

utility communications

digest

news, information, and events in the utility radio service from 30 kHz and beyond

Utility Room Utility Monitoring— How To Monitor The World From Your Kitchenette!

When the war with Iraq started, many friends and relatives asked if they could come over and sit in my kitchen. It was the same way during the events that took place on 9/11 and when the space shuttle broke up on reentry. During severe weather outbreaks or during times of international turmoil, the phone rings off the hook. "Can I come over and listen in?" or "What are you hearing?" they ask.

I don't live anywhere near Baghdad, New York City, or Dallas. Yet tucked neatly away in a corner of my breakfast nook in my tiny apartment is my "Command Center," where I can keep tabs on the state of the world. It's always ready at a moment's notice whenever disaster or breaking news happens. Flowing into my kitchenette is a steady pipeline of information on what is going on in my town, nation, and planet. My wife has nicknamed it "KITCHCOM" for Kitchen Command, but I'd like to think of it as the "War Room with a refrigerator."

Many UTE monitors might be surprised that I can successfully monitor so much in such a little space. It all goes to prove that you don't have to live on an acre of property and have a roof covered in antennas to be able to tap into the river of communications flowing through the air.

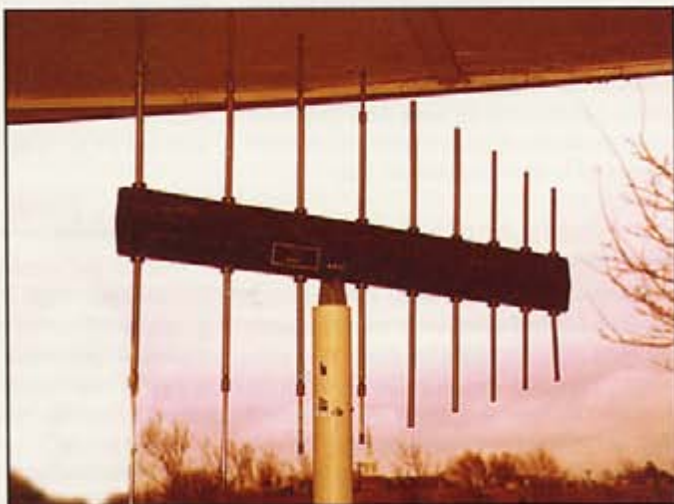
The "ears" of the system are just outside on my crowded balcony and consist of a military surplus UHF antenna, various wideband VHF/UHF antennas, and an "active" HF antenna connected to a metal rain gutter. Interestingly, my landlord and neighbors don't give my antenna farm as much as a second glance. They are well aware that I'm an electronics writer/junkie and also a storm spotter for the city. Most figure the equipment is used to keep tabs on the weather. Besides many of the balconies in my apartment complex are graced with an ever-growing crop of direct broadcasting satellite antennas, so mine are just an extreme form of theirs.

So How Does It All Work?

At the heart of the system is a bank of off-the-shelf scanning receivers, a vintage shortwave receiver, a computerized receiver, a communications system analyzer, two home PCs (and a standard Internet connection), and three cable-connected television sets. Except for the communications analyzer, nothing in my monitoring system is exotic or above the capabilities of the average TV technology junkie. Most everything is off-the-shelf or custom engineered by yours truly.

The Receivers

The main workhorses in my system are a WiNRADiO receiver and Bearcat 780 XLT scanner radio along with an analog shortwave radio, various scanning radios, and two-way radio



This is the author's compact AS-15405/PRC-41 military surplus antenna used for UHF MILCOM. Although not very big, it acts like a beam antenna many times its size and is a real champion at bringing in those weak signals. (All photos by Steve Douglass)

transmitters. Together this mish-mash of equipment makes it relatively easy to intercept almost any type of communications from 5.3 kHz to 2.5 GHz.

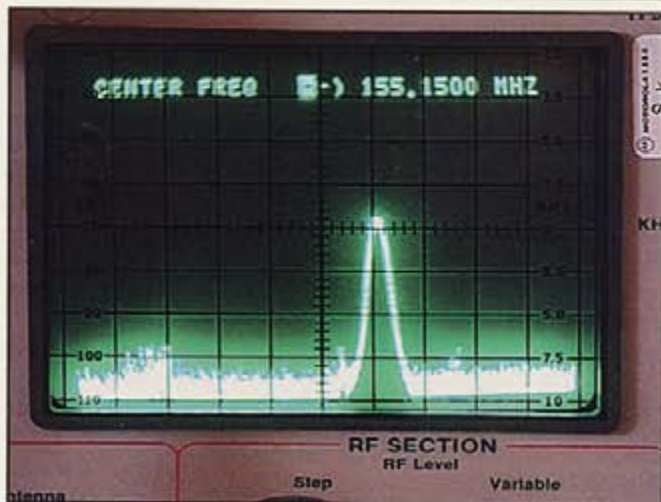
Just in case you've been living in a cave in Afghanistan and weren't aware, WiNRADiO manufactures a suite of PC- and Macintosh-compatible communications receivers that can turn any computer into a powerful and versatile radio communications monitoring station. Consisting of a black box (or a card that you can discreetly install inside your computer), the WiNRADiO receiver is an expandable system with plug-ins and programs (some designed for it by third-party software developers and hobbyists) that range from spectrum analyzers to direction finders. The latter can be very useful to law enforcement agencies in tracking down clandestine communicators, such as drug smugglers or terrorists. There is even a WiNRADiO device that will let you set up a communications interception station in a remote area, which you can monitor and control via the Internet!

My WiNRADiO 1550E has an incredibly large frequency range (from shortwave to microwave) and its reception modes include sideband, CW, AM, FM, and Wideband FM. Although it can be programmed to work like any scanning radio, what makes the WiNRADiO extremely powerful is the RF Spectrum Scope option. Used in conjunction with my Uniden BC-780XLT, the pair becomes a powerful communications intercepting duo.

I use my WiNRADiO to display a graph of the active frequencies in the military UHF aviation and satellite band (225



KITCHCOM's BC-780 sits upon the Motorola R2001D Communications System Analyzer. Together they are a potent pair of communication interception tools.



Close up of the Motorola R2001D Communications System Analyzer scope in action. Spectrum scope can display a 1- to 10-MHz chunk of the radio spectrum in real time.

to 399 MHz). As the receiver tunes through the band, active channels pop up like blades of grass across a graphic chart. I just let the receiver search all day until it finds any active channels. I then enter those frequencies into the highly sensitive Uniden Bearcat 780 XLT for continuous monitoring. With 500 memory channels available you have plenty of places to plug in new frequencies that the WiNRADiO digs up.

Ask any radio hobbyist to name one of the best (and most popular) scanning radios and the answer will be the Uniden Bearcat BC-780XLT. Although it doesn't offer shortwave (1 to 30 MHz) as the WiNRADiO system does, it covers VHF and UHF bands (30 MHz to 1.3 GHz) very well. The BC-780XLT combines computer programming capability with portability as it can be easily programmed via its computer interface and then installed in a vehicle for radio monitoring on the go.

Although the Uniden Bearcat 780 XLT is a champ at monitoring those exotic military channels, I also highly recommend it for scanning Homeland Security agencies as well as regular police, fire, and emergency channels.

Complementing my monitoring system is the venerable Panasonic RF-4900 shortwave receiver. I use it to monitor the U.S. military, UTE stations, and international broadcasts on shortwave. I bought mine at a good price on e-Bay, where many comparable and good-condition used shortwave radios can be found. If you decide to go receiver hunting on e-Bay, just make sure the receiver has SSB reception capabilities or you won't be

able to monitor military, amateur radio, or the majority of UTE frequencies.

The "brains" of my radio intercept system is a Motorola Communication Analyzer R2001D. It's an amazing professional tool that can ferret out and analyze any radio signal between 1 MHz and 1 GHz. Unlike the WiNRADiO, this analyzer has a constant real-time spectrum scope that doesn't have to rely on a slow sweep of a band before showing the active channels on its CRT.

My Transmitters

During the severe weather season I can usually be found chasing twisters in the Texas Panhandle. However, there are times when I just can't pull myself away from work, but still want to help coordinate with local weather television storm spotter crews in the area. For this purpose I obtained a license and operate transmitters on VHF and UHF General Mobile Radio Service (GMRS) frequencies used by local spotter groups. Inside my chase vehicle is a city-provided VHF transmitter used for talking with my fellow Amarillo Emergency Service spotters on official frequencies.

I also use two Midland land mobile radio GMRS units (one base and one mobile) as a back channel. I use this to chat informally with other spotters (see "Into The Storm" elsewhere in this issue) and back and forth with KITCHCOM, where I have a GMRS base station for communicating with my wife (or a number of volunteers). I have no shortage of friends and volunteers who happily man

KITCHCOM to monitor severe weather reports on television while connected to local weather radars on the Internet. They then relay critical information about the storm to me and other spotters via the GMRS base station.

Antennas: HF And Beyond

Because of my apartment logistics, a long-wire shortwave was out of the question. My first solution was to try a Citizen's Band 27-MHz steel whip antenna. To make up for the rather short antenna length, I ran the coax to a RadioShack shortwave antenna amplifier. I then grounded the antenna to a metal plumbing pipe with a short run of copper wire. Although the improvised antenna can't compare to a good long-wire dipole, reception above 15 MHz isn't bad, but sensitivity really falls off at lower frequencies. Still I have no problem receiving shortwave powerhouse broadcasters and even some relatively weak military sideband communications.

In light of these shortcomings, however, I decided to experiment. I tried running a very thin, almost invisible, single strand of copper wire to a tree in the apartment compound, about 70 feet away. Unfortunately, the high winds common in West Texas kept breaking the wire and I grew tired of climbing up the tree to repair it. I found a solution staring me in the face, though, when I noticed a metal flashing and gutter running the full length of the apartment complex. I attached a coax to it with an alligator clip, and connected it to my shortwave receiver via a MFJ anten-

na tuner and—bingo—I now have a natural HF antenna over 150 feet long! Signal strengths went through the roof (pardon the pun) on all bands!

For VHF and UHF coverage I use several off-the-shelf scanner antennas available at any electronics communications outlet. For UHF military I found a great MILSURPLUS antenna (AS-15405/PRC-41) at a local salvage shop, and it works wonders on the 225- to 400-MHz military aviation and satellite band. Vietnam War surplus, this is a compact beam antenna only three feet long but capable of amplifying a weak signal 20 dB over a standard dipole antenna. It's directional, but not overly so. In good used condition it cost me only \$60, which included a cool carrying case making this antenna very portable. I mounted it on an old photographer's light stand and use an "Armstrong" antenna rotator (a.k.a., my own two hands) to point it in any direction I need.

Transmitting Antennas

It's one thing to run wires to a rain-gutter for shortwave reception, but installing an efficient UHF transmitting antenna is another thing altogether. Commercial UHF base station antennas are too big to mount on my tiny antenna-crowded balcony. The solution? I attached a trunk-lip mount NMO magnetic mount UHF GMRS mobile antenna to a surplus television wall-mounting bracket. I then calculated the length of several UHF radials, which I attached to this mount to provide a circular (omnidirectional) ground plane. I was surprised to see that the SWR (standing wave ratio) was very low.

The only problem I have encountered with this setup is that I have to turn off all my scanning radios before I key the mic, because the close proximity of the transmitter wrecked havoc with their sensitive circuits causing the receivers to overload and feed back.

So far there have been no complaints of interference from my neighbors, most likely because the antennas are outside and because I severely limit my transmissions to emergency communications only and resist the urge to chitchat.

Getting It Wired

All the coaxial cables for receivers run into the mini-monitoring post through a RadioShack wall-through-tube that the previous tenants thoughtfully left in place. This was great because I didn't have to drill any holes in the walls and ruin my chances of getting back my rent deposit.

Electrical cords are kept in check with nylon cable ties with heavy-duty spike and circuit breaker-protected power strips, reducing the risk of short circuits or an overload and a fire. Plus, from time to time the landlady inspects the apartment and I didn't want a mass of tangled cables scaring her to death.

Listening In

My main monitoring interest is in military communications. But to supplement this source of information and to get a balanced picture of what is going on from a global perspective, I also twiddle the dials and search for what other nations' press agencies are reporting. Although news reports from some international shortwave broadcasters are sometimes heavily slanted against the U.S., they also have no compunction about reporting on classified military operations inside enemy countries and can be a good source of inside information.



Here's my compact beam antenna useful for frequencies above 800 MHz. This is a surplus antenna originally designed for 800-MHz trunking radio repeaters. "Compact" is the key word in selecting antennas to be mounted in a relatively small area like an apartment balcony.

Remember that these same broadcasters are also in the propaganda business so their claims are always suspect. However, keeping good records of what you hear on the military frequencies and combining that data with news reports will paint a clearer picture of what's going on in the world. In intelligence circles this is known as COMINT (Communications Intelligence) and provides a big piece of the information puzzle.

This is also where the televisions come in. Each of my three TVs is tuned to one of the 24-hour news networks. During times of conflict they're always on, with the volume turned down but the closed-captioning switched on.

Designing Your Own "KITCHCOM"

So by now you are probably asking how you can accomplish the same without spending a small fortune on receiving equipment and hiring a Ph.D. in electronics to put it all together for you. Fortunately there is a way, but on a smaller scale.

Many of the international shortwave broadcasters also broadcast in real-time over the Internet. Just install the latest version of Real Player, Windows Media Player, and a good MP-3 player on your PC and you're set. Do a search for shortwave broadcasters and you'll find links you can listen to on their sites. The big television networks, such as CBS, NBC, ABC, and CNN, also provide Real Audio (and Real Video) links as well.

But what about listening in on the military chatter online? There are two sites I enthusiastically recommend. To listen in on real-time VHF and UHF military chatter, point your browser to <http://www.milAirComms.com/>. There you'll find a link that will let you listen in on many military frequencies *live*. You'll also find a listing of military terms and equipment recommendations, just in case you decide you want to try your hand at military radio monitoring. Another site that lets you listen to the military on shortwave (also in real time) is Orexis Communications' (Umea, Sweden) at <http://194.165.225.6/>. Here you'll find a shortwave receiver you can control yourself and a chat-room that lets you talk to experienced radio monitors who can help explain what you are hearing. You must have a Java applet installed in your browser to do this; there are links on the site that point you to the proper downloads.

Another way to get a good handle on what's being intercepted on the military airwaves is to visit QTH.net and subscribe to a military monitoring news group, such as MILCOM or MILAIR. There you can talk with rabid military monitors or just lurk and read their radio interception posts, which are always fascinating.

Some of you are probably wondering if military monitors reporting to each other on what they hear could be considered compromising to military security. Keep in mind that the military only lets you hear what it wants you to hear. They can pull the plug at any time. Plus many communications that may sound to an eavesdropper like classified information (such as troop movements, etc.) are intended for enemy interception and are deliberate disinformation broadcasts!

In light of this, if in the heat of battle a military unit accidentally broadcasts real classified information, it's usually disregarded as bogus. In fact, it is not uncommon for units to flood the airwaves with bogus information from "phantom" units aimed at confusing an enemy even further. Still, experienced military monitoring hobbyists are aware that they may be posting sensitive information on the Internet and usually delay or edit their reports to reflect their respect for military communications security. None of us relish a visit by the FBI, which we know monitors the discussion groups. Those who do publish sensitive information are usually kicked off the news group by a moderator and banished from posting any information to the group.

MACK Attack

Speaking of war, during the Iraq conflict many of the U.S. Air Force Special Operations Command (AFSOC) MC-130 Combat Talons and AC-130 gun ships took heavy fire as they engaged in missions to drop Special Forces troops north of Baghdad before the official start of hostilities. These forces were essential in securing key assets in advance of the assault on Baghdad. In light of this, AFSOC wants to replace its aging fleet of fixed-winged insertion aircraft with a stealth multi-role aircraft that could also serve as a clandestine troop deployer and tanker for stealth aircraft, such as the F/A22, F-35, and B-2.

Those stealth geniuses at the Lockheed Skunk Works have released a classified design they say will meet the AFSOC's needs. It's known as MACK, an acronym

representing M-X, A-X (a regular air lifter), CX (Cargo), and KX, a future refueling tanker.

MACK encompasses significant stealth characteristics, including engines mounted deep inside the fuselage, low observable (LO) material construction with broadband LO characteristics and stealth shaping. The MACK would also be fitted with state-of-the-art electronic self-protection and electronic attack devices to enable it to avoid detection or thwart an attack if one should occur. In other words, if the aircraft is detected and attacked, the MACK will be more than capable in defending itself, or even initiating an attack, against hostile forces with its two formidable retractable cannons, one mounted on the top of the fuselage and one below.

Reader's Logs

Do yourself and me a favor and put your loggings in the format listed below. As an added measure to ensure that your logs will be included, submit them in frequency order from low to highest. We are also now accepting your MILCOM logs from above 30 MHz!

0000 (Frequency MHz): STATION, Anytown, USA, summary of traffic heard in MODE at 0000Z. (monitor/sometimes location)

2473.5: PBC (Dutch Navy, Goeree): 0108 RTTY 75 bd/850 Hz w/carbs. (RP)

2598.0: VCM (Canadian CG St. Anthony): 0901 USB w/MIBs & gale warnings in EE. (RP)

2582.0: Bermuda Harbor Radio heard at 0039 in USB w/mariner information Bulletins in EE. 24/02 (RP)

2609.0: FOU (FR Navy Toulon): 0111 RTTY 75 bd/850 Hz w/test tape. (RP)

4273.5: FOU (FR Navy Toulon): 0346 RTTY 75 bd/850 Hz w/test tape. (RP)

5263.0: ZORRO (Mexican Army): 0254 USB/ALE TO CICLON (Mexican Army). 24/02. (RP)

5550.0: 0200Z WEST 530 pos rpt w/NEW YORK Radio. (DS2)

5550.0: New York (MWARA CAR-B): 0123 USB w/PP-BIA (accented EE pilot) w/position report. 24/02. (RP3)

5598: 0144Z REACH 697 rptng position and flt ops to SANTA MARIA Radio. (DS2)

5598: 0142Z Air France 653 position rpt and SELCAL chk w/NEW YORK Radio. (DS2)

5696: 0100Z continuing. CAMSLANT Chesapeake wrking many CG assets in explosion/sinking of tanker off Carolina coast. Some CG assets included CG Rescue 1501, 1502, 6031, cutters *Sherwood*, *Altgard* (I think), and 277. (DS2)

5696: 0330Z USCGC EAGLE w/pos rpt to CAMSLANT. (DS2)

5696: 2330Z CG Rescue 1502 revng traffic from LANTAREA concerning EPIRB from fishing vessel via relay CAMSLANT. (DS2)

6318.5: RT3 (unidentified): 0400 USB/ALE TO HMV (unidentified). (RP)

6318.5: RT3 (unidentified): 0342 USB/ALE TO STK (unidentified). (RP)

6507.0: Olympia Radio, Greek Maritime, tx schedule in EE/Greek: 2200 USB.

6586: 0109Z SKYTOUR 702 sndng pos rpt/altitude to NEW YORK Radio. (DS2)

6604: 0155Z GANDER Radio w/aviation WX. (DS2)

6607: 0112Z UNID CW station sending groups of numbers. (DS2)

6628: 0158Z Iberia 6702 pos rpt to SANTA MARIA Radio. (DS2) (LA)

6754.0: Trenton Military: 0331 USB w/vol-met. (RP)

6915.0: UNID, very long p/p in Russian, pulse dialing: 2015 USB. (LA)

8047.0: CECOM (U.S. Army Communications & Electronics Command, Ft. Monmouth, NJ): 1834 USB/ALE TO BDLNGB (unidentified National Guard Bureau). (RP)

8056.0: 309 (DLA 309, Defense Logistics Agency, Battle Creek MI): 1743 USB/ALE sounding. 24/02. (RP)

8110.0: O/M (JJ): 0234 USB w/O/M (JJ). 24/02. (RP)

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