and visits to AWA's incredible museum and museum annex.

Other features of the Conference included a book fair offering both new and "golden oldie" volumes, a ladies luncheon, a farewell luncheon and – high on my list of attractions – the opportunity to trade ideas and information with people of similar interests.

Make it if you can next year! You won't be disappointed.



The home radio quickly became a fixture in 1920s living rooms. Make and type of this set is unknown.

❖ Crystal Receivers

I'll bet if I were to ask you to name the earliest type of broadcast receiver to be widely used in the nation's living rooms, you would immediately say, "must be the crystal set." A picture comes to mind of dad fiddling with the cat's whisker adjustment, intently listening through earphones glued to his head, while the rest of the family listens through extra earphones or looks on.

The truth is, though, that while the earphones and intent listening are definitely part of the picture, the cat's whisker and crystal are not. The galena crystal, along with other forms of semiconductor detectors (such as carborundum, zincite and platinum/acid [electrolytic]), date to an earlier era of radio communications – the era before World War I.

Back then, there was no radio broadcasting (that is, diffusion of entertainment or



The Westinghouse "Aerola Jr." receiving set utilized a crystal detector.

information to the general public). The radio transmissions were point-to-point communications – mostly marine, commercial and military. Home crystal set users were individuals, much like present-day *MT* readers, who wanted either to listen in on the broadcasts or communicate with some of the stations. (Back then, those with amateur transmitters were not prohibited from contacting non-ham stations.)

But the radio communications landscape had changed dramatically by about 1920, thanks to the technological advances made during World War I. Especially important were the developments in vacuum tube technology accomplished then and the availability of great numbers of tubes, at low prices, on the war surplus market.

The improved tube technology not only facilitated the transmission of voice and music, but also made it possible to receive the transmissions reliably and with simple equipment. The result: during the early 1920s there began an explosion of broadcast stations, including many in attics and garages, all sending out programs to the private listener.

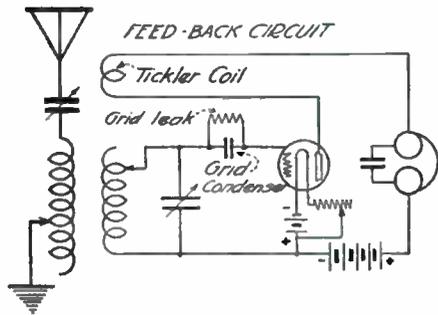
❖ The Regenerative Receiver

Some young hobbyists and families with limited budgets were still tuning in these programs with crystal sets. But the more serious listeners were gravitating to vacuum tube radios using a simple, but powerful, circuit devised by legendary radio inventor Edwin Armstrong.

In Armstrong's basic *regenerative* cir-



AWA Member Bob Renkar shows off his 1939 Golden Gate Exposition commemorative radio at the AWA Conference. Photo by Larry Babcock



Schematic of a simple 1920s regenerative receiver. Energy was fed from the output back into the input via the "tickler coil," creating a feedback loop.

cuit, a single tube served both as detector and amplifier (the latter was a function that could not be performed by the crystal detector or any of its relatives).

But the astonishing performance of the Armstrong circuitry lay in its feedback arrangement. Part of the tube's output was coupled back into the input. The result was that the received signal could be amplified over and over again, resulting in tremendous gain.

In the earliest regenerative sets, the degree of feedback was controlled by changing the relative positions of two coils – one in the output circuit and one in the input. The closer together the two coils, the greater the degree of feedback.

With the coils too close together, the tube would go into oscillation – emitting a radio signal that would interfere with other radios in the neighborhood and create an ear-splitting howl in the earphones. The idea was to reduce the feedback (regeneration) until it was just below this point – resulting in maximum amplification of the received signal.

The regenerative circuit extracted so much performance from a single tube that many of the early 20s factory and home-built sets had just one. A typical example was the Crosley 50. I've included both interior and exterior views of this set. Notice the two pancake coils that controlled regeneration. They can be brought closer or farther apart by pulling or pushing on a front panel knob.

Crosley 50s are still quite common at radio meets, because they were originally manufactured and sold in such great quantities. I saw one sell, without tube, for about \$50.00 at the AWA auction. You could likely do better at a flea market.

The tube is an important issue, because it can cost \$30.00 or more to replace the rare type 11 or 12 that belongs in the set. If there is a tube installed in a "50" you are considering purchasing, check it carefully. Make sure it is the correct type (you may find the socket occupied by an 01-A worth maybe \$5.00 and incorrect for the radio) and that the filament is good. Filaments blew out easily – especially when inexperienced users connected the batteries incorrectly.

❖ Firing up a Crosley "50"

Unlike the later, more elaborate, battery

sets that were designed to use an auto-type "A" battery to light their filaments and two or more large "B" batteries to supply plate voltage, the Crosley 50 is very easy to power. Use a flashlight "D" cell, or perhaps a couple of them in parallel, to energize the 1-1/2-volt filament. Three 9-volt transistor batteries in series will do for plate voltage. If you're a purist, add a series resistor to drop the 27 volts down to 22 or 23.

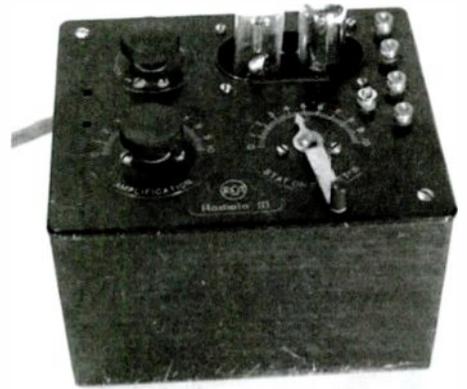
Connect the antenna, ground, batteries and headset. (The headset has to be a high impedance unit, not a modern hi-fi type. Vintage sets of the correct 2000-ohm impedance are readily and inexpensively available at radio meets.) Turn the battery rheostat to the minimum (fully counterclockwise) position and pull the regeneration control all the way out so that the coils are as close together as possible.



Two views of the Crosley 50. Front panel controls (clockwise from left) are: Tuning dial, regeneration control, battery voltage control and coil tap selector.

Now slowly advance the battery control until the set comes to life with a rushing or howling noise. Push in the regeneration until the noise stops, then pull it back until you hear a pop or howl that signals the onset of regeneration. Slowly push it in again until the noise just stops. Now you are ready to tune for stations.

To understand the tuning procedure, take a look at the tuning capacitor (upper right in interior photo). One of the two plates is fixed, the other is spring-loaded and is moved in and out by an eccentric cam controlled by the large front-panel knob. Called a "book capacitor," it has a very limited capacity range compared to the modern variable capacitors we're all



The Radiola III was slightly more sophisticated than the Crosley 50 and boasted a second tube to provide higher earphone volume.

familiar with.

For that reason, the tuning coil is tapped so that more or fewer turns can be placed in the circuit depending on the position of the front-panel tap switch. In this way, the broadcast band is spread out in segments, each accessed at a different position of the tap switch.

Another simple regen receiver of the era is the RCA Radiola III. We won't be able to cover this somewhat more sophisticated set in detail just now. However, like the Crosley, it has controls for battery, regeneration and tuning. Its extra tube provided extra volume in the headset.

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Electronic Kit Building A Lost Art? Not Any More!

By Dr. John Catalano

Building electronic kits was a major pastime in the 1960s. Every "radio person" I knew had built a Heathkit. It didn't matter if they were World War II vets or high school students. Most all had broken open the cardboard box delivered to their home from Benton Harbor, Michigan, and experienced that distinctive mixed smell of plastic, phenolic, paint, rosin, rubber, ink and paper.

I started my electronic kit building in junior high school, when my Dad came into my room one day. After surveying about one hundred model airplanes I had bought and built hanging from the ceiling, he spun out of the room and returned a few minutes later with a "magazine" in his hand. "Stop wasting your time and money on the airplane model and try building one of these." Then he tossed me my first Heathkit manual. (I was surprised to hear these words coming from a former US Air Force aircrew member.)

A few weeks later I was building my first Heathkit – a shortwave receiver. Over the years it was followed by a CB walkie-talkie, ham transmitter, ham band receiver, CB transceiver, 6 meter transceiver, 2 meter transceiver, grid dip meter, Q multiplier, stereo amp, FM tuner, and a weather station – all Heathkits. By the end of the 1970s, just about every engineer and technician where I worked had built a Heathkit color TV. Heath was not alone in the kit business: Allied also had their Knightkit line of ham, shortwave and audio products.

It has been decades since Heath ceased operations as a provider of a full range of kits. Those interested in Heath can read and see some

great stories on the Internet at <http://www.heco.home.mindspring.com/> Check out the link to "A history of the Heath Company" collected by the late Bjorn Heyning. It contains his memories and many other Heath employees.

❖ Worth the Effort

The personal pleasure and pride that results when you first turn on a working piece of equipment – which a few hours or days ago consisted only of several bags of parts – is unforgettable.

Although Heath was not the only kit provider available, their trademark was construction simplicity. In reality, to successfully build a Heathkit you did not need to know *any* electronic theory. Of course, Heath's well-written, step-by-step instruction manual was also a major key. All that a person really needed was a careful reading ability, personal organization, identification of electronic components, and basic soldering ability.

❖ Kit Building Today

The above four requirements are as valid for kit building success today as they were thirty years ago. In this two-part article we will share some hints for each of the four areas – hints which will increase your chances of building a kit into a working piece of electronic gear.

This series of articles will follow our building Ten-Tec's model 1254 SSB-CW-AM microprocessor controlled, 15 memory, dual conversion, general coverage receiver kit. The Ten-Tec home page is at <http://www.Ten-Tec.com> or you can reach them at 1185 Dolly Parton Parkway, Sevierville, TN 37862 U.S.A. (800) 833-7373 or (865) 453-7172.

If we follow the instructions carefully and use good construction techniques, this digital receiver covering 100 kHz to 30 MHz will be a useful addition to our radio shack. It's powered from an included 12 volt DC wall transformer and can do double duty as a mobile receiver.

All of the construction techniques we will use in building the Ten-Tec 1254 receiver can be applied

to any electronic construction effort. So let's start.

❖ Reading Ability

Read each instruction slowly and make sure you dwell on the meaning of each word. In fact, re-read each one. Treat the instruction manual as textbook, not a novel. Every detail is important. There is a major difference between reading and studying. *Study* the manual by reading and understanding each word and sentence. Don't perform *any* action until you read and understand it completely. As the carpenter's saying goes, "Measure twice. Cut once."

❖ Personal Organization

If you lose a part, you cannot complete the kit. Therefore, you must be organized and keep track of every component of the kit. Even opening the cardboard box when it arrives is important. Don't even *look* at the parts until you have a prepared surface on which to work.

A dedicated place to build your kit, such as a workshop area, is ideal. However, most kits are built on kitchen tables around the world. If you use the kitchen table, use a thick cover to protect the surface and your relationship with your significant other!

A plastic shower curtain liner, available at most dollar stores, makes a great table cover. Use a small square of thick cardboard placed over the plastic as a soldering "station" and solder splash pad.

Some kits, including the 1254, are supplied with components pre-sorted by use. For example, all components for the display board are grouped together in a package. See Figure 1.

Once a pre-sorted package is chosen for construction, its components should be grouped by type. Make separate groups of resistors, capacitors, inductors, diodes, transistors, integrated circuits, unique components and mechanical parts.

❖ Telling Resistors from Inductors

A good place to start is on page 15 in the "Getting Started" section and the back cover of the Ten-Tec instruction manual. These pages are very helpful in identifying components and determining their value. We'll review some component basics.

Resistors are usually cylinders with leads



Figure 1 - Ten-Tec 1254 starts life as bags of parts

coming out each end, axially. Typically, four colored bands adorn the cylinder. The colored bands are used to tell the value of a resistor. For example, assume we have a resistor with brown, red, orange and gold bands. The band closest to one end of the resistor is the first band. The first two bands are read out as numbers. See Figure 2 Color Chart. Brown has a value of one and red a value of two. The third band is the multiplier. For example, the third band is orange, which corresponds to three (see Figure 2) This means three zeros are placed after the first two numbers. Brown-Red-Orange equals 1 2 000 or 12,000 ohms. Using K as a symbol for 1000, this can be written as 12K ohms.

COLOR CODE FOR COMPONENT VALUES

BAND COLOR	VALUE
Black	0
BROWN	1
RED	2
ORANGE	3
YELLOW	4
GREEN	5
BLUE	6
PURPLE	7
SILVER	8
WHITE	9

Figure 2 - Color Code Chart for resistors and inductors values

If any other colored bands exist past the third, they give the tolerance of the resistor's value (using a different color code). For example, a gold fourth band indicates that the actual value of the resistor will be within +/- 5% of the banded value. Resistor values can, and should, be verified using a ohmmeter before installation.

❖ Watt?

Resistors come in various wattage ratings; one-eighth and one-quarter are commonly used on printed circuit boards, the main construction method of the 1254. Different resistor wattages manifest themselves as different resistor diameters and length.

❖ Inductors

Molded inductors look like resistors and have a similar color banded value system. However, if you measure an inductor on an ohmmeter, it will usually read less than 5 ohms since it is simply a coil of wire.

❖ Capacitor IDing

Capacitors come in all different shapes and values. The most common for PCB use are either tubular, disc, or mylar types. Capacitors have two primary parameters associated with them: value and voltage rating. The tubular have their values printed on them. Their leads can be axial protruding from either side of the body, or both leads coming from the same side.

Electrolytic capacitors have their values written on them. These caps have positive and negative leads, which are usually marked on the body. Note the polarity of these electrolytic capacitors carefully before installation.

The flat disc caps use a code for their value. This consists of three digits. As with

resistors, the first two digits are numbers and the third a multiplier. Again, the multiplier tells how many zeros are placed to the right of the two digits. For example, 101 equals 1 0 0. However, it is always read in picofarads (pfd). See the Ten-Tec manual on how to convert Picofarads to nano and microfarads.

Mylar capacitors are also used in the 1254. These are usually square shaped rectangles with both leads protruding from one of the longer sides. They use the same marking convention as the discs.

❖ Semiconductors and ICs

Diodes are usually small glass cylinders with – you guessed it – colored bands. The end with a band closest to it is the cathode. The diode symbol used in circuit diagrams is an arrowhead pointed into a line. The banded end cathode corresponds to the line on the diode symbol. Care must be taken when forming or bending the leads not to crack the glass body.

In the 1254 kit, integrated circuits (ICs) come in two different packages: dual-in-lines (DIP) and in-lines. The DIPs look like black bugs with legs (pins) coming from both sides. The In-line ICs have all their pins all coming from one side. The number of pins can vary from 8 to, well, a lot.

Integrated circuits indicate pin number one in different ways. Some ICs use an "o" molded in the corner of its plastic package near pin one. Others use a "u" molded in the center of one end of the IC. Pin 1 is the first pin at the top left of the "u". Pins are numbered down the side from pin 1. For DIPs it then continues across the *bottom* of the IC to the other side. Then up that side.

❖ Discretes

Transistors are real problems, even though they usually only have three leads – base, collector, and emitter – for a bipolar or gate, and a drain and source for an FET (field-effect transistor). The problem is that the leads can be in any order. Check the diagram of the transistor in the instruction manual. Be careful to note if the diagram is viewed from the bottom of the device or from the top. We can identify leads' functions (base, collector, etc.) if we look at their positions relative to a flattened section of the transistor's body, or other physical marker on the transistor.

❖ Soldering

Before we start a discussion on soldering, a few words of caution: At 600 to 800 degrees, a solder iron applied directly to plastic can easily melt it. The iron applied directly to paper for a prolonged period can potentially cause a fire. Touch it to skin and you'll have a nasty burn.

Be careful. The plastic and cardboard work surfaces are there just to protect the table from scratches, contain the kit parts and catch solder splashes. Keep the hot parts of the iron away from the table protectors. And, of course, keep the iron away from body parts.

You'd be surprised at how many newbies sport painful burns on their lip after trying to determine if their iron is hot! Unbelievable, but true. More on choosing a soldering iron and tools

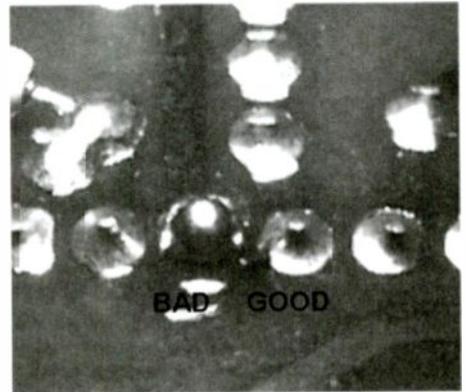


Figure 3 - Bad high contact angle "bubble" on left; good solder joint on right later.

Basic Soldering

The soldering process makes a mechanical and electrical connection between the lead of a component and the copper trace of the printed circuit board. This is done by using a soldering iron to melt solder made of lead (pb) and tin (sn). It also has a rosin core which aids in the process. But that's not the whole story.

Why heat, why rosin? At atmospheric pressure a layer of oxide grows on most metal surfaces within 1/2 second. So we rarely interact with metal surfaces, but instead we deal with metal oxide layers on the metal surface. But oxides are not as electrically conductive as the metal, resulting in highly resistive connections.

These oxides can be broken down by heat. Therefore, the soldering iron provides two functions – melting the solder and breaking down the surface oxides.

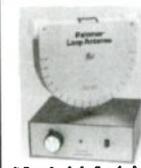
Contact Angle

When a drop of liquid, for example water, "sits" on a surface, the shape of the drop can tell us a lot about the liquid/surface interface. If the drop sits high and round, it indicates that the surface forces are not allowing the liquid to contact, or wet, the surface.

If, on the other hand, the drop loses its shape and spreads, it means that there is close contact between the liquid and the surface. In this case the liquid has "wetted" the surface. See Figure 3.

If a tangent line is drawn from the side of

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Figure 4 - Top of the line Weller WESD 51

the drop to the surface, the angle that it creates with the surface is called the contact angle. High contact angle or well-formed drop equals poor wetting; that's bad. Low contact angle or spreading, flattened drop equals good wetting; that's good.

Now, remember that poorly conducting oxides are present on metal surfaces. Luckily, at temperatures over 350 degree these oxides become unstable and break up. Although the oxide breakup is just for a few seconds, it is enough time (when helped by the solder's rosin core) to allow the melted solder to wet the surface of component leads and printed circuit board (PCB) traces.

"Heat the Work, NOT the Solder!"

That's the old electronic technician's dictum. Always place the soldering iron tip on the junction of the PCB trace and the component lead. Then feed the solder on the hot junction. Remove the iron after the solder has flowed. Scientifically, a proper solder junction has good wetting, resulting in low contact angles.

Cold Solder?!

Another term you will hear when there is a problem is that it is due to a "cold solder connection." What does this mean? All molten solder becomes cold, reaching room temperature. The "cold" in cold solder refers to electrically cold, or non-conductive. This can occur if the surface oxides are not heated to a high enough temperature for it to break up. Check the contact angle.

A poor electrical connection can occur if a non-conductive material, such as the rosin used in the core of the solder, surrounds the lead. Again, this is usually a sign of improper heating. Check to see that there is no dark ring,

indicating rosin, between the component lead and the solder flow.

A cold solder joint that is more difficult to see can occur if the pieces to be soldered are moved before the joint is cool and the solder is still in a molten state. In this case, oxygen becomes part of the lead/tin mixture and a poorly conducting inter-metallic compound is formed. This is usually detectable from the dull gray appearance of the joint. For metals the rule is: the shinier the surface the higher the conductivity. It has to do with the amount and location of free electrons.

Clean is Good

One key to good soldering is keeping the tip of your soldering iron clean and coated with a thin coat of solder. Following a few simple rules will keep the tip in this state. First, have a damp sponge on hand. As the iron warms up, gently polish the tip with a brushing action on the damp sponge.

When the tip takes on a shine, apply enough solder to coat the tip. Then wipe excess solder off on the sponge.

The iron is now ready to be used. If you leave the iron on for a few minutes without using it, do another gentle wipe of the damp sponge before re-use.

One more thing: NEVER use your soldering iron for anything but fine solder and never use it with acid core solder.

The Soldering Iron

A low wattage (under 100 watts) temperature-controlled soldering iron is almost a necessity, since the size of components (and therefore the amount of heat needed) vary a great deal. Too much heat and you will destroy the component and damage the printed circuit traces. Too little heat and your kit will not work.

My temperature-controlled Weller Model WCC 100, 100-watt soldering iron holds a place of honor in my workshop. I've had it for over a decade and it still has years of life left in it. Whatever you do, DO NOT use a cheap solder iron. Your work and your enjoyment will suffer. I've used Weller irons during my entire 30-year industrial electronics career and at home and have never been let down.

These days I use a Weller Model WESD51, a 50-watt iron with digital temperature display. See Figure 4. At a maximum of 50 watts the WESD51 is just perfect for PCB and fine electronic work. This is a top of the line, top quality soldering iron. Weller makes a whole range of soldering irons, so pick one that fits your needs and budget. If you intend to make electronic construction a hobby, I suggest that you invest in the best iron that you can afford. One place to find good equipment is at <http://www.cooperhand-tools.com>



Figure 5 - Set of basic electronic kit building tools

Actual Soldering

Start by using good quality solder rosin core with a composition of 60% Tin and 40% Lead and having a diameter of 0.03 inches (not exactly what you'd use for plumbing projects!). You can buy good quality solder at Radio Shack.

Place the iron on the junction of the PCB trace or hole and the component lead. Make sure you only heat the junction of interest, not adjacent sites.

Wait about two to three seconds. Then feed a *small* amount of solder to the heated junction. Keep the heat on the junction another two to three seconds or until the solder flows. Then smoothly remove the iron. That's it! Whoever said timing is everything, must have had soldering experience.

Resist the temptation to "brush on" the solder, and remember to keep the tip of the iron shiny with frequent wipes on the damp sponge. Finally, watch for accidental bridging of the solder to adjacent pads. Later, with lots of components on the PCB, these can be impossible to find. Catch them now.

Other Tools

At a minimum, you will need mini diagonal cutters, mini needle nose pliers and a range of screwdrivers. If you are not adroit with the diagonal cutter, you'll also need a wire stripper. See Figure 5.

Once a component is soldered in place, use the tip of the diagonal cutter to cut the excess leads just above the solder joint. Use a quick, clean snip. Cut them low enough so adjacent leads cannot touch. Discard the clipped leads so they don't remain on the PCB and cause an electrical short. This could easily result in component destruction.

Speaking from experience, don't try using "Dollar Store" tools. They are usually of poor quality. I found their "cutter" doesn't cut but "tears, smears and bends."

Radio Shack or Sears are good sources for high quality tools. Xcelite produces some of the best electronic tools. If your budget allows, get Xcelite's basic four piece tool set. In any case, make sure that the cutters and the pliers are matched to the small size of the components. In general, the smaller the tool the better. Four-inch tools are the norm.

You will find that a magnifying glass is a useful item, as well as an ohmmeter for verifying resistor values. I've seen digital multi-meters in discount stores selling for under \$9 that would be just fine for this kit. For coil tuning during alignment, a Radio Shack alignment tool assortment will be necessary.

Investing money in good electronic tools will save hours and days of time in troubleshooting non-working kits. The return on investment in quality, time, and pleasure will be great. So get your work station ready, and next month we'll build the Ten-Tec 1254!

This is your equipment page. Monitoring Times pays for projects, reviews, radio theory and hardware topics. Contact Rachel Baughn, 7540 Hwy 64 West, Brasstown, NC 28902; email editor@monitoringtimes.com.

MT REVIEW

Mastech Ms8209 Universal Multimeter

By Bob Grove W8JHD

While multimeters abound for general electrical use, nothing comes close to the multiple functions of this recent release from Mastech. The manufacturer refers to this multiple utility as a "5 in 1" concept, since its meter reports sound, light, humidity, temperature, and electrical measurements.

The applications for its many measurements are virtually unlimited. Its numerous electrical units make it invaluable for scientific and electronics test benches. The relative humidity scale finds application in critical gardening and exotic plants as well as environmental facilities for storage and living. The photometer assists photography, filming, video taping and even rare plant growing. And the sound level meter is ideally suited for auditoriums, classrooms, churches and performance halls for acoustics control.

Let's take a quick look at the scales, units, ranges, and claimed accuracy:

DCV: 0 mV - 600 V (+/- 0.7%)
ACV: 0 mV - 600 V (+/- 1.0%; true RMS)
DCA: 0 mA - 10A (+/- 0.5%)
ACA: 0 mA - 10A (+/- 1.5%)
Ohms: 0 ohms - 40 megohms (+/- 1.2%)
Capacitance: 0 nF - 200uF
Frequency: 10 Hz - 200 kHz (+/- 0.5%)
Duty Cycle: 0.1 - 99.9% (+/- 3.0%)
Temperature: -20 deg. C. - 1000 deg. C. (+/- 1.0%)
Relative humidity: 30 - 90 %
Sound Level: 35 - 100 dB (0.1dB/3.5%)
Luminance: 0 - 40,000 Lux (5.0%)
Function transform: DC/AC, selectable
Range transform: Automatic or manual, selectable

The multimeter's rugged, rubberized enclosure resists splashing and provides durability. The test leads are high-quality rubber insulated, not the stiff plastic normally associated with low-cost meters. A thermistor probe is included for direct-contact temperature measurements.

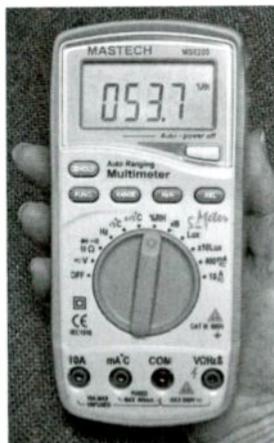
A built-in prop can be hinged out to stand the meter for convenient viewing. A backlight allows the unit to be clearly read in low light conditions.

A high-quality, zippered, nylon bag is provided, containing pockets to securely hold the meter and test leads. And how many other manufacturers even include a battery?

❖ Let's test the meter

It's handy to have so many functions in one instrument, but are they all equally accurate? We decided to take a look, comparing the Mastech 8209 to several other test instruments of known accuracy. Here's what we discovered.

Since we had an opportunity to evaluate two identical instruments, their responses should be close; they weren't. As a matter of fact, when compared with instruments of established accuracy, the MS8209 didn't even come close to its specified



tolerances on several functions.

The better of two was very accurate on AC and DC volts, current (milliamps), resistance (ohms), capacitance (nanofarads) and frequency (hertz), and even sound level (within 4 dB).

But our room temperature was 7 Celsius degrees off (that's 12 Fahrenheit degrees); the relative humidity read 22% low when compared to an accurate sling psychrometer; and the luminance readout showed no relationship between the lux and 10 lux scale (which should have been related by a factor of 10).

But it's not all bad news. Checking with the factory, I was able to secure the calibration procedure which is now included with the instruments sold by Grove Enterprises.

If you are looking for a multimeter for the electronics bench with applications for environmental measurements, all at a reasonable cost, then this is the meter for you.

The Mastech MS8209 multimeter with calibration procedure for the technically inclined is available for \$89.95 plus shipping from Grove Enterprises (1-800-438-8155 or <http://www.grove-ent.com>)

Zap Checker 185

By Bob Grove W8JHD

Some months ago we had the pleasure of reviewing the Zap 180, a handy handful of electronics that provided broadband signal detection. This month we take a look at its improved replacement, the ZC185.

Like its predecessor, the new model is a sleek, ergonomically-designed, pocket-sized instrument designed for the detection of signal presence in virtually any part of the radio spectrum. Its specifications are impressive: 3-5000+ MHz bandwidth, high sensitivity (cell phones and covert listening devices [bugs] at 50+ feet, two-way radios at several hundred feet), and signal announcement by meter, LED and silent vibrator.

Since digital bursts are different from constant analog signals, a switch allows selection of either mode for maximum sensitivity.

In weak-signal environments, the linear mode is chosen for highest sensitivity; in strong-signal conditions, a logarithmic setting provides 1000:1 signal-strength variations and their detection. A thumbwheel allows fine adjustments.

The silent vibrator mode allows the instrument to be worn in stealth, revealing the presence of a transmitting device.

A concise and highly-informative set of operating instructions is provided. The instrument is powered by two AA alkaline cells (not provided).

❖ Our field test

The ZC185 is intuitive to operate, but it's a good idea to read the manual first to fully appreciate its capabilities.

The contoured outline of the case is especially comfortable in the hand. The log/linear mode switch and sensitivity thumbwheel with the on/off switch are easily operated by the thumb.

The LEDs are brilliant and meter response is fast, allowing rapid resolution of signal sources.



As expected, some environments are packed with radio-frequency (RF) signal sources, and the ZC185 is, after all, a field strength meter; as such, it provides a reading of the aggregate of all signals in the environment. Nonetheless, as discrete signal sources are approached, the readings get stronger.

We found the ZC185 to be quite a handy instrument for testing undesirable radiation from consumer electronics, detecting the presence of transmitting devices

(welcome and unwelcome), and revealing the general RF conditions in any area.

The new ZC185 Zap Checker is available from Grove Enterprises for \$158.95 (1-800-438-8155; <http://www.grove-ent.com>; or write 7540 Hwy 64 West, Brasstown, NC 28904).

A Radio Revolution – Eton E1XM

By Larry Van Horn, N5FPW
MT Assistant Editor

There is a radio revolution taking place and the leader of that revolt is a new entry into the shortwave portable market, the Eton E1XM.

The E1XM, part of the new Eton Elite Series, is the world's first radio to combine AM, FM, Shortwave, and XM Satellite Radio* technology into one unit. The E1XM offers reception through a digitally synthesized PLL tuner with a synchronous detector, passband tuning, and selectable bandwidth filters. Manufactured in India (not China) it has 1,700 station presets, and a robust memory scan function.

But more importantly, and what sets this radio above any other portable in the marketplace today, is the plethora of features, level of performance, and inclusion of the XM satellite reception capability, all in one neat and trim package.

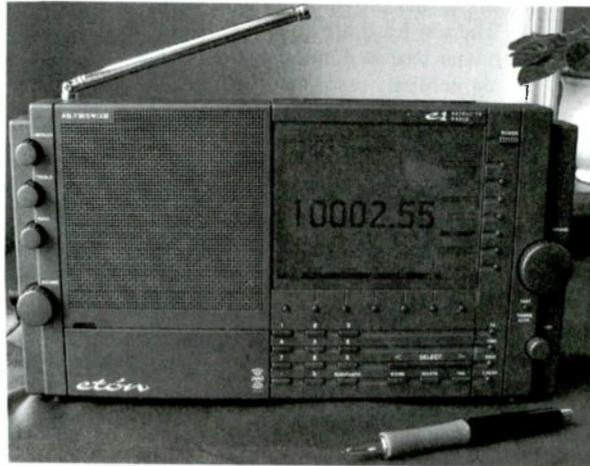
❖ Inside the Box

The first thing I noticed when I took the E1XM out of the box was a sleek, well-built portable radio. Gone are the huge boom box and quality control issues of its predecessor, the Grundig Satellite 800. The case appears to be made of a type of hard plastic. The ergonomics are good, though some of the buttons on the front of the radio are a bit on the small side.

Applying power and tuning around in the AM/FM bands, I was impressed with the excellent and clean audio. Tuning through both broadcast bands, I noted that signal levels were good (especially in the FM broadcast spectrum). The base and treble controls allowed for a wide range of adjustment to set the audio just right for the station being received. The use of selectable filters (2.3, 4.0 and 7.0 kHz) regardless of mode is something you don't normally see on most portable radios and is a welcome feature. A DX soft key turns on a preamp to improve reception on weaker signals.

As I dug deeper into the operation of the radio, I sensed the feel of a Drake design. A call to Walter Hess, the technical support manager at Eton, confirmed that Drake did have a major hand in the electronics of this unit.

One of my chief complaints with many shortwave radios is their much-hyped "synchronous detection" feature. The E1XM has a selectable sync detector that actually works. In fact, it worked very well indeed. In the shadow



MT Rating: 3 3/4 Stars

of nearby local stations, AM Sync allowed me to monitor weaker AM signals as close as 10 kHz away from the local station.

Another nice surprise was the Pass Band Tuning (PBT) control. This is well implemented, with a numeric indication on the display of where the control setting is set. It also does its job very well.

The AGC has a Slow/Fast and Auto mode which keep the AGC in fast mode while tuning so you don't miss weak signals. Though it works well, I would have liked to see an additional setting of "off."

Single Sideband (SSB) reception is also good. And as an extra bonus, there is a feature in the radio's menu system that allows you to enable or disable Enhanced SSB. When enabled, it adds another 30dB image rejection, which is a very nice feature.

As I mentioned above, the E1XM has 1,700 memories that can be used to store and recall commonly monitored frequencies. The first 500 are called "memory" channels and the remaining 1,200 are referred to as "Country" channels. These 500 memory channels can be scanned using the "seek" function which can stop on any stored channel with a predetermined squelch level.

The "Country" feature is used to enter all known signals from countries you listen to regularly. These country memories can be scanned using the T.SCAN function to selectively monitor desired "memory" channels. The following receiver controls and information can be stored in each memory channel: frequency, mode, bandwidth, AGC and PBT settings, and synchronous detector settings.

❖ Antennas

You can choose from the internal antenna (whip) to an external antenna, using one of two slide switches on the side of the radio. One switch is for FM and one for HF (LW/MW/SW).

The manual states that a PAL to female F adapter is included for external antenna connection. This was not the case in the initial shipment from Eton. Mr. Hess says anyone wanting the adapter can contact Eton and they will be supplied with one. But if you don't want to wait on Eton for the adapter, you can pick one up from Radio Shack (#278-265B) or buy a cable from Universal Radio that has an F to SO-239 connector.

And one final antenna note: this radio does not have a built-in ferrite loop antenna for LW/AM broadcast reception. According to Mr. Hess, the display was generating a lot of noise and they decided not to incorporate an internal antenna for those bands. Instead, you will be using the whip antenna or an external antenna (not included) if you want improved reception in those bands.

❖ The Display

Speaking of the display, it is a dot matrix type (which might explain the noise issue noted above), and it is nice, big and clear. You can adjust the brightness and contrast, or turn it off completely. You can choose between off, dim, medium or bright, using a multi-purpose switch on top of the unit. The display defaults to dim when turned off or you can turn it off completely when the AC adapter is used. With batteries, the display will turn itself off to save energy. And when it is off, it will display either the local or UTC time (if set).

❖ XM Radio

XM Radio is a subscription service, and

MT First Look Rating (0-10 scale)	
Audio Quality.....	8
Audio Levels.....	8
Back light/Display	5
Battery Life	7
Ease of use	7
Feature Set	8
Keyboard/Button/Control Layout	7
Overall Construction	8
Overall Reception.....	7
Overall Manual	6

therefore is not free. But this radio is XM capable and all that is needed is to pay the activation and monthly subscription fees, buy the optional \$50 XM antenna/module, and you are in business. Once you open up the world of XM satellite there are a lot of neat services, and the feature does add a lot of additional value to the listening capability of this radio. Music, news, and sporting events (including all Major League Baseball games) are some of the many services on XM. For more information on this, see John Figliozzi's *Programming Spotlight* column in the October 2005 issue of *Monitoring Times*.

❖ Overall Rating and Final Thoughts

Overall, I like the E1XM. As I mentioned previously, this is a major improvement over the now discontinued Grundig Satellite 800. But as is the case with most radios, there is room for improvement.

I was disappointed by the lack of DRM capability. Given the push by major shortwave broadcasters toward DRM, I felt Eton missed a golden opportunity by not including this mode in their flagship radio. I would gladly pay extra to have the DRM mode in the E1XM.

No carrying handle. Yes, this is a moderately large portable without a carrying handle. Also, the adjustable stand (adjustable to one position at 45 degrees) is disappointing. They used a soft plastic for the stand and we noted during our testing time that it tended to bend. Bottom line – don't lean too hard on the radio when you are steadying your hand on it while tuning around. We pointed this out to Eton and it has been relayed to the engineers.

We did note something very strange during our test. The external antenna adapter got warm. In fact, it got very warm. So much so, we contacted Eton immediately and they also verified the problem. It isn't anything that will harm you, but I have to wonder how long it will be before that heat loosens up the external antenna jack in the unit.

The backlight display is entirely too dim. Even with lights turned out and the contrast at maximum, it is too faint. You will really notice this when you place the unit in ambient light and are using the adjustable stand.

Probably my biggest beef with the E1XM is that it uses double instead of triple conversion. We didn't see a lot of resulting problems here in Brasstown, but I am not sure that will be the case for other end users in more robust RF environments.

The Exalted Carrier Single Sideband (ECSS) seemed a tad off. I have seen at least two more reports that back up what we saw in our test unit (serial number 00528). It isn't extreme, but to an old AM broadcast band DX hound like me, it is noticeable enough.

Finally, while most of the manual is well written, the Appendix gets an "F." It is loaded with errors, wrong frequencies and much more. We sent Eton several pages of changes and they promised that they would be included in future editions of the manual.

Overall, we are very pleased to see Eton

introduce a quality product such as the E1XM. It now becomes the benchmark which we will use to judge other radios following in its footsteps.

With the release of the Eton Elite, a radio revolution has truly begun and the E1XM is the leader.

MANUFACTURER SPECIFICATIONS

Frequency Range:

Band	Mode(s)	Frequency Ranges
Longwave	AM, LSB, USB	100 - 500 kHz
Mediumwave	AM, LSB, USB	500 - 1800 kHz
Shortwave	AM, LSB, USB	1800 - 30,000 kHz
FM Broadcast	FM	76 - 108 MHz (range is selectable: 76 - 90 MHz or 87 - 108 MHz)
XM Digital	Digital	2.3325 - 2.3450 GHz (Optional)

Sensitivity: SSB (10 dB S+N/N)
Less than .25 μ V 0.1 - 30 MHz (DX on)
Less than .5 μ V 0.1 - 30 MHz (Normal)

Sensitivity: AM (10 dB S+N/N, 1000 Hz, 30% modulation)
Less than 2.0 μ V 0.1 - 30 MHz (DX on)
Less than 4.0 μ V 0.1 - 30 MHz (Normal)

Sensitivity: FM (20 dB S/N, monaural)
Less than 1.5 μ V 76 - 108 MHz (DX on)
Less than 4 μ V 76 - 108 MHz (Normal)

Frequency Resolution: 10 Hz in AM and SSB modes, 20 KHz in FM mode
Frequency Stability: \pm 10 ppm, 0° to 50°C
Frequency Accuracy: Better than \pm 100 Hz at 25°C

Selectivity (AM and SSB):
7 kHz at -6 dB, less than 12 kHz at -60 dB
4 kHz at -6 dB, less than 9 kHz at -60 dB
2.3 kHz at -6 dB, less than 5 kHz at -60 dB

IF Frequency:
1st IF 45.0 MHz (AM and SSB)
2nd IF 455 kHz (AM and SSB)

1st IF 10.7 MHz (FM)

Image Rejection:
Greater than 70 dB, 0.1 - 30 MHz
Greater than 55 dB, 76 - 108 MHz

IF Rejection:
Greater than 80 dB, 45.0 MHz
Greater than 80 dB, 455 kHz

IP3 - Intercept Point (50 ohm antenna input):
Greater than +10 dBm at 20 kHz spacing (Normal)
Greater than -20 dBm at 5 kHz spacing (Normal)
-30 dBm at 5 kHz spacing (DX)

AGC Performance:
Threshold: 1.0 V
Attack Time: 1 msec (Bandwidth dependent)
Release Time: Slow 3 seconds, Fast 300 msec
Less than 2 dB change in audio output for 90 dB.

RF input change referenced from the AGC threshold point plus 3 dB.

Internal Antenna: 30 1/4 inch (1.003 meters) telescopic antenna (for use on all bands).
External Antenna: 50 to 75 ohm, PAL type male (PAL to F type adapter included)

External Speaker Output: 4 to 8 ohms, external jack is 1/8 inch (3.175 mm)
Audio Power (internal or external speakers): 1.25 Watts - battery operation

**The E1 comes equipped with XM's connect and play technology. An optional satellite antenna (VX300 \$49.85), activation fee, and a monthly subscription are required to listen to XM Satellite radio.*

The E1XM is available from Grove Enterprises, Inc. for \$499.95 plus shipping.

3 Watts normal - operation from AC adapter.
Internal Speaker: 4 inch (10.16 cm) 8 ohms
Line Audio Output: 300 mV, 47k ohms
Line Audio Input Jack: 1/8 inch (3.175 mm) stereo
Headphone Jack: 1/8 inch (3.175 mm) stereo

DC Power Requirements:
Input 7-14 VDC supplied from AC adapter, external DC power supply or 3.6 to 6.0 VDC supplied by four internally mounted "D" cell (1.5VDC) batteries (not supplied).

AC Power Requirements:
120 VAC \pm 10% to 9 VDC, 15 Watt 1 Amp AC adapter. Center conductor of connector is positive, negative is connected to input ground.

Current requirements (approximate) from 9.0 VDC supply
Worse case at maximum volume: 850 mA nominal with backlight display off and 900 mA with it on.
From batteries with 1/4 watt average audio output (normal battery currents):
FM mode - 175 mA backlight off, 225 mA backlight on.
LW/MW/SW - 210 mA backlight off, 260 mA backlight on.
XM - 350 mA backlight off, 400 mA backlight on.

Operating Temperature: 0° to 50°C
Shipping Weight: 6 lbs (2.72 kg) (includes AC adapter, batteries not included)
Size: 13-1/8 inch width (33.37 cm) by 7-1/2 inch height (19.05 cm) by 2-9/16 inch depth (6.5 cm)

Note: Published specs subject to change

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More Updates of Radio Software

As we all know, software is ever-changing – revising, adding more features, and fixing “bugs.” This month we’re going to look back on some of our recently reviewed radio software and software-driven hardware. Let’s see how many of them followed through with their plans to add features and functions – and fixing bugs.

❖ Spectrum Lab

This program can transform itself into many operating audio and RF applications, including specialized audio analyzer, filter, frequency converter, hum filter and data logger, VLF receiver and spectrum analyzer with waterfall display, and real-time audio processing. And it’s all done in software! All it takes is a PC with a “reasonable” soundcard.

When we last looked at Spectrum Lab Version 2.4b12 in March 2005, we configured it to operate as a long wave 100 kHz receiver. Figure 1. The latest release is Spectrum Lab V2.5 b8 (built 2005-08-31). This new version’s features include:

- A new spectrum-event-logging feature which, when used in the radio-direction finder application, provides the ability to suppress noise from up to three independent directions.
- A Beacon Logger for DI2AG, an experimental, medium wave beacon on 440 kHz in southern Germany.
- A “highly experimental” output plug-in for Winamp, to feed audio streams from the Internet into Spectrum Lab.

You can download and then play with this wonderful teaching tool, Spectrum Lab, at

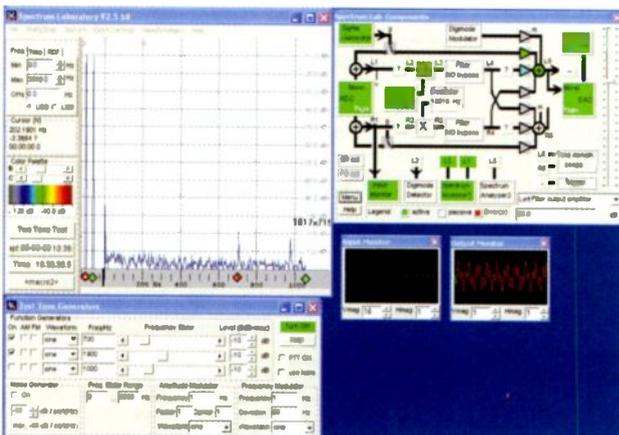


Figure 1 - The Versatile Spectrum Lab version 2.5 b8. Lab Instrument to VLF Receiver - It can do and teach

<http://people.freemnet.de/dl4yh/spectral.html>

❖ RxPlus

In my opinion, this “do everything for SWLog” program was already great when we looked at version 1.76 in August. It works with loads of receivers, but I particularly enjoyed using it with my ICOM R75. Now that ICOM has decided not to discontinue the R-75, RxPlus will appeal to many new R75 owners.

RxPlus version 1.82 was released on July 23, 2005. In addition to being a shortwave receiver controller, DSP audio processor, digital modes decoder and database manager, RxPlus has added or improved the following:

- Chat System
- Stand Alone Audio Processor (for registered users only)
- Full featured support for the ILG and HFCC databases
- Added the following receivers to its already long list: Drake R8A/B, ICOM PCR-1000, ICOM R756Pro and ICOM R756 Pro I ICOM IC-R75, JRC NRD-535, Kenwood R5000, Ten-Tec RX320(D) and Ten-Tec RX350D receivers

See all of RxPlus’ amazing smooth operating features at <http://www.cam.org/~noelbou/RxPlus/>

❖ Shortwave Log

We tested build 1968 of SWLog, another great, innovative radio program, in May ’05. The current version is build 2000. It features:

- A multi-user, real-time logbook that enables users to share logbooks over the Internet with a community of SWLog users.
- Remote control of the receiver via the serial port or connect to another radio across a home network or the Internet via IIS, Cassini, or Apache.
- Supported Receivers: Drake R8A/R8B, Icom PCR100/PCR1000/R75/CIV-based radios (i.e. IC-756Pro/IC-R8500), Flex Radio SDR-1000, Japan Radio Corp. NRD-525/535/545, Lowe HF-



Figure 2 - RxPlus gets even better with Version 1.82

- 235/250/250E, Yaesu FT-817/920 and Ten-Tec RX-320/320D/321/340/350.
- Extensive logging features that search up to eleven (up from nine) separate databases to find matches and automatically populate fields when entering logs.
- View aerial images and maps of transmitter locations or other places within the United States via the TerraServer function.
- QSL tracking and monitoring, including native support to directly scan QSL cards into the program.

Build 2000 can now be downloaded for free from <http://www.shortwavelog.com>. Go to their website to view the many other useful functions included in Shortwave Log.

You can join their Yahoo Group at <http://groups.yahoo.com/group/swlog/>

❖ RadioMax

This program is still one of my favorites to use when I don’t want to have to think so much (those times are becoming more frequent!). Other radio programs have many more features and functions. Instead, RadioMax is so natural to use. Pretty much everything you need for simple receiver control and logging is on one simple screen. It’s perfect for the shortwave listening newcomers and us lazy folk. (Reviewed Dec 2000.)

The last upgrade to RadioMax was version 5.22. Go to <http://www.datadeliverydevices.com/RadioMax.htm> to download a demo version or purchase a full copy.

❖ RF Space’s SDR-14

RF Space’s SDR-14, a state of the art software-defined radio (see Feb ’05 AT), now has its

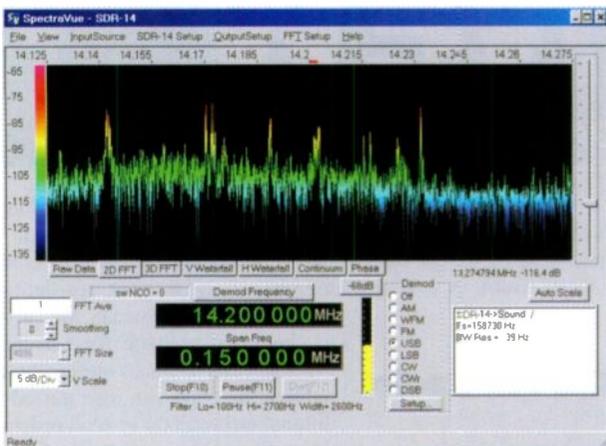


Figure 3 - SpectraVue, the software end of the very impressive SDR-14 From RF Space

own Yahoo Group, SDR-14. You can drool over this hot little compact PC-based receiver with lots of sophisticated features at <http://www.rfspace.com/products.html>. See Figure 3. A new version of the SDR-14's control software Spectravue is now available for beta testing.

Spectravue beta 2.00-07 can be downloaded at <http://www.moetronix.com/beta>. The new version promises:

- More versatile external radio operation modes
- Dual demodulation modes – (Sounds very interesting)
- Combination of display formats
- Additional supported graphic file formats
- More tuning alternatives using the mouse – (This is one I'm waiting to see)
- Two S Meter reading capabilities – RMS and Peak

When it is released out of beta testing, we'll give it a try right here. The SDR-14 is an easy to use, high quality, professional grade, RF spectrum test gear, and a great receiver, too.

❖ Flex Radio SDR-1000

Speaking of SDRs, take a look at Flex Radio Systems' website for the latest on their SDR-1000 products. Figure 4. *Hams take notice:* A 100 watt PEP version of SDR-1000 software defined transceiver is now available, as well as a receiver-only version for SWLers. The latest software that powers the SDR-1000 is PowerSDR version 1.4.

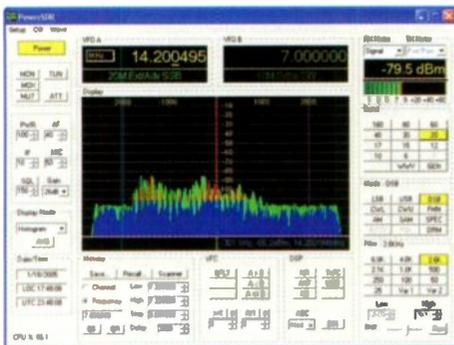


Figure 4 - Flex Radio Systems SDR-1000's software, "Power SDR" in full operation. Hams take note - a full software defined 100 watt transceiver!

From recent articles in *QST* it seems that I'm not the only one that saw the SDR-1000 as a revolutionary communications product that has changed the world of communications. You can read these non-biased reviewer's opinions on the Flex Radio System's website, <http://www.flex-radio.com/>. Add these to the reviews in this column almost a year ago (Nov, Dec '04) and let performance speak for itself.

❖ MixW

This is a multimode program for hams that helps you in normal contacts and in the heat of contests. Figure 5. MixW is useful to both hams and shortwave listeners, since it can decode, as well as transmit, in the following modes: SSB, AM, FM, CW, BPSK31, QPSK31, FSK31, RTTY, Packet (HF/VHF), PACTOR (receive only), AMTOR (FEC), MFSK, Hellschreiber, Throb, Fax (RX only), SSTV, MT63.

For decoding, no external hardware, such as a TNC, is required for MixW to do its thing. All it needs is a computer running Windows 9x, ME, NT4, 2000 or XP operating system, and a compatible soundcard. For ham operation, a simple rig interface is required.

Two new versions have been created since we tested MixW version 2.12 in July 2004. The latest, version 2.15, did not have as many additions as the version before it (2.14 – there was no 2.13). All changes have been incorporated into the current version 2.15:

- Two spectrum windows are now possible, allowing receiving in both
- Receive sensitivity is improved for some modes
- User defined scrambling is supported for VHF packet
- FT980 support is added
- Extended contest support
- CAT support for JRC, FT857, IC7800, IC756PRO3
- MP3 format support
- OmniRig support added
- Frequencies listed in "KnownFqs.dat" will be shown at the spectrum bar with grey marks
- "Search and pounce" (SP) and "Run" modes of operation are added.
- Run mode assumes CQ operation.

And lots more contest friendly operating additions. You can see them all in detail at <http://www.mixw.net/downloads.htm>.

❖ HamScope

HamScope is a multi-mode digital communications interface for amateur radio and the monitoring community that supports PSK31 (BPSK and QPSK), RTTY, ASCII (7 bit and 8 bit), MFSK16, PACKET and CW. It is also a radio control interface for several ICOM, Ten-Tec, Kenwood, and Yaesu transceivers.

HamScope data links to several common ham logging and control programs, including Dxbase, LOGic 7, RYLogit, TRX-Manager and YPLOG. A DDE server is included for users

who wish to connect to the program via the Internet.

HamScope runs under Windows 98 and NT, using a 133 MHz Pentium I or better. You can find these PCs for free at yard sales and flea markets. A 16 bit SVGA color graphics capability is necessary for the panoramic waterfall displays.

We tested HamScope version 1.54 in August 2004, but the latest version is now 1.55. The primary difference is a number of "bug" fixes. One such "bug" was evident in the use of function keys. These have now been fixed.

An interesting issue that was reported by 1.54 users was a problem they ran into using HamScope's Packet operation. It seemed to only occur when the program ran on a modern day PC with GHz speed. So it ran better on the older, slower PC! That problem has been corrected in version 1.55.

Go to <http://www.qsl.net/hamscope/HamScope.html> for a free download of HamScope 1.55.

❖ That's It For Now!

One thing is for sure: As long as there is one programmer left on Earth there *will* be software revisions. So, in a few months we'll do the software rounds again. Please email me any upgrades or revisions of radio software that you would like to share with us.

With the 2005 Holidays almost here, remember to *make time* to enjoy them with your family and friends. They only come once in all of eternity.

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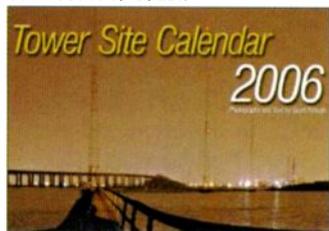
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What's NEW

Tell them you saw it in *Monitoring Times*

2006 Tower Site Calendar

Are you ready for 2006? Enter next year's appointments in style using the Tower Site Calendar, now in its 5th year. Each month the calendar features a different, well-known broadcast transmitter site photographed by Scott Fybush, and includes significant dates in radio and television history. The full-color monthly calendar has become a tradition for many radio engineers and hobbyists. "It's turned into a very popular gift for radio engineers," says Fybush. "It's been exciting to travel around the country and see the calendar hanging in radio stations from coast to coast."



The 2006 calendars cost \$16 each, postpaid (\$17.28 for NY residents), and can be purchased by check or money order payable to Scott Fybush, 92 Bonnie Brae Avenue, Rochester, NY 14618 or via credit card at <http://www.fybush.com>

2006 QSL Calendar

Shortwave hobbyists can help celebrate the 30th anniversary of the DX-Camp Langensfeld near Hanau, Germany, by purchasing a beautiful wall calendar from Rhein-Main Radio Club. This fine-quality calendar depicts some of the best QSL cards of the past 30 years (in cooperation with the ADDX image archive), many from stations which no longer exist.

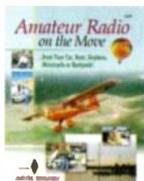
For more information, email Harald Gabler DrGable@t-online or visit the club website at <http://www.rmrc.de>, or write Rhein-Main-Radio-Club - P.O.Box 700849 - 60558 Frankfurt, Germany. The cost of the calendar is 14,80



Euro; extra shipping may apply.

Amateur Radio on the Move

Are you an amateur radio operator who likes to take your hobby with you? Maybe you have questions about installing your radios on your favorite mobile platform. If you need answers, then the ARRL has a new book for you - *Amateur Radio on the Move*.



This book covers all forms of going mobile in Amateur Radio - in your car, your boat, your airplane, your motorcycle, your RV, or even from your backpack while hiking in the wilderness.

Each chapter is written by experts, people with lots of hands-on experience in toting ham radio on a mobile platform. They share the joys as well as the problems and pitfalls of using amateur radio in a mobile environment. Use this ARRL book to find out what to do, and what not to do!

Some of the more interesting topics covered in *Amateur Radio on the Move* include: radios you can use mobile, getting power to run a radio, installation tips and safety, antennas, getting rid of the noise, operating hints and tips, and computer software.

Chapters and authors of each section are:

- **Mobile in Your Automobile** by Roger Burch, WF4N; Mike Gruber, W1MG; Terry Rybak, W8TR; Mark Steffka, WW8MS
- **On the Go with Maritime Mobile** by Steve Waterman, K4CJX
- **Aeronautical Mobile** by Dave Martin, W6KOW
- **RV Mobile and Motorcycle Mobile** by Al Brogdon, W1AB
- **HF Unplugged** by John Bartscherer, N1GNV

This softcover first edition (ISBN: 0-87259-945-0), can be ordered from the ARRL website (<http://www.arrl.org>), via their toll-free telephone line 1-888-277-5289 (Outside US +1-860-594-0355), or via snail mail at ARRL Publication Sales Department, 225 Main Street, Newington, CT 06111-1494 USA. Order ARRL catalog number 9450 - \$19.95 plus

shipping.

If you need some expert advice on doing ham radio on the go, then this new ARRL book is a must read.

The NRC AM Radio Log

2005-2006, 26th Edition

One of my favorite annual radio publications is again available for purchase, and quite frankly, no self-respecting AM DXer or listener should be without this superb publication on his or her radio room bookshelf.

Formerly known as the *National Radio Club Domestic Log*, the first edition of this annual favorite was published by mimeograph, and the stencils were hand-typed in Boston by the legendary AM radio hobbyist John Callarman. Since that first edition (which I still have, by the way), the *Log* has progressed to a sleek professional publication produced by Wayne and Joan Heinen.

The 2005-2006 26th annual edition of the National Radio Club's *AM Radio Log* contains 276 pages in 8-1/2-inch by 11-inch size, 3-hole punched, loose leaf format, so you can put it neatly into a 1/2-inch three ring notebook.

AM band, by-frequency, radio station listings from the United States and Canada include the new expanded (X-band) stations from 1610-1700 kHz. Each station listing consists of its operating frequency, callsign, location (city and state of license), time zone, antenna and transmission power, mailing address and daytime telephone number, hours of operation, broadcast format networks, and much more.

There are also cross reference listings by city and callsign, as well as a list of stations conducting AM stereo operations. Recent additions to the log include a list of FM simulcast call letters and a list of regional groups of stations. There is also a list of talk radio hosts and their syndicator or network.

The *NRC AM Radio Log* is available from several radio dealers and directly from the club website

at <http://www.nrcdxas.org/>. This publication lists for \$25.95 (non-NRC members) and \$19.95 (for members). New York residents will have to add sales tax. Be sure to check the website for current Canadian and overseas rates on this publication. You can also get additional information or send orders via mail to: National Radio Club Publications, Box 164, Dept W, Mannsville, NY 13661-0164.

The *AM Radio Log* is the world's best and most accurate source on AM radio stations in the United States and Canada. If you tune the AM broadcast band, you need the *AM Radio Log*.

- Above book reviews by Larry Van Horn N5FPW

A DXer's Technical Guide

In the nearly 200 pages of this new book from the International Radio Club of America, you will learn about the principles underlying the design of successful receivers, antennas, and receiving accessories; find reviews of the best commercially available DXing equipment in different price ranges; as well as detailed instructions for building one's own antennas and other DXing aids. Although it focuses on the technical backdrop to medium wave DXing, it will also be of interest to serious shortwave listeners and low band radio amateurs.

Prices: IRCA members \$15.00 (US/Canada/Mexico/sea-mail), \$20.50 (rest of the Americas/Europe airmail), \$21.50 (Australia/Japan/New Zealand airmail). Non-IRCA members add \$2.50.

To order, send your funds to: IRCA Bookstore, 9705 Mary Ave NW, Seattle WA 98117-2334. (Please make check out to Phil Bytheway or it will be returned), or use PayPal to: fokker_d8@yahoo.com (please include an extra \$0.50 to cover the service charge). For more information, visit <http://www.ircaonline.com>

Books and Equipment for announcement or review should be sent to What's New, c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC, 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel Baughn, editor@monitoringtimes.com.

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- _ Headphone jack
- _ Built-In Antenna: telescopic antenna for AM, FM and Shortwave reception
- _ External Antenna Connection for the addition of auxiliary antennas
- _ Calibrated LCD signal strength meter
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- _ Tunes via auto-scan, manual-scan, direct key-in entry and tuning knob
- _ Internally recharges Ni-MH batteries
- _ Station name input
- _ Dimensions: 6-5/8"W x 4-1/8"H x 1-1/8"D
- _ Weight: 12.2 oz.

Features are subject to change

E10 \$130*

AM/FM/Shortwave Radio

Intelligence meets performance in the E10. With 550 programmable memories, manual and auto scan, precision tuning and alarm clock features, the E10 provides the sophisticated tools for listening to news, sports, and music from around the world. The E10 even allows internal recharging of its Ni-MH batteries (charger and batteries included). With excellent AM, FM, and Shortwave reception, intermediate frequency shift and shortwave antenna trimmer—the E10 gives you the performance you want with the digital ease you deserve.

Features

- _ Shortwave range of 1711 – 29,999 KHz
- _ 550 programmable memories with memory page customization
- _ Manual and auto scan, direct keypad frequency entry, ATS
- _ Clock with alarm, sleep timer, and snooze functions
- _ Earphones
- _ Supplementary wire antenna
- _ Power Source: 4 AA Batteries (included) or AC Adapter/Charger (included)
- _ Dimensions: 7-1/2"W x 4-1/2"H x 1-1/2"D
- _ Weight: 1 lb. 1oz.

E100 \$100*

AM/FM/Shortwave Radio

The E100 fits full-sized features into your palm or pocket. This little marvel is packed with all the latest radio features you want: digital tuning, 200 programmable memories, digital clock and alarm, plus AM/FM and Shortwave reception. And, it is small enough to fit in your coat pocket.

Features

- _ Shortwave range of 1711 – 29,999 KHz
- _ 200 programmable memories
- _ Memory page customization
- _ Manual and auto scan, direct keypad frequency entry
- _ Earphones
- _ Power Source: 2 AA Batteries (included) or AC Adapter (not included)
- _ Dimensions: 5"W x 3"H x 1-1/4"D
- _ Weight: 7 oz.



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Handheld Receivers

IC-R3 • 500 kHz - 2.45 GHz* • AM, FM, WFM, AM-TV, FM-TV • 450 Alphanumeric Memories • CTCSS with Tone Scan • 4 Level Attenuator • Antenna with BNC Connector • 2" Color TFT Display with Video and Audio Output Jacks • Lithium Ion Power

IC-R5 • 150 kHz - 1.3 GHz* • AM, FM, WFM • 1250 Alphanumeric Memories • CTCSS & DTCSS Decode • Weather Alert • Dynamic Memory Scan • Icom's Hot 100 Preprogrammed TV & Shortwave Channels • Weather Resistant • AA Ni-Cds & Charger

IC-R20 • 150 kHz - 3.3 GHz* • AM, FM, WFM, USB, LSB, CW • 1250 Alphanumeric Memories • CTCSS & DTCSS Decode • Dual Watch • Audio Recorder • Weather Alert • Dynamic Memory Scan • Icom's Hot 100 Preprogrammed TV & Shortwave Channels • Lithium Ion Power

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