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COVER STORY

By Chuck Gysi, N2DUP

LOCAL RADIO UPGRADE... A TIME TO PANIC?

When your local public safety agencies migrate to a new system, relax and try to enjoy.

If it hasn't happened to you yet, it probably will. And if it already has happened to you, it's bound to happen again!

For many scanner hobbyists, just to hear the words ìnew systemî is reason to panic and get worried about the hobby. Oh, those words of fright: My police are going to a trunked system. My fire department is switching to digital. My dogcatcher is moving to EDACS. My favorite casino now is on an LTR trunking system.

My local shopping mall is switching to a low-power repeater.



Have no fear! If you worry about upcoming changes to radio usage in your locale, you'll lose touch with the primary benefit you get from scanning: enjoyment. If you fret over it, you'll miss out on so many other things to monitor. I never say never. I just refocus on new targets and try not to forget past targets.

Here's a case in point.

Once upon a time when I got my start in scanning, a nearby county where I lived had a four-channel VHF high band radio system for police. The system way back in the 1960s and early 1970s had three zone channels (north, central and south) and one point-to- point channel. As the system became overloaded into the mid- 1970s, additional VHF high-band channels were added as zone channels and some municipalities added their own VHF high-band channels to help escape channel crowding. Those of us who had crystal scanners needed to purchase additional crystals to keep up with the changes, or ... we moved forward with programmable scanners as they started becoming more plentiful.

We didn't panic back then. We just adjusted. We didn't miss much, but we had to adapt by adding more crystals or migrate to programmable receivers.

But then, this county decided enough was enough. They couldn't move any more units onto a crowded VHF high-band radio system that was receiving increased interference from the metro area, and adjacent metro areas, too. It was time to take the next step.

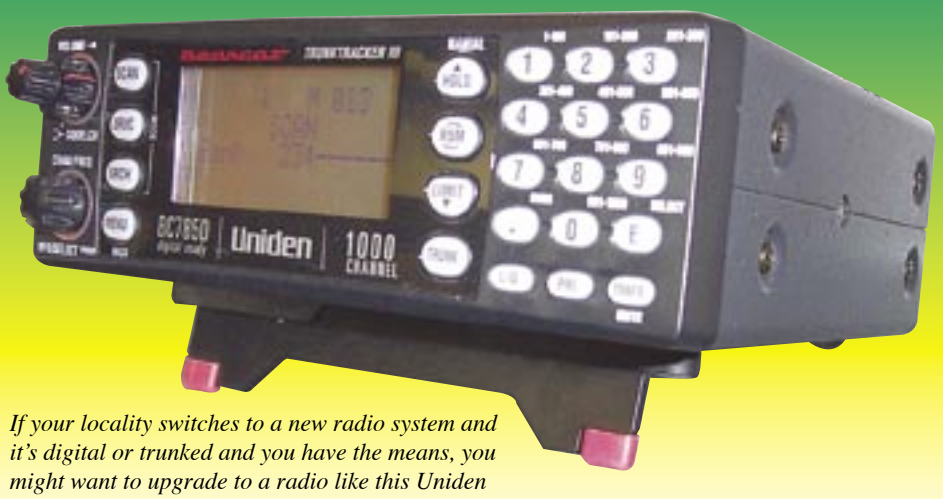
So ... after a series of meetings, this county decided to move to a much more quiet UHF band. Not just UHF, either. T-band. This T- band was television Channel 19 from 500-506 MHz and a series of repeaters in the 501-MHz band were employed all across the county for police communications. Zones were made smaller (the largest municipalities became their own zones!) and there were many more channels, including channels for car-to-car use, license plate information, tactical use, and more. They really had a system now!

That system served the county well for police communications for almost 25 years. But growing pains still were being felt. Police forces expanded and with it the need for increased communications capability. After another series of studies and meetings, this county decided to take the next step forward. It was time to move to a trunked system and while they are at it, go digital.

Scanner hobbyists were in a tizzy. Digital scanners weren't readily available yet. How could they begin to monitor this new system? And even worse, word came about that



Some day you no longer may hear your local emergency services dispatchers on your scanner because they have migrated to a new a radio system.



If your locality switches to a new radio system and it's digital or trunked and you have the means, you might want to upgrade to a radio like this Uniden Bearcat BC785D. Photo by Lisa Stephens/scancomm.net

fire and EMS units still on VHF low band would migrate to this new system, too. What would be left to monitor?

The switch started and units migrated to not only trunked, but digital. In fact, they stayed on the same frequencies, and added a few more to expand coverage. This new digital trunked system is on 501 MHz because there weren't enough frequencies in the 800- MHz band for a completely new system. So, those who monitored the old 501-MHz frequencies now heard the buzz of digital sounds instead of clear-voice analog FM signals.

For many, that became annoying. However, one firehouse in one end of the county was doing something about it. For years, this firehouse repeated communications from VHF low band on 46 MHz to a UHF repeater on 460 MHz. This allowed UHF handheld radios to crossband with the VHF low band system and offered good listening because several of the VHF low-band channels were patched into the one UHF channel (different subaudible tones separated the communications).

Much to the surprise of scanner hobbyists, the 460-MHz repeater started relaying digital communications via analog UHF. It once again was possible to monitor some of the digital comms with an analog receiver. Those who paid attention to the channel were the first to find out.

But my story doesn't end there. It's a story of diligence ñ one of determinedness. Think back what I said about how this system started back in the 1960s with three zone channels on VHF high band and one additional point-to-point channel.

One of the frequencies in this group of zone channels was 155.550. For years, the county continued to hold the license for the frequency, although technically it no longer was in use. Every five years, the county renewed its license for the old VHF high band channels, even though everything now was on UHF T-band. But here is where determinedness pays off. I am willing to bet almost no one ever monitored those frequencies anymore. Why would you put a frequency in your scanner if you knew it wasn't in use? Well, there is a very good reason!

Across the county were a few diligent scanner hobbyists who probably kept those old VHF high-band channels in their scanners over the years. Sure, there were other users who probably came across on those channels in other areas, but as long as the county held a license for the frequency, these determined scanner hobbyists were keeping these channels monitored.

And then it happened ...

One day, probably two and a half decades after it was used on a regular basis in the county, 155.550 sprang to life from the county radio room. Wow! Probably 25 years had lapsed since the frequency was last used on a regular basis, but now it was being tested for possible NEW use!

Because everything had migrated to UHF T-band digital trunked, there remained a need for paging purposes in the county. The fire and EMS units rely on paging day in and day out, and it was time to overhaul or scrap the old VHF low band system, which certainly had coverage problems because of the nature of signals there. Thus, the county is in the process of reactivating after decades an old channel for paging purposes.

Those who monitored 155.550 over the years heard it first and reported it via e-mail lists. There was plenty of chatter about it. A new ìoldî channel was in the making. For those who pay attention on the Internet to new FCC licenses, they would have missed this ìnewî channel because it was there all the time. And for those who can't monitor digital trunked communications, at least they may have an opportunity to continue to hear emergency services dispatches on an analog paging channel.

Continued on page 6

LOCAL RADIO UPGRADE... A TIME TO PANIC? continued

That was a long way of saying that you should never give up listening because you hear about a change coming. There are other similar opportunities. Old frequencies might find new uses, but in quicker fashion than the example I painted. For instance, if a police department moves from 460.050 to a trunked system on 800 MHz, the old police channels might all of a sudden come into use by the town's parks department or school security. You might be surprised. While one user moves, it might open up new monitoring possibilities!

Likewise, if everything in your town seems to migrate to a system you cannot hear with your scanner (or moves to a system like OpenSky that no scanner can monitor), search for new monitoring targets. Is there a shopping mall? Try listening to its security channel in the business band. Perhaps the local rescue squad has a chatter channel that is analog ... you'd have to search it out and look through FCC licenses online for your community. So ... when you hear ... or next time you hear ... that your community is switching to a new radio system, don't get too excited. Refocus your listening targets, keep an ear on the old channels forever(!) and start thinking about what it may take you to upgrade your equipment so you don't miss too much.



Radio towers carry analog, digital, conventional and trunked radio signals to your scanners. New radio systems often mean installation of new towers, so keep a lookout on the horizon in case new towers are erected in your area.

Write in:

Let us know what you're hearing on your scanner. What would you like to monitor? Send your e-mails to nat-com@scanning1.com and make sure you put 'Nat-Com' in the subject line so your e-mail doesn't accidentally get spiked to the spam bin. ●



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A Review of the Kaito KA-1102

By Jon Van Allen KF7YN

If you have been listening to shortwave very long or been on eBay lately, you are surely aware of the current large crop of low cost, Chinese-made SW receivers saturating the market. You will see names such as Tecsun, Degen, Kaito, Kchibo and many others you are probably not familiar with. Not only is it confusing to try to figure out which ones are worth looking at and which are not, the Chinese are not known to use names and model numbers which set them apart so the task is even more daunting as we sort through the list of possible candidates. I wasn't sure if the Kaito KA-1102 was much different from the KA-1101, for example, but it turns out there are major differences despite the nearly identical model numbers. Even the well known European based Grundig has moved their entire shortwave line to Chinese factories. Alas, everything seems to be made in China these days.

The search for the ultimate $100 or less portable SW receiver has been a hot topic for some time. The ideal receiver must be small, sensitive, selective, have a digital display, full frequency coverage, ssb capable, acceptable audio quality, wide and narrow bandwidths and have all around decent performance. Sounds like a tall order and nobody has really accomplished all of the above to anyone's satisfaction... until now.



Normally I wouldn't get very excited about a low priced shortwave portable, but I started reading more and more positive comments in several Yahoo groups and eHam reviews about the Kaito KA-1102, especially from people who have been raving about this radio's AM band performance. Any low cost portable radio that can perform reasonably well on the AM band has to be worth looking at!

I bought this radio and put it through the paces at home near Salt Lake City and I took it to the Yellowstone area where I spend a good deal of time every summer. I also spend time in LA which is jam packed with AM radio stations. The final test for me is to see how this little gem works along side my trusty Grundig Satellit 700 in the crowded Far East with stops in Japan, Korea, China and Hong Kong as well as the long ocean crossing to and from California which is the ultimate sensitivity test, a few thousand miles from anywhere in the middle of the ocean! My testing laboratory stretches far and wide!

Let's open the box and have a look inside. Inside the box is a fitted cardboard liner with compartments for the radio, manual, batteries, stereo





earphones and AC adaptor. Also included is a brown suede leather carry pouch with a draw-string strap. This is really a nice touch, the radio and 34 page owners manual fit nicely inside the pouch.

The ownerís manual tells you what you need to know but the Chinese to English translation leaves something to be desired. However, you should have no trouble understanding the broken English instructions.

This radio operates on three AA batteries which can be either rechargeable or standard alkaline cells. Who knows why the design engineers decided to go with three cells; nobody sells AA's in three packs. Included with the radio are three 700

Continued on page 10

A Review of the

mAh Ni-MH rechargeable batteries. You can charge the batteries inside the radio or use an external charger. Charging the batteries takes 1-9 hours according to the manual and the display even shows how much charging time remains! Now that has to be a first!

This may be sufficient for the traveler who has access to the power mains every day or two but I already installed a set of high capacity 2200 mAh Powerex Ni-MH cells which give a week or more of regular service between charges. A WORD OF CAUTION: if you use alkaline batteries, don't plug the AC adaptor into the radio, it will charge whatever batteries you have installed. This could lead to leakage or worse, so always remember to remove those alkaline cells before plugging in the AC adaptor.

This radio is SMALL, just under 3-1/2" tall by 5-1/2" wide by 1-1/8" thick and weighs just a little over 10 ounces without batteries. For those who use the metric system this translates to 143 x 88 x 28.5 mm, weight is 280g without batteries. Even with batteries, this radio still weighs well under 1 lb. That is small and light enough to take anywhere, including in a back pack into the wilderness or in your carry-on luggage! This radio sits comfortably in the palm of my hand, yet it seems somehow bigger. There is a flip-down support stand on the rear of the radio which puts the radio at a good viewing angle. The telescoping antenna swivels for any position.

The manufacturer says this radio is made in one of the highest quality factories in China and specifically states that sensitivity is excellent on all bands. From my experience with Chinese made portables in the last several years, these claims are true. The first thing that grabbed my attention is the high construction quality and very good fit and finish. The KA-1102 looks, feels and performs more like what you would expect from a modern Japanese made radio. The Chinese are making great strides in quality and performance.

The speaker is only 2.6" (66 mm) but sounds very good for its size and does not strain the ears to listen to for short to moderate periods of time. I often use a set of amplified stereo speakers for longer periods of time. The earphone jack is also a line out jack so that you may use external speakers with our without amplification.

Ergonomics are not the greatest, but manageable after spending a little time getting used to the strange way features are accessed. For example, there are 10 memory pages (banks, if you prefer) with 19 memories possible for each page for a total of 190 memories. Pages 1 thru 6 can be programmed with any band, AM, SW or FM. Pages 7 thru 10 are band specific. Page 7 is for FM only, Page 8 is for AM band (MW) only, Page 9 is for SW and SSB only and Page 10 is for ATS function, random memory preset. At first this seems strange and inconvenient, but once you program stations, it's easy to remember. The real inconvenience is that SSB can only be programmed into Page 9 along with the smaller steps for SSB tuning. It's a mystery to the logical mind why the design engineers decided on this arrangement.

So you're wondering what ATS is, right? Nowhere in the manual could I find what ATS is an abbreviation for



Kaito KA-1102

continued

but it is an automatic search and store feature. With ATS enabled, the radio scans thru a band and automatically stores stations it stops on into Page 10. When it stores 19 stations, it stops scanning.

There is also a copy function; you can copy the contents of an entire page to another location. This is handy when programming using the ATS feature and want to clear it out for new searches.

Scanning: The KA-1102 has one of the best auto-scan functions I've seen in any portable regardless of price. It scans fast and stops on relatively strong stations. It also goes to the next band when it reaches the edges of each band. For instance, if you start scanning in the 22 meter band, it will automatically move on to 19 meters, then 16 meters, etc. I am pleased with this radio's scanning performance and features.

Tuning can be direct entry, by frequency or meter band which is nice if you want to start scanning in any particular band, just hit the meter band and then either the up or down button. Holding the tune up/down button for a few seconds increases the speed. This really makes whizzing through the bands fast and easy. Tuning steps can also be selected as follows: FM band 100/50/10 kHz. AM band 10/9/1 kHz. SW band 5/1 kHz. SSB 1 kHz with rotary thumbwheel variable fine tuning.

The volume control is electronic via up/down buttons and is indicated by a nine segment graph in the upper right hand corner of the display. This looks more like a signal strength graph to me, but I'm old-school when it comes to these things. While I prefer a real volume knob, the electronic volume control is not a big deal in reality.I often use the volume control on my amplified stereo speakers instead. A little voice in my head says "get used to it dude, this is the way of the future".

Other features: FM Bass boost is barely noticeable using the internal speaker and the manual recommends not using it unless using headphones or external speakers.

The clock can be set for 12 or 24 hour format. Tone is selected by a slide switch on the side of the radio, Music or News. Music enhances treble while News cuts treble. This is fairly standard on most portables.

Sensitivity is selected by a slide switch, DX and Local. It would be nice to have a variable RF gain control but as with virtually all low cost portables with limited space, a DX/Local switch is all we're going to get.



There is a button on the front panel that does double duty, On AM and SW it selects Wide/Narrow filter and on FM is selects Stereo or Mono. Fortunately, the processor remembers which position you had it in so you don't have to keep selecting it when you change bands. The Wide position is a bit too wide for crowded band conditions, so I usually leave it in the narrow position. Most portables in this price range don't even have selectable wide/narrow filters so this is a plus!

The KA-1102 is a double conversion design which means it does not hear images like other single conversion receivers such as the Grundig S350 I reviewed this past summer. The 1102 has decent selectivity and is not too easily overpowered by stronger stations in the presence of weaker stations like most low priced portables.

Signal strength is indicated by a basic 4 LED bar graph under the display window. The signal strength graph is all but useless; it doesnít really tell you much that you didnít already figure out with your ears. Iíve never seen a digital signal strength indicator that adequately replaces a good old fashioned analog S-meter and this radio is no different.

Battery condition is indicated by a familiar looking 3 segment battery icon in the display. This radio plays and plays on a set of alkaline batteries, I'm not sure exactly how many hours but I used it for an hour or two per day for 2 weeks in Yellowstone

Continued on page 12

A Review of the Kaito KA-1102 continued

on one set of alkaline cells and they were still good for another week or two at home.

The display and keypad are backlit with modern cool-blue LEDs. The backlight can be set to always on (while plugged in), off entirely or on for 8 seconds after the radio is turned on or after any button is pushed. The backlit keypad is very welcome; I prefer to use a radio with a backlit keypad at night. This has to be a good selling point all by itself to us night-owls!

The radio has two alarm options, beep or radio. It beeps like a conventional alarm clock or can be set to turn on the radio to any frequency you chose. There are also three groups of auto on/off timers. This is handy for hearing programs at odd hours you might not remember to turn the radio on; it will turn itself on and turn itself off! There is also a sleep timer which can be set anywhere from 1 to 99 minutes.

Okay on to the meat and potatoes, how does this thing perform in the real world? During the ocean crossing, I noted our position at 45 degrees North latitude by 160 degrees West longitude, over 2,000 miles west of Portland Oregon.

At 2300 UTC I headed out on deck, pulled up a chair and extended the antenna. I pulled in the BBC and VOA morning broadcasts to Asia on 15250 and 15305 kHz respectively and Radio Netherlands evening broadcast to North America on 9845 with a strong signal. I also snagged Radio Japan on 17825 with a strong signal.

Okay so I could hear the strong broadcasters but how about single sideband utility and ham radio signals? I tried the aeronautical on-route frequency 11282 kHz from San Francisco and could hear airliners and San Francisco radio clearly on USB. I also heard several hams using Morse code on 14 and 18 MHz, I copied a QSO between an RU station in Russia and a W8 station in Michigan on 14.005 MHz, I also heard a JA1 station in Japan in QSO with a N5 station in Texas. All of these were heard using only the stock antenna. Wow!

The problem with most low cost portables is tuning SSB and Morse code (CW) to a listenable degree. This radio surprises me in its ability to fine-tune these signals with the thumbwheel fine tuning control. The radio does not drift much and the recovered audio is stable and easy on the ears. While this is no match for an expensive table-top receiver, it does a decent job for casual monitoring of AM or SSB/CW signals. I would say it's certainly as stable as any portable under $300.

Once we got to Asia and band conditions were a lot more crowded, I tested the radio at night and during the day. Occasionally there were strong stations that caused some splatter; I don't think the KA-1102 is at fault because I had the same problem with my Grundig Sat 700 so I would think the problem is with poorly adjusted transmitters in China causing in-band interference. The little Kaito was able to pull in everything my Sat 700 could hear, but the Kaito does a better job than the Grundig in some respects such as search and scan.

I also noticed that the Kaito does not have the "chuffing" problem nearly all other synthesized portable radios have. There is a very brief pause during tuning as the synthesizer locks, but the audio is not muted during the entire process, you can still hear signals as you tune or scan. This is a very welcome improvement and makes tuning much more enjoyable. Now if it only had a tuning knob!

I did not spend much time testing FM performance, although I did do a bit of FM DX'ing in Yellowstone from my campsite and heard several stations in Jackson WY and Idaho Falls 90-100 miles away. I would normally use a bigger radio for FM simply because of the audio quality. I bought my Kaito for shortwave broadcasts and to check band conditions and propagation while I travel. I was pleasantly surprised at the SSB reception so that's a bonus in my book.

I have to say the KA-1102 is the closest thing to the ultimate small portable under $100 yet, even though ergonomics need improving. The receiving performance of this radio rivals portables in the $200-300 range. The street price for this radio is between $79-$99. Several dealers are carrying the KA-1102 in the US at the time of this writing. I bought mine from an eBay dealer in Florida for somewhat less. If you're looking for a good performing small portable, I highly recommend the Kaito KA-1102.

As always, we welcome your email, what you are hearing on your scanner and what topics you would like to see covered in these pages. I can be reached via email: jonvanallen@msn.com

Until next time, happy scanning!

CB RADIO SCENE:
MIDLAND CB RADIOS

By John Phillips, N2IUJ

The folks over at Midland have recently decided to give consumers a "bonus", This bonus comes in the form of a new 3 year warranty on many of their CB radio models, the longest warranty in the CB industry! Let's take a look a two of Midland's CB offerings that include the new warranty, the model 1001Z and the 77-255ESP.

GREAT BASIC CB

The Midland 1001Z, also sold as the model 1000 are identical radios and have a "street" selling price generally under $60. At this price you would expect a basic no frills model, but midland has packed a generous amount of features into a compact and low priced mobile CB.

This small CB radio sports a 5 segment LED S/RF meter and has the same standard metal 4 pin "screw on" microphone connector found on the top line sets. Midland also included an instant channel 9 switch and a PA function switch too! There are rotary knobs for volume, squelch and channel selection, no simple "up- down" buttons here! The set includes a good quality microphone, mobile mounting bracket and fused power cord. This radio is all black with green LED display for the channels.

The built in ANL circuit is always on and helps reduce static. The compact size allows for fit in places where a full sized rig won't go. Also uncommon in a CB of this price is the PA function, heavy duty mike and S/RF meter. These features, along with the unprecedented three year limited warranty make the Midland 1000/1001Z one of the best deals in a low cost 40 channel AM CB radio. There really isn't anything that another "under $60" compact mobile CB would have that seems to be missing here! The radio has a bottom mounted built in speaker, along with an external speaker jack, and is available from Midland CB dealers in the USA and Canada...



A test drive with the 1000 connected to a K40 antenna gave great performance on both transmit and receive, and all functions and features worked as advertised.

MORE BELLS AND WHISTLES

If the Midland 1000/1001Z seem a little too basic for your needs, check out the model 77-255ESP. This slightly larger model is loaded with additional features!

You will find both a real analog S/RF meter, as well as an LCD display of signal and channel too. The radio has both microphone and RF gain controls, which allow you to adjust the incoming receive signal strength and the transmit mike volume for varying conditions. A bright/dim switch gives the user two selectable light intensities for night driving use.

Another great feature is the talkback switch, this feature, when turned on, allows the user to hear themselves through the CB speaker while transmitting. This is great for checking the sound of aftermarket power mikes.

The features of the 77-255ESP don't stop here, either! The rig also contains ten USA/Canada weather band channels, 3 channel 1 button memory positions and Midland's exclusive "ESPII" noise filter circuit, which is said to boost noise filtering far above the normal ANL capabilities.

This radio is still smaller than many medium sized CB radios, and includes the 4 pin microphone, mounting bracket and power cord. There is no PA option on this set, however.

The 77-255ESP has a "street " selling price of under $130, and is also covered by Midland's great new 3 year limited warranty.

Check with your local Midland dealer or some of National Communication's advertisers for more information on these exciting CB radios!

Something Useful: Tips To Remember About Scanning

By Laura Quarantiello

I've written for National Communications, in one form or another, for more than 10 years. During this time I've seen many changes to the hobby; scanners have become smaller and more powerful, radio systems have become bigger and more complex. First trunking came along, then digital trunking. The Electronics Communications Privacy Act of 1986 was enacted and then 9/11 occurred. Through it all, I've tried to keep my articles timely and informative. No matter the subject, from aviation to federal monitoring, from choosing a scanner, to getting the most out the scanner you have, I've always tried to leave you with something useful. I believe that the best scanner articles, whatever the topic, teach techniques that you can apply to your own listening. In this, my last article for *National Communications*, I'd like to leave you with some parting tips, something useful that I hope will help you continue to enjoy the hobby.

Never underestimate the power of the Search button. It's the most important button on your scanner, and the most underused. The Search button can help you find new frequencies and map the usage of different frequency bands. You should always find time each week to take a spin through a different band, searching for new and interesting activity.

Don't become complacent. We often get in a ìrut,î listening to the same old frequencies every time we turn on our scanners. Don't be afraid to try the Service Search feature, or simply to punch up some channels you don't often listen to. Have you tried the aviation band lately? Or the railroad channels?

Don't think you have to own the latest and greatest scanner. Each year new scanners are released and hobbyists drool over the specs. Go ahead and drool, but remember that you don't have to own the latest scanner to enjoy the hobby. As long as your scanner does the job and receives what you want to listen to, you don't need to spend the big bucks. Upgrading is nice, but it's often not necessary. Even older trunk trackers work great on many of the systems in use today.

Use your resources. Frequencies change, radio systems are upgraded, new frequencies become active. Are you in the loop? There are many resources, both printed and online, to help the hobbyist keep up with what's new on the air. Read magazines like National Communications, visit websites like www.radioresources.com, and join in some of the great scanning related groups online. In addition to general groups about scanning, there are groups targeted to emergency services, aviation, military, etc., as well as groups for different geographic listening areas.

Check your antenna. Antennas tend to be the most overlooked piece of radio equipment we own. We put them up and forget them, until they don't work or our reception starts to degrade. Plan on checking your antenna and its connections every Spring, whether or not you've had a hard Winter. Pay special attention to all connections, even the one at the back of your radio. It's easy for these to loosen or sustain moisture damage. And remember that a good discone will almost always improve your reception, so think about upgrading.

Keep a log. All it really takes is a cheap notebook to create a record of what you've heard and where. You can also make your entries in a Word document or Excel spreadsheet. Whether you choose the low tech or the high tech method, keeping a log is one of the best uses of your time in front of the dials. Believe me, there will come a time when you'll want to remember a frequency or the time a transmission was heard. Your log will become your ìbible,î an indispensable reference.

Know your scanner. Most people don't read the manual, and that's a shame. Granted that some scanner handbooks are poorly written, but that shouldn't keep you from studying the manual for your scanner. All of the knobs and switches are explained, as well as critical items like entering frequencies, setting up trunked systems, and using CTCSS/DCS codes. The more you know about your scanner, but more you'll get out of your scanning. Spend some time with your owner's manual, you'll be surprised what you learn.

Take a field trip. Remember that rut I talked about earlier? You can put some excitement into your scanning by taking a field trip. You don't have to go far, even a nearby hill will open up reception of things you haven't heard before. Of course, if you have the time and opportunity, take your scanner with you on your vacation. You may enjoy listening to something different. Don't forget to do your homework beforehand, compiling lists of frequencies for the areas you'll be visiting. And, of course, just using the Search feature on your scanner will reveal local activity. Don't forget to keep notes!

Share the hobby. Never pass up an opportunity to talk about scanning. Whether you're at an airshow, a national monument, a racetrack, or just a local park, share the hobby with people who show interest. Get online and share your knowledge with others, or even sit down and write an article about something you've learned about scanning, or one of your scanning adventures. This hobby is never so much fun as when we pass along something useful about it to others. ●

SCANNING DURING SEVERE WEATHER

By Clint Duckworth, Hamilton, Alabama

The sky gets dark and the thunder sounds, you look outside and you see a storm headed your direction. The first thing you do is turn on the TV and tune into the weather channel or local news station. Then you find out that a big storm is headed your way and that the county next to you is getting hammered with damaging wind, hail, and lots of rain. You also hear that funnel clouds have been spotted close to your county. You think, well its time to get the flashlights, candles, batteries, etc. ready for the big storm coming your way. Have you thought about tuning into your scanner radios?

To me, scanner radios are the best source of news as it happens. During severe weather, you can get the latest news on funnel cloud sightings, hail reports, flooding reports, and much more with a scanner. I have eight scanners (six bases & two portables). I only keep four bases running in the house. The other two bases are for back up use and the two portables, of course, are for when traveling. On one base, I have my local police, Sheriff, Fire, and state trooper frequencies programmed. On the other base, I have a combination of frequencies for Northwest Alabama. The other base that I have running is for ham radio frequencies for my area. By the way, ham radio is one of the best sources of getting severe weather reports. And the other base that I have running is for scanning local utilities, power company, state DOT, forestry, and much more. When severe weather is in or approaching my area, I tune into my scanners.

The main frequencies that I monitor during a severe weather event are my local police and fire, state troopers, and of course, local ham frequencies. Since I have four base scanners, I can monitor all the counties that I monitor in Northwest Alabama without missing any action. My local police or fire channel may be talking on one scanner, and at the same time on another scanner, a county right next to me is talking about the same event, and on another scanner, a ham radio operator is talking about a funnel cloud sighting. The more scanners that you can put into play during severe weather the better your scanning experience will be. Get a list together of the main fire, police, sheriff, state police, EMA, and HAM frequencies for your area and have them ready to tune into on your scanner when severe weather hits you. If you have multiple scanners, be specific. In one scanner, put your local police and fire frequencies in it. In another scanner, put frequencies for counties that surround you. In another one, put in ham radio frequencies in. And in another radio, put in your local utility frequencies. This way you won't miss any of the action. In any severe weather event, be ready to tune into your scanner radios! You'll be amazed at what you will hear!



Down But Not Out
From Hilltop to Apartment

By Jim Sutton, N2OPS

As I watched my scanner spin through the weather channels without stopping, I knew my life was changed. It was either raise the white flag on scanner listening or create an inside antenna system that would bring in maximum reception.

After living 12 years at a high hillside location with outside antennas, I was in a first floor apartment in the lowest part of the village. The drop in elevation of 280 feet combined with the largest hill in the village, towering 150 feet above my location, solidly blocking a portion of my reception made it a challenge to receive even surrounding counties. With the apartment rules forbidding outside antennas it was time to come up with an inside antenna system.



The wind damaged Channel Master Monitenna went back into service as a window mounted inside antenna.

AN INSIDE JOB

The wind damaged Monitenna that I saved suddenly had great value as I fashioned an inside antenna. With one of longest sections, missing the Monitenna had its remaining VHF low band element cut to VHF high band. Loose wire, cut to the length for VHF low band was then added, which allowed the modified Monitenna to fit perfectly in my living room window. With most of my signals to the north, the perfect spot was found.

A magnet mount mobile scanner antenna will also work. The less efficient Scantenna can also have the all too short low band elements cut to high band only. A simple dipole back of set TV antenna can work as well allowing the length to be adjusted for a specific frequency. Be sure to use a barrel connector and 75-300 Ohm transformer. Antennas with ground planes extending out horizontally are a poor choice as the ground planes are both awkward and can allow someone to lose their eye.

To determine the length of antenna for a specific frequency divide the frequency into 2808. At 155 MHz VHF, high band the length is 18 inches. For 46 MHz VHF low band its 61 inches. For 460 UHF the length is 6 inches.

MORE POWER TO ME

My Grove PRE-4 Power Ant gave my signals a boost when used inside as it did with the antenna mounted outside. Combined with a new section of RG6 cable I was going strong. The new cable made a dramatic difference in the weakest signals.

TWO OUTPUTS AND EIGHT SCANNERS

Now there were eight scanners with only two outputs from the Grove Power Ant. A Radio Shack one to four TV amplifier came to the rescue feeding four scanners from one input.



This Channel Master 3044 amplifier drives four scanners.

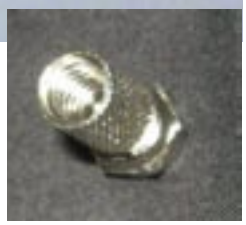
A newer Channel Master one to four amplifier did an even better job when attached to the second output resulting in a total of eight scanners being fed from one Monitenna. My big city police on UHF was gone until the Monitenna was in place. However, with the signals 40 miles away they were still barely readable. Patience determined the exact spot in the window that would be lost with movement of only an inch in any direction.

After experimenting with a number of connections from the preamp to the scanners, I found that six foot pre made BNC to BNC cables cut in half with screw on F connectors from Radio Shack performed the best.

Even though the amplifiers are marked for TV use they work fine on all scanner bands. Scanner and TV bands are next-door neighbors throughout the frequency spectrum making for good compatibility.



This UHF yagi from a local two-way radio dealer brings in 800MHz trunking from a neighboring county.



Twist on F connectors from Radio Shack do a fine job and require no crimping tools.

With the antenna system in place, weather scan brought in two weather stations, one marginal and one full quieting. Ironically, neither gives the forecast for my area. The one that does cover my area recently had work done to the transmitter, weakening the signal and rendering it useless for me. E-mails and calls to my local weather service folks brought a delightfully fast resolution and now my local weather signal comes in fine.

THE BIGGEST CHALLENGE

One adjacent county has a hill in the way of receiving it's 800 MHz trunked system. Coupled with multiple transmitters on the same frequencies which fight each other often give a constant beat which has the signal fluctuating effecting both



This 430-1430 MHz Radio Shack inline amplifier combined with the yagi accomplishes what no other combination would bringing in the 800 MHz trunking system from an adjacent county loud and clear..



This vintage Channel Master crystal scanner located above my Uniden 9000XLT provides the best in audio and sensitivity.

the strength on the S-meter and the audio quality.

The solution was my 800 MHz yagi that used to be mounted above my home. Now it is in the window coupled to an inline UHF preamp from Radio Shack. This fickle signal was my biggest challenge.

Shortening the length of the cable was a must, as loss at these higher frequencies can wipe out your gain when the cable is too long.

TRUE OLDIES BUT GOODIES

My primary scanner is a vintage RCA 16S300. This crystal-controlled scanner has an unrivaled clarity for local reception including simplex channels that demand good sensitivity to receive mobile callbacks. When I want to hear just my local calls this is the one scanner that remains on. Take care as some older crystal scanners wreak havoc with other scanners and TV reception. The next in line for sensitivity is my vintage Bearcat 300 bringing in even more fringe reception.

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Down But Not Out Continued

DETECTIVE WORK

My handheld scanner allowed me to find just the right spots for my antennas. Don't rule out spots that you assume won't work as you may pass up optimum reception. A handheld with a signal strength meter helps narrow down the best receiving location.

Be ready for lots of surprises discovering what comes in and what doesn't. The surrounding terrain, buildings and the direction your window faces dictate the optimum spot for the best reception.

Wood frame buildings will fare better than those with metal in their construction. Metal that reduces signal strength can be siding, coating on insulation, or any combination, which will weaken your signals limiting reception to window areas. My wood frame apartment has metal backed insulation which necessitates the antenna be placed flush against the window. While my apartment has cloth screens and thus no problem with mounting the antenna. However, there may be metal screens at your location presenting a bigger challenge.

MORE BATTLE

Bringing your scanner antenna inside means you will have to contend with indoor sources of interference such as computers and VCR's that did not pick up with the antenna mounted outside and away from the source of interference. Also, ìbirdies. î or internally generated signals that didn't pick up on the antenna when mounted outside may suddenly appear hanging your scanner up on any number of channels. And interference can extend beyond your apartment to the neighbors.

Most interference will be eliminated by setting the proper CTCSS or PL tones in your scanner. If your scanner has an attenuator option for individual channels, this will help with the channels that nave no CTCSS. An attenuator decreases the sensitivity to allow a stronger signal to make it through while eliminating much of the interference.

My county fire has CTCSS for all of the mobile units, but no CTCSS for the dispatch signal. To eliminate the interference I have the frequency entered twice. The base is open squelch with the attenuator on. The second is without the attenuator, but CTCSS allowing reception of distant mobiles. Without this combination I'd be unable to hear my local fire calls.

A TIGHT FIT

For situations where an outside antenna is possible, and the rules allow one, a nifty through the window or door feed is available. This will be a bigger challenge in newer energy efficient apartments with tight fitting windows and doors than in older units with looser fitting doors and windows.



This unique slimline feed will allow antennas to be fed through tight fitting doors and windows.

An excellent source for amplifiers, cable and connections for apartment applications is Solid Signal. Their selection of amplifiers includes single unit, multiple unit, and UHF only amplifiers. They range from simple 10 db to 22 db and can drive up to 8 scanners. Be sure the amplifier is for off the air TV. Solid Signal is the source for the Eagle Spen FC-200LX slimline flexible 8 inch coax window cable. Top quality RG6 cable, connectors and splitters are also available. RG6 is a must over the inferior RG59 cable. The Solid Signal web site is http://www.solidsignal.com/.

COMPETITION

Preamps are very limited in where they will help. While they amplify the weak signals you desire, they will also amplify interference. Any strong local signals can overload and literally splatter on frequencies across the scanner bands. Once upon a time overload was limited to major cities. Now many rural locations have paging, cellular and basic land mobile transmitters resulting in city type overload. Overload can be merciless to the scanner listener in a valley with interfering transmitters at the top of the very hills cutting off his reception. Gain control in the preamp is a plus, as often the gain must be adjusted back. The option of individual attenuation is almost always a must. In line, adjustable, attenuators and FM broadcast band filters are available from Radio Shack.

GOING PROFESSIONAL

My ultimate scanner is a GE Phoenix UHF mobile two-way radio, which is used for two-way communications on land mobile and GMRS frequencies. This radio doubles as an ultra sensitive scanner bringing



This GE Phoenix two-way radio doubles as an extra sensitive scanning receiver. Above the two-way radio is the Grove Power Ant that feeds the two one to four amplifiers.

Eight scanners function from one antenna. The ninth scanner is fed from the 800MHz yagi.



in signals that just don't make it on any scanner. Land mobile radios can be programmed for receive only, with the ultimate in sensitivity and adjacent channel signal rejection.

Check with your local land mobile two-way radio dealer to find out what is available for receivers and antennas. The expertise of an experienced two-way radio dealer can prove invaluable to receiving those stubborn fringe signals.

REVISITING LOCAL LISTENING

Moving to the center of the village found me checking out previously passed over listening. After the luxury of listening to multiple counties, I took another look at what was happening right around me. Within less than a mile, I have a large motel, a school, construction crews and other businesses, which provide very interesting listening. Only one operates on a licensed frequency, so diligent searching of frequencies and PL's paid off nicely. Only a few miles away are a salt mine and two large state correctional facilities, previously left out of my scanner, which now provide interesting listening with good signal strength.

Be sure to have all the dot business frequencies as well as FRS and GMRS frequencies in your scanner. The chatter on the FRS and GMRS frequencies takes place all day and night. From kids talking after school to hunters pursuing Bambi, there is always something to hear.

FINALLY

No two situations are alike. Try each and every option you can think of and then search for ones you did not think of. Get any scanner or ham radio friends in on the challenge and even though you were down, you won't be out.

May your signals be strong, your static be few.

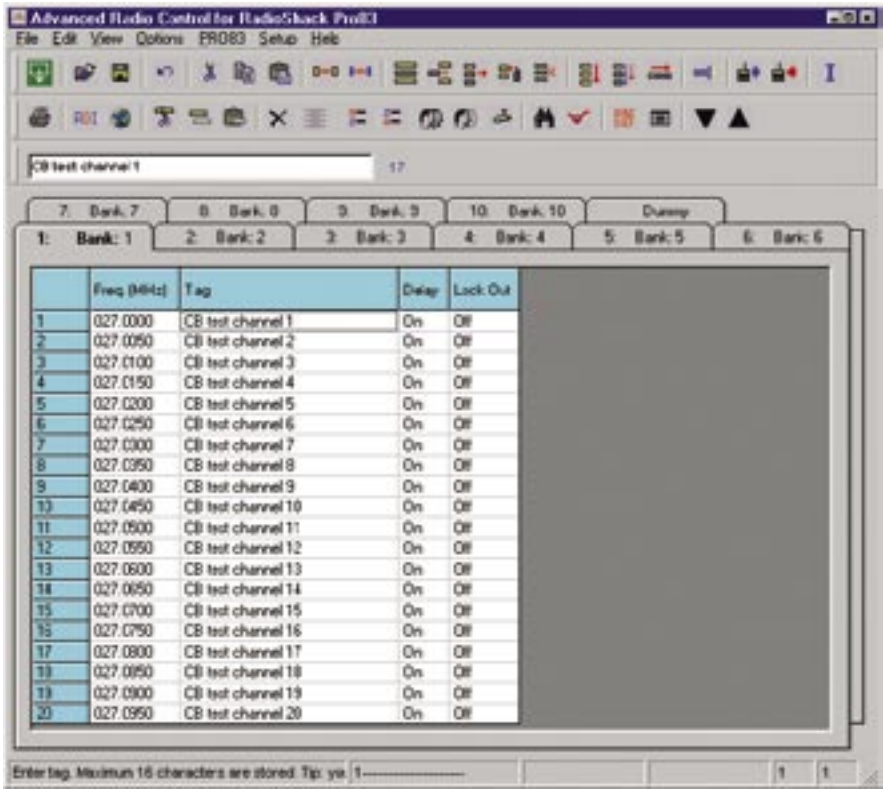
BuTel's ARC-83 Windows Programming Software for the Radio Shack PRO-83 Scanner... a quick way to get up and running with your PRO-83

By Ed Muro, K2EPM

Recently both Radio Shack and Uniden have brought to the market a number of new scanner models that incorporate a new technology, as far as scanners go, called Close Call and Signal StalkerT.

While some will argue that this feature is nothing more than a fancy "search" function, I beg to differ. In essence, the scanner is incorporating a frequency finder or "near field" receiver within the scanner that will lock on to a signal and tune the scanner to that frequency. While the concept of "Reaction Tuning" is not new, it most certainly is new to have it incorporated right in to the scanner and at such a reasonable price. In the past, reaction tuning could only be done if you had some expensive and sophisticated equipment in your possession. Most commonly, you needed an OptoElectronics Scout and a scanner that was capable of being interfaced to the Scout, most commonly the pricey AOR 8000 series. A number of years ago Scanner Master came out with am interface cable that allowed the Scout to Reaction Tune the Uniden BC-245 XLT and BC-780, bringing the technology to a more affordable price.

I personally owned a BC-245XLT / Scout combination, and while it was a useful frequency sleuthing tool it had its limitations..namely, the whole set up was a bit "clunky" for a lack of better description. Quite frankly, in this post- 911 era in which we live in, the serious scannist should try to enjoy his hobby while bringing as little attention to himself as possible. So, it really didn't behoove me to sit on a bench at the mall with the BC-245 in one hand connected by this cable to the Scout in the other hand. Aside from raising the eyebrows of the security folks, it really ratcheted up the "geek factor" in the eyes of the babes strolling through the mall.



Then comes the last quarter of 2004 and Radio Shack is running an awesome Thanksgiving weekend sale and the Pro-83, not much larger than the Scout (never mind the BC-245) goes on sale for around 50-bucks. I knew I had to have one of these.

Well, the Pro-83 sure is one neat little radio. Not only is it a frequency finder, but it also is a 200 channel conventional scanner. Here is where ARC-83 comes in to the picture. While I certainly posses a number of more sophisticated scanners in my equipment arsenal, the Pro-83 being not much larger than two decks of playing cards (front to back) quickly became my favorite grab-and-go scanner. In a rush it fits in my back pocket or hooked up to an ear-bud speaker and placed in my inside jacket pocket, it looks like I might be hooked up to a cell phone or the ever popular IpodT.

Over the last nine years computerized frequency management and radio programming have become an important aspect of the hobby to me and I had heard some scuttlebutt that BuTel had some programming soft-

ware available for the Pro-83. Having used the ARC series of programming software with my BC-780, 250D, and 785D I knew ARC-83 would be the perfect fit for my needs.

ARC-83 is a windows software package for easy programming of the memory channels in the Radio Shack PRO-83 scanner. However, ARC-83 has nothing to due with the "Close Capture" technology portion of the radio. This software simply offers a way to program the memories of the Pro-83 and store various "frequency profile files" on your PC. It is also important to note that the Pro-83 uses one way PC communication only. This means that you can only send data from a PC to the scanner. You can NOT read data from the scanner. This is NOT a limitation of the software, it is a limitation of the firmware in the scanner.

In an effort to fully disclose, I want to mention that the ARC-83 is not the only software that will program the Pro- 83. Computer Aided Technologies, makers of the popular Scancat Programs has had the PRO-83 incorporated into their software for some time now. Not only does it program the PRO-83 but many other models of RadioShack and Uniden scanners. The ARC-83 is scanner specific -- that is it will only work with the PRO-83. I chose it because I have used the product on other scanners and was familiar with its operations.

Before we get in to the meat and potatoes of the features of the software first let's make sure your computer is capable of running the software. With pretty modest requirements you should not have much of a problem.

System requirements: ARC-83 will run on any computer running Windows 95/98/ME/XP/Win2000/ or NT. You will need a minimum display resolution setting of VGA 800x600 with SMALL Fonts. Now here is the only possible glitch for people with newer computers. You will need a free serial port (com1-com8). Radio Shack scanners use a standard RS232 port for computer programming and control. Radio Shack scanners do not have a USB port available. Therefore, ARC-83 is developed to support standard serial com-ports. For laptop PC's that do not have a serial port we advise to use a PCMCIA serial port extender card. While you can try a USB to serial converter, they are sometimes subject to communication nightmares. Because of their unreliability BuTel does not support USB connections.

Where there is a radio to be programmed by a computer there needs to be an interface to connect the hardware! Well, there are many cable options available. I found that the cable I have for my Pro-96, which was purchased from Black Bag products, works just fine. Also Radio Shack sells an interface cable, item # 20-289. You can also get the cable from Hobby Radio Stop (937-299-7226). I have also read that BuTel themselves puts out a cable, model # IF2B. The Memory Editor Screen: If you have used any of BuTel's other products, the channel programming screen will look very familiar.

The top section has a standard Windows MENU bar and a Toolbar. Most options found in the menu also have a "shortcut" in the toolbar. If the mouse is moved over a toolbar button a help text is shown giving a brief description of that button. The editor bar changes as you move the mouse in the editor grid, if you click on a column the editor bar will show the right edit options. You can edit data both in the editor bar or directly in the editor grid. Using the memory bank selection tab you can set the active memory bank that you want to edit.

Continued on page 22

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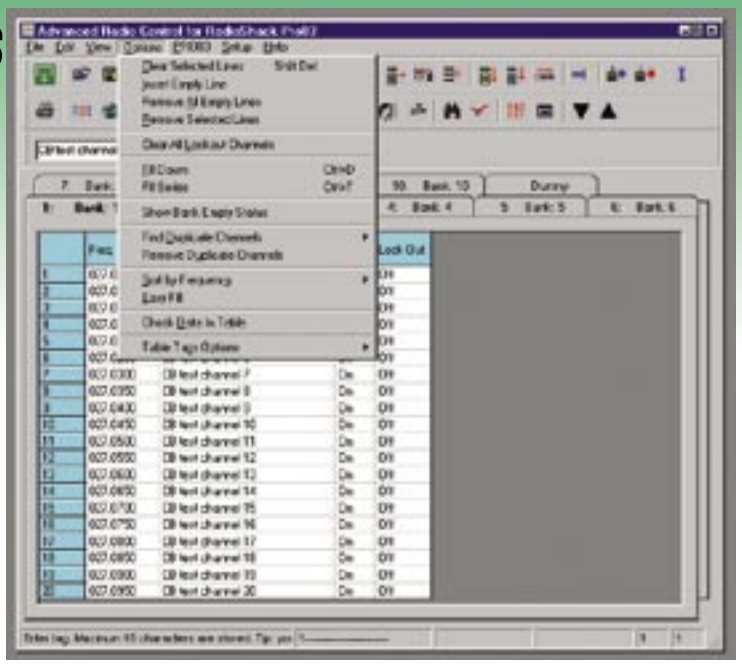

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BuTel's ARC-83 Windows Programming Software for the Radio Shack PRO-83 Scanner... continued



Once data is transferred to the memory channel grid you can use numerous options to edit your data. Using the menu or toolbar you can easily move/copy/sort data. All options also have a toolbar button available. Moving the mouse pointer over a toolbar button will show a small popup help text. You can edit data directly in the grid or you can use the editor bar. The editor bar will automatically change if you click on a column. In the grid there is no cursor shows. In the frequency and tag columns you can directly type data, to edit existing data use the editor bar above the grid. You can only use the backspace to correct data, for advanced edit, use edit box above the grid or double-click. You can go to edit mode by using double click in the frequency or tag column. The background color will change to light blue, indicating you are in edit mode. You can now use cursor buttons etc to edit data.

When you enter a frequency and you press ENTER the other cells of that line are automatically programmed depending on your custom settings (default channel data) set up with a few mouse clicks such as Scan Delay, Priority, and channel Lock Out.

Gommert has included a nifty feature in the software called "Frequency Sorting." With the click of one button you can sort frequencies either by ascending or descending order. I can not confirm the technical facts but in the past I have known that some scanners will actually scan faster when set up in such a manner. BuTel also eludes to this theory in their documentation.

Another feature that BuTel included in the software package is they have termed "Easy Fill" and it does just that fills in frequencies easily. This option that lets you program data in a range of channels with only a few mouse clicks. Additionally you can use Easy Fill to quickly program a range of frequencies in a memory bank so you can use a memory as a search bank. The software will automatically calculate the frequencies for the selected channel range. Example: Frequency is set to 88.000 MHz, step is set to 50 kHz and channel range is 1-100. If you select APPLY the software will program 88.000 in channel 1, 88.050 in channel 2, 88.100 in channel 3 etc.

In the memory editor grid you can use the standard Windows clipboard options (Cut, copy, and paste), this provides the user with a lot of flexibility in moving data from one area to another, or even from one version of ARC to another (as in transferring programmed frequencies from ARC-780 to ARC- 83, etc), and even transferring data to other applications such as Word or Excel.

As in other ARC applications, BuTel has included a "dummy bank" or "clipboard" to use as a temporary storage location for setting up banks.

Another carry-over from previous editions of ARC software is WebCatcher which allows you to easily import frequencies from your favorite websites.

One really useful feature that is user definable is "back up." You can set the software to "back up" your file at selected time intervals. Need I say anymore here? With regard to files.. the key to not pulling your hair out when a catastrophe strikes is "Backup. backup..backup!" This feature is independent of "saving" your file and you will have to manually delete the backup files from the directory. Incidentally, ARC-83 comes with an excellent built-in User Manual in pdf format located by clicking on the "HELP" menu.

When all is said and done, this familiar software package really makes compiling, editing, storing and programming files for the Pro-83 a painless effort. It is reasonably priced and I would not be caught without it!

On The Go? You Need A "Go Bag"....



By Tom Swisher, WA8PYR

George Carlin said it best. We all need a place for our stuff, so that we can get more stuff. While this is certainly true (especially in the radio hobby), in my case I needed a place for my stuff so it would be easier to carry and prevent it flying all over the truck while out and about. If you've ever tried to carry a bunch of handheld radios and their ancillary gadgetry in a collection of plastic grocery bags, you know what I mean. So if you're on the go with your radios a lot, you need a "go bag" to carry them in. I certainly did.

Over the years, I've experimented with a variety of "go bags," which are loosely defined as cases full of stuff, ready to go at (or almost at) a moment's notice. My first trials started several years ago, when a flirtation began with fishing tackle boxes. I started out with a small plastic one I'd had for many years, and found it to be nice, with a lower section for a handheld radio and several little compartments in the tray for holding little bits of stuff. Unfortunately it just wasn't the right size to carry enough stuff. So I bought a bigger one. Better, but still not quite there. Then I saw a Plano model being lugged about by a friend, and promptly bought one. It was perfect, having an upper section with a clear lid, just right for carrying antennas, adapters, batteries and other bits; and a deeper bottom section with larger compartments suitable for holding a small extension speaker, scanners and other small radios, and a variety of cables and power packs.

That Plano case served me well for a few years. However, it was just too large and unwieldy to be a proper go bag, not to mention that it was really heavy when fully loaded, and rather difficult to get into without getting it out of the car and onto a flat surface. So, I reluctantly began the search for a new go bag.

At this point, I began a new flirtation with soft-sided bags made of ballistic nylon. I started with a Plano tackle bag; designed to hang from the handlebars of a bike or motorcycle, it was small enough to be convenient, but large enough to carry the stuff I needed. However, I discovered after a short time that it just wasn't right, having no internal dividers to keep things from banging into each other. So I moved up to an Eddie Bauer gear bag. It's not divided inside, but it's just the right size to hold three radios without their banging into each other. It also has two front pockets and a rear pocket; batteries, earphones, speaker mikes and other odd bits fit nicely in the front pockets, while the rear pocket holds antennas, pens, a notepad and other like items. I still use this one for quick day trips, but it still wasn't quite right for general use.

Finally one day, I happened to be out on a freelance photo job, and started looking at my camera bag. Hmmmmmm.... divided into padded internal compartments to protect things; has web pockets inside for this and that, and a variety of outside pockets for small fiddly bits. Perfect. So, I started haunting the area camera shops looking for a suitable camera bag. After quite a while looking for something suitable (most of the bags I found were either too large, too small, or too expensive), I finally found one. It's a nice, mid-sized Nikon bag with adjustable interior dividers, a sizable front pocket and a webbing zipper pocket inside the lid. The price was very nice; on closeout, it cost me the princely sum of $20. Photo 1 shows the empty Nikon bag.

Continued on page 24

On The Go? You Need A "Go Bag"... Continued



The next step was to figure out what to put in the bag and where to put it. I started with the basics: a couple of scanners with different capabilities, a handheld ham radio, batteries and chargers. With this in mind, I chose my Radio Shack Pro-96 (APCO-25 capability) and Pro-92B (easy to use LTR capability); Uniden BC250D (lots of channels); and my Yaesu VX-5R tri-band handheld. Also included were spare batteries and battery holders for these radios.

Next on the list are external antennas and mounts. I first fabricated a dual-band J-pole antenna for the Yaesu; this is a very simple antenna made from TV twinlead antenna wire. It is easy to make, can be rolled up and stored in very little space, and makes a big improvement in coverage with a handheld radio. The fact that it works very well for scanners is an added bonus. I also included a couple of suction-cup antenna mounts from Radio Shack. These are little gadgets with suction cups and 6-foot antenna cables; they can be affixed to most flat surfaces (typically a window), a BNC antenna attached and the other end of the cable connected to the radio. This improves coverage not only by getting the antenna up higher, but also by allowing one to put the antenna at the window where the signal will be less affected by building materials. To go with these mounts I selected telescoping aluminum BNC antennas, as well as a few other spare BNC antennas just in case.

Finally I selected power packs and other necessary accessories. The power packs I chose are the Radio Shack "Adaptaplug" selectable-voltage models. These feature selectable voltages ranging from 3 to 12 volts, as well as a variety of available interchangable, selectable-polarity tips. This means I can use two power packs to charge all of the radio in the bag simply by selecting the proper voltage and connecting the proper tip. I also have a few packs of rechargeable Nickel-metal Hydride (NiMh) batteries, as well as dry-cell packs for the Radio Shack scanners, and several alkaline batteries. Other necessary accessories include antenna and audio adapters. I carry all of the adapters in a small plastic compartment case I picked up at Big Lots for fifty cents.

A note of safety: if you carry loose batteries in your Go Bag, please be careful. Batteries (especially NiCd and NiMh types) can heat up rapidly if shorted, and might set your Go Bag on fire, which would be a very bad thing. For safety, keep your batteries in their original packaging until you're ready to use them. If they did not come in packages (such as the NiMh batteries I purchased at a hamfest), bundle them together with a rubber band and store them in a plastic bag. An even better alternative would be the small 4-cell storage cases visible in Photo 2; these can be obtained from battery distributors such as Batteries America (http://www.batteriesamerica.com). Remember, be careful with these batteries.

Now that all of the stuff is together, it's a good idea to lay it out and inspect it to make sure you are not missing anything and that everything is in good shape. In Photo 2, you can see all of the stuff, ready to go. In the rear (L-R) are the Pro-96, VX-5R, BC-250D, and the Pro-92b. In front of the scanners are the two Radio Shack variable voltage "Adaptaplug" power packs. In the middle you can see the coiled dual-band "twinlead J-Pole" antenna, Yaesu speaker mike, and the compartment box containing Adaptaplug connectors and antenna adapters. Finally in the front are a Radio Shack scanner cloning cable; the two Radio Shack suction-cup antenna mounts, coiled with an extra 6-foot BNC extension cable; 3 packs of NiMh rechargable batteries; and a selection of BNC antennas.



Finally we come to putting it all together. I started by arranging the padded dividers inside the bag to combine maximum usable space with the best possible protection. Photo 3 shows the loaded Go Bag. The radios are at the corners, each in it's own padded compartment. In the two center compartments are the coiled antenna cables and suction-cup mounts (left) and the Adaptaplug power packs (right). There is additional space atop the power packs for more batteries or a handheld GPS unit as needed. The NiMh batteries in their little plastic cases are underneath the Yaesu VX-5R, which is a very small radio. In the front pocket of the bag are the speaker mike and an over-the-ear earphone; pens; the compartment case full of adapters; and the dry-cell holders for the Radio Shack scanners. Inside the webbing pocket on the case lid can be seen the antennas.

How has it worked out? Absolutely great! It's the right size to hold a great deal of necessary stuff, but also small enough to be easy to grab and go in a hurry. In fact, it worked out so well I decided to put together another, larger bag for longer trips. To that end I picked up a small suitcase at a local discount store (for $15). Intended as a kid's suitcase, it's a bit more than twice the size of the Nikon bag. I fitted it out with padded dividers, which allows me to carry all the above stuff, as well as a portable Sangean ATS-505 shortwave receiver, a Sony AN-LP1 active shortwave antenna, a long-wire antenna, more chargers and a six-outlet power strip. I can even slip my small QRP+ transceiver and it's acccessories in there as well if the mood strikes me.

So there you have it, the Go Bag in a nutshell.

Now, if I could just figure out what to do with all those empty tackle boxes.....

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Scanner Accessories That Have Become Necessaries

By Mark Meece, N8ICW

A recent scanner purchase I made has brought to my attention that simply buying a new scanner is not what it used to be. These days, and especially with the introduction of the digital scanners more than the scanner purchase itself needs to be considered. While these can be applied to any scanner now on the market and any future models, this article will focus on the Radio Shack Pro-96.

It took me more than a year to save up for it, such is life on the family budget, but recently I was finally able to purchase a Pro-96. My first digital scanner, and first major scanner purchase since getting my BC-780XLT three years ago. I have discovered there is something different about this scanner purchase from those I have made in the past. In past purchases there have always been accessories one can buy to enhance the particular scanner one has purchased. I have found that with the Pro-96 they are NECESSITIES!

The first priority need is for the Pro-96's power. While the Pro-96 runs off four AA batteries, it does not come with a AC power hook up. So you will need to consider an AC to 9 volt DC power supply with a "B" adapter plug set to center pin "positive". Although the manual calls for the "C" adapter many hobbyists have found that the "B" is a better fit. These power supplies are affectionately known throughout the hobby as "wall-warts". In this case the correct RadioShack catalog number is 273-1706.

Now, that brings us to batteries. Powering up the Pro-96 with just plain old alkaline batteries is not going to cut it. You are going to want to get Nickel Metal Hydride (NiMH) batteries with a rating of 2000 mAh or better. These offer the best bang for the buck and depending on backlight usage last for a good 8 hours or more. I have found that the Rayovac 15 minute rechargeable I-C3 batteries last 10 hours or more and using the accompanying charger really do charge in only 15 minutes. If you plan on keeping any rechargeable batteries in the Pro-96 itself while using a AC-DC adapter you must use the yellow battery holder, the black battery holder is only for non-rechargeable alkalines.

Now for the antenna. While the stock rubber duckie antenna that is supplied with the Pro-96 is quite adequate, the Pro-96 area of expertise is the 800 MHz band. The Radio Shack 800 MHz scanner antenna (catalog # 20-283) is an excellent replacement. It greatly enhances 800 MHz reception on the Pro-96 and I have found that it does a formidable job receiving the 108-138 MHz VHF air band. This antenna should be a consideration for any digital capable handheld scanner.

To the meat of this article, in one word: "Programming." Today's scanners are becoming more and more complicated. The Pro-96 introduced the scanning world to V-Folders. What that means in a nutshell is that the Pro-96 can be a 5,500 channel scanner. Now being the veteran hobbyist that I am, learning to program different types of electronic equipment has never been that difficult. However just going through the Pro-96's manual can be quite daunting. I have seen more than a few messages on the various scanner chat boards of entry level hobbyists taking their Pro-96 back for a refund simply because they could not quite figure it out. The Pro-96 is a perfect example of the days of pulling a scanner out of the box, turning it on, entering a few frequencies and then you are scanning, are over, way over! However the RadioShack stores will offer to program the scanner for your local area.



So unless you want a visit to the medical center for carpal tunnel syndrome, programming this puppy by hand should only be a last resort. With that said, we need to think about programming the Pro-96 by software. Yes, that means we must now consider our computers a scanner accessory necessity. Fortunately, men such as Jim Springer or Don

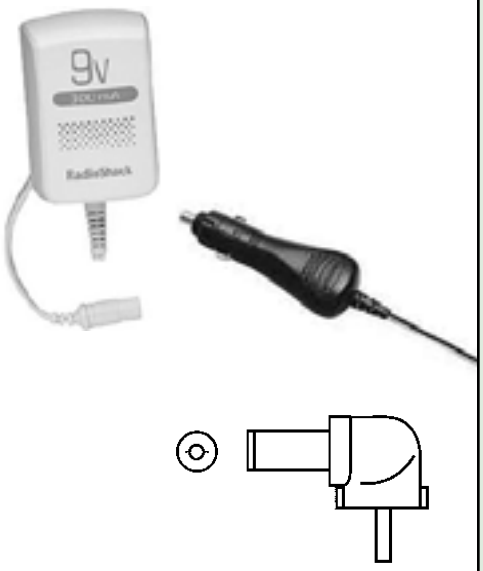


FIGURE 1
SCANNER ACCESSORIES/NECESSITIES SOFTWARE

Uniden BC245XLT Scancat Lite Plus
Uniden BC-246T E-Scanner, Scancat Lite Plus, ARC246T
Uniden BC-250D i25D Digital Card, Cable E-Scanner, Scancat Lite Plus, ARC250
Uniden BC-296D Cable included Included Software, Scancat Lite Plus
Uniden BC-785D i25D Digital Card, Cable E-Scanner, Scancat Lite Plus, ARC250
Uniden BC-796D Cable Included, Scancat Lite Plus
Uniden BC-898T Scancat Lite Plus, ARC898T
Uniden BCT-8 Cable, Scancat Lite Plus
Pro-83 Scancat Lite Plus, ARC83
Pro-92/2076 Win92 Pro-93/2053 Scancat Lite Plus, Win93
Pro-94 AC/DC Adapter, Cable, ScanCat Lite Plus
Pro-95 AC/DC Adapter, Cable, Scancat Lite Plus, Win95
Pro-96 AC/DC Adapter, Cable, Scancat Lite Plus, Win96
Pro-97 AC/DC Adapter, Cable, Scancat Lite Plus
Pro-99 AC/DC Adapter, Cable, Scancat Lite Plus
Pro-2051 Cable, Scancat Lite Plus
Pro-2096 Cable, Scancat Lite Plus, Win96

Starr have written excellent software programs called "Scancat Lite Plus" or "Win96" for the Pro-96. In the case of the Scancat Lite program, it will also do many additional RadioShack and Bearcat scanners. Both software companies have a trial version and both programs sell for $30.00. I should note that the Pro-96 is computer programmable, but not computer controllable. With the programs one can manage files upon files upon files for the V-Folders which is very handy for those who like to travel with their scanners.

Of course you will need a cable to make the connection between the computer and the Pro-96 which makes for yet another accessory/necessity. There are several different sources for this cable. First off Radio Shack offers the #20-289 programming cable for around $25. Black Bag Software (http://www.pro96.com) offers one for around $20, and the Yaesu interface cable CT-29A also works with an added stereo to mono adapter and also goes for around $25.

These above references can be made for the radios and accessories/necessities listed in *Figure 1* as well.

These are just a few of the radios and accessories/necessities currently available. This list is by no means complete. There is also other software not mentioned here that cover the above models, for brevity I list here the most popular. This should give you an idea though of what to expect for your next scanner purchase. When doing your research on what you are looking for in a scanner, you must consider the extras, and I wholeheartedly suggest you research your upcoming purchase as thoroughly as you can. Find out what extras are needed to make using your new scanner easier. You will find it will save you from consistently reaching into the medicine cabinet for the headache powders. Keep in mind the extra costs involved with getting the accessories you need to enhance your scanning pleasure and budget accordingly. I think you will find that in purchasing a new scanner these days, the points featured in this article should indeed be considered necessities !

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800 MHz Rebanding Impact on Uniden Scanners

By Paul Opitz,
Uniden America Corporation

Background Information

Beginning in the late 1990's, the FCC and industry began studying interference problems on public safety communications systems in the 800 MHz band. The root cause of most of the reported issues was interference from high-powered business radio systems on channels adjacent to relatively low-powered public safety radio systems. In early February 2005, the FCC issued a Report and Order directing that certain actions be taken to reduce or eliminate the conditions that have resulted in this interference. These actions include:

Moving current non-public safety licensees out of the 806-809/851-854 MHz band.

Moving public safety licensees into the 806-809/851-854 MHz band. Changing the current 800 MHz channel plan.

The relocation of licensees should help to isolate critical public safety bands away from interference-creating services, but will require that users reprogram their scanner with the new frequencies.

The change to the 800 MHz channel plan will have the greatest effect on scanner operation. Most scanners use this channel plan to determine the voice channel frequency for Motorola Analog or mixed systems. Users with scanners that rely on this channel plan will need to reflash their scanner in order for it to continue to properly track Motorola Analog or mixed systems. Scanners that cannot be reflashed will need to be replaced.

These two changes (relocating licensees and changing the channel plan) are together referred to as "Rebanding." More information on Rebanding can be found at http://www.800ta.org and from the links on that site.

Model	Motorola APCO 25	Motorola Analog	EDACS	LTR
BCD396D	Reprogrammed	Reflashed	Reprogrammed	Reprogrammed
BC246T	N/A	Reflashed	Reprogrammed	Reprogrammed
BC296D	Reprogrammed	Reflashed	Reprogrammed	Reprogrammed
BC796D	Reprogrammed	Reflashed	Reprogrammed	Reprogrammed
BC898T	N/A	Reflashed	Reprogrammed	Reprogrammed
BCT8	N/A	Reflashed	Reprogrammed	Reprogrammed
Older Models	N/A	Replaced	Reprogrammed	Reprogrammed

Impact on Scanning Receivers

Rebanding is a mixed blessing for scanner users. The same interference sources that have affected public safety users have also affected the use of scanners, sometimes to a greater degree. Rebanding should greatly improve scanner operation for the same reason that public safety radio operation will improve: less interference from unwanted sources. However, as rebanding occurs on a system, scanners will need to be replaced, reflashed, or reprogrammed in order to continue to track the trunked systems in the 800 MHz band. The following table summarizes this impact on Uniden's current product line.

End users will be able to reflash the indicated models using a PC cable and a software download from Uniden's web site. All future Uniden trunktracking models are expected to either incorporate the Rebanding requirements or be flash upgradeable to do so. The first public safety systems could be rebanded as early as April 2006. Uniden's goal is to have a firmware update available for each compatible model by this time, but final testing and release of the update will depend on the actual implementation of these changes. Uniden plans to announce firmware updates for each model as they become available.

This statement is based on the current rebanding plan, as accepted by FCC and industry. Future changes to this plan could affect Uniden's response or its ability to respond. Nothing in this statement should be construed as any type of promise or warranty. Uniden reserves the right to make changes to its rebanding response policy at any time.

Boating Shore Station Licensing

By Gordon West, WB6NOA

Do you live or work in an area where boating is popular? If you can tune into marine VHF ship-to-ship radio channels and hear activity, you could qualify to obtain your own shore-to-ship, marine VHF, FCC-issued shore license.

Or maybe you provide shoreside search and rescue services to local lakes and rivers. You,TOO,might qualify to obtain a marine shore license to talk from your vehicle or a shore station to boats up and down the lake and river.

Or maybe you live well inland, but you have a business that provides a service to boats on a big lake, or ships at sea. Maybe you are the manufacturer of stainless steel rails for boats, and you need to regularly communicate with your customers over marine single-sideband frequencies when they are far out at sea.

The FCC-issued coast station license is a "natural" for the following organizations and individuals: Sportfishing shop Yacht club Marine supply company Marine search and rescue group Drawbridge and locks operators Marina and fueling docks Marine repair facility Power Squadrons and U.S. Coast Guard Auxiliary Non-profit organizations furnishing non-commercial communications to persons operating non-commercial vessels

The coast station license would not be appropriate for an individual or organization just wishing to talk with boats in the harbor or boats at sea on a casual basis. Eligibility for the license is based on your regular activity working with boats in the harbor or vessels at sea, such as supplying some sort of service to them. That service could even include the regular passing of weather information to these boats at sea on marine channels.

In other words, it would be in violation of the eligibility rules to obtain a license "just for the fun of it." You need to be in some sort of regular marine activity or business to qualify for the shore station license. If you qualify, you may obtain numerous VHF shore-to-ship frequencies to communicate locally with boats and ships in the harbor, or on the lake, or going down the river. Now that marine VHF 5-watt handhelds are priced lower than $95 for a synthesized 55-channel radio, almost anyone going out on the water is going to take along a marine VHF handheld, sometimes encased in a waterproof pouch. There ARE marine waterproof VHF handhelds, but they cost about $250.

On marine VHF, everyone continuously listens to 156.800 MHz, VHF channel 16. This is the international distress and calling frequency, and for the safety of everyone around you and out on the water, guard this channel for an emergency call-up. Have a second receiver on your working channel to minimize stations you normally communicate with out on the water calling you on the distress channel. Make sure you keep a good watch on 156.800 MHz, because you might be the only one in the area hearing an incoming distress call. Have some local phone numbers posted at your shore station to know how to get a hold of your local rescue agency. In navigatable waters, it is probably the U.S. Coast Guard. On small lakes and rivers, the rescue agency might be state or county patrols. Or, in very remote areas, that rescue agency might be YOU!



Some Coast Stations are remote controlled to a mountaintop "High Site."

The Federal Communications Commission also grants ship and shore station licenses for long-range, marine, single-sideband frequencies. Your shore station license for long-range communications would usually include a couple of frequencies for each megahertz band: 26 MHz 22 MHz 16 MHz 12 MHz 8 MHz 6 MHz 4 MHz 2 MHz

Continued on page 30

Boating Shore Station

With the right shoreside equipment and antenna system, your communications range on 12 and 16 MHz would be nearly worldwide. Up to 1,000 watts of output power is permitted on the worldwide bands.

The equipment you would use for your VHF and long-range SSB channels would also include capabilities of digital selective calling. This would allow your shore station to continuously guard selected frequencies in case of a local or distant boater activating their DSC distress button feature. This is part of the new Global Marine Distress Safety System, and the big red distress button is an automated way of seeking help other than calling a voice Mayday on VHF channel 16 or 2182 kHz. When you apply for your working frequencies on VHF and long-range SSB, you would also apply for those digital selective calling frequencies available for distress calling and monitoring.

Years ago, obtaining a coast station license was a paperwork nightmare. The early form was FCC Form 503, and you would regularly work this form back and forth between FCC personnel until you got everything absolutely correctly, right down to the decimal point, for your application. It would generally take 6 months to a year to obtain a successful coast station license.

That's all changed now with the universal licensing system, and electronic filing. It is still a nightmare on the computer, but you get instant acknowledgment that you have made an error in the processing because the computer will instantly flash you error messages. It won't let you go further on the application until you get it right the first time! However, if you work with someone who has been through the process and knows how to obtain the coast station license, you can many times receive a license grant within 92 hours!





(Left) Some VHF marine shore radios double as a GPS and are waterproof!

(Above) US Coast Guard coast station console.

Licensing for a shore station call sign and shore-to-ship operation is found in FCC rules, Part 80, "Private Coast Station Eligibility." You will need to first obtain a federal registration number (FRN), and as a radio enthusiast, you may already have one assigned as a licensed ham radio operator or GMRS licensee. You will be working with several FCC computer forms at www.wireless.fcc.gov/uls.

The process is so complicated that you need to know carrier frequency versus operating frequencies, proper frequency channels selection for VHF and proper frequency modes for single sideband, station details like latitude and longitude--but in degrees, minutes, AND SECONDS which is not the common way of how a GPS reads out.

You will also need to supply details on how high up your VHF and/or SSB antenna will be off the ground, elevation of ground above sea level, locations for each of the antennas, and additional statements that require precise knowledge of the FCC rules in order to advance on to the next computer page.

But if you're really serious about needing and wishing to obtain the license, you can find others in the marine electronics industry who will validate your eligibility and offer their service to obtain your shore station license to talk from shore to ship. In fact, rescue squads might even obtain a coast station license at an unspecified location--a license that actually travels with you and your emergency station as you go up and down the river, preparing to help someone out in distress.

But first, look at the FCC universal licensing system pages to see whether or not you want to try it yourself. You won't lose any of your $205 10-year license fee by incorrectly working through the process--the fee doesn't get collected until your application is computer squeaky clean.

You can also contact Suzy, N6GLF, at 714/549-5000, Monday through Thursday, 10:00 a.m. to 4:00 p.m. (California time), and ask specific questions on the process or let her advise where a local application processor may be found in your area.

Licensing cont.



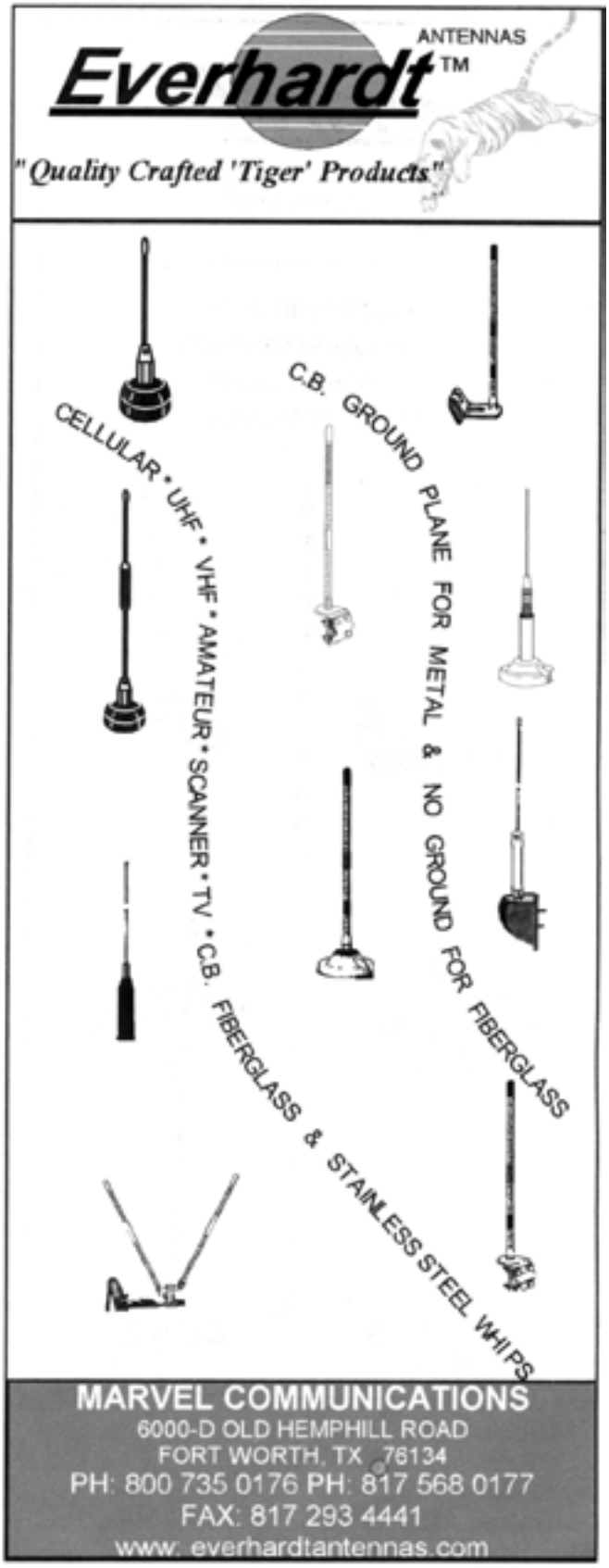
Coast Station operator provides radio and weather reports.

You will also need to obtain the $55 restricted operator's permit if you have never held this lifetime permit before. It's that tan card that you may rec all obtaining for free 20 years ago, still hanging around in your old wallet. However, if you have never obtained the lifetime restricted operator's permit, that needs to be accomplished, too, on the universal licensing system.

So if you are into either short-range and/or long-range marine radio monitoring, and you have all of the required qualifications to meet the FCC eligibility for a coast station license, a licensing agent can complete the process within a week. Equipment for VHF that meets coast station requirements is available, and long-range, marine single-sideband equipment is not much more expensive than a moderately priced ham set. Your antenna system could be a simple VHF vertical or a simple worldwide high-frequency dipole, and on marine single-sideband frequencies, you can imagine the thrill of talking to a boat at sea thousands of miles away to handle any requirements they may have for you to handle on shore.

And if you enjoy life-and-death excitement where you get involved, your VHF or marine single-sideband transceiver with digital selective calling capabilities will sound off, loud and clear, when a distress digital signal is received and your radio automatically switches over to the distress voice frequency. This ties in with your assigned maritime mobile service identity number (MMSI), and that, too, comes with your successful coast station license.

Here on the West Coast, listen for coast station WMD. That is my station, and there are plenty of exciting moments I can tell you about when I can actually get involved with relaying distress calls.



PART 1

Scanner Antenna Systems

By Jon Van Allen - KF7YN

Okay you have that new scanner all programmed, have a database of frequencies, talkgroups, call signs and codes handy for anything that comes along, but you may soon discover you aren't hearing everything you want to hear! By now you realize you need a better antenna but you are not sure which antenna to get or what kind of coaxial cable. Not to mention how to feed more than one scanner with just one antenna! I have helped many scanning enthusiasts solve their antenna problems. By the time you have finished reading this article, you will have the information you need to analyze your needs and choose an antenna system with confidence!

The type of antenna you chose should be based on four major considerations: 1) Where you live: Urban, large city or metro area or a smaller town or rural area. 2) What frequency ranges you normally listen to. 3) Type of antenna; base, mobile, portable or handheld. 4) If you are able to put up an outside antenna.

If you live in a larger metro area, chances are very good you will not need an antenna with much gain. This is because in most metro areas, the signals are strong enough that you may not even need an external antenna or one without gain so you don't overload the scanner. (I addressed overloading in Part 1 of my Scanner Features article).

Probably the most popular external antenna is the "discone". It covers a very wide range of frequencies but exhibits no gain. This is ideal for the big city dweller who wants to cover the maximum range of frequencies but not overload their scanner with excessive gain. Most discones are advertised as 30-1300 MHz, but I can tell you from many years of experience that discones do have some strange characteristics on certain frequencies which we'll discuss later. Simply stated, the discone is a good all-around choice and discones can also be used for transmitting on frequencies in the antenna's specified range. If you monitor the VHF-Lo band (30-50 MHz) the discone is not the best choice but is good above about 100 MHz which includes civilian and military aircraft, VHF-Hi and UHF frequencies up thru 900 MHz. Some discones have a VHF-Lo whip which improves reception on that band, but I've had much better luck on VHF-Lo with larger antennas.

Directional antennas: I live in a metro area of about 1 million people and most of what I monitor can be done without an external antenna but I need the ability to monitor signals from a specific area now and then. One directional antenna I like is the Grove Scanner Beam which is basically a TV antenna modified for scanner frequencies. Have you ever noticed TV antennas are mounted with their antenna elements in a horizontal (flat) position? That's because TV (and FM radio) signals are transmitted with horizontal polarization. Nearly all of the signals you receive on your scanner such as police, fire, medical, etc. are transmitted with vertical polarization and as such, scanner antennas are always mounted in a vertical position. You can



easily transform an old TV antenna to work with your scanner by flipping it upright instead of laying flat. These are known as "log-periodic" antennas (short for Log Periodic Dipole Array). The elements start out short on one end and get progressively longer to the other end. That's the basic idea of the Grove and Antenna Warehouse Scanner Beams. To convert your old TV antenna for your scanner, you need a 300 ohm to 75 ohm "balun" transformer and you can even feed your scanner with the RG6 cable most TV antennas are supplied with. You've seen those transformers, the flat twin lead cable hooks into one end and regular TV coax cable goes on the other end with an "F" connector. Ideally you should also change the element length and spacing but I have found TV antennas work okay as is just by flipping them to the vertical position. If you already have a TV antenna rotator, you're

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all set! If you prefer something more durable and are willing to spend more money, Create makes several superb log-periodic models in the $300 to $450 range. Create log-periodics are serious antennas!

Another popular style of directional antenna is the Yagi (properly called a Uda-Yagi for it's Japanese inventors). Yagis are usually designed for single bands but are also available for 2 or more bands. Many hams use these for HF, VHF and UHF. For many years I used an 11 element 146 MHz Yagi on the VHF-Hi band. Even though it was made for the ham radio 2 meter band, it did a good job from about 136 MHz up to about 155 MHz. It was only about 10 feet above my rooftop but I could hear conversations 40-50 miles away or more that I could not hear on my discone. When 800 MHz came to our area, down came the 2 meter Yagi and up went the Grove Scanner Beam. I also replaced my discone with a Scantenna which we will discuss next.

The AntennaCraft Scantenna is renowned for it's excellent performance especially on the VHF bands. I love listening in on VHF-Lo 30-50 MHz "skip" from all over the US and beyond and I've never owned a better performing antenna for this than the Scantenna (except it's older cousin the Montenna which is no longer made). The best part is the Scantenna is affordable, for less than $50 (including shipping) you get the antenna and 50 feet of RG6 coax! This is my favorite all band scanner antenna. I can monitor a Highway Patrol dispatcher on 155 MHz 120 miles away with my Scantenna! And it does a good job on our local 800 MHz trunked systems and the VHF and UHF aero bands. It is a rather strange looking contraption (see photos) and is about 6 feet tall so it's going to be noticeable on your roof or tower.

Radio Shack sells a good performing VHF-Hi and UHF scanner antenna, the 20-176 which gets generally positive remarks in the scanner newsgroups and is priced at about $20. It does not receive well on VHF-Lo.

Discrete, stealth and "hidden" antennas: My all time favorite stealth antenna is the Ventenna which is made by the Forbes Group. It looks just like a roof vent pipe! The antenna is the same color as the pipe and is hollow and slips over the original vent pipe. The only difference is the Ventenna is longer than the original vent pipe. Ventenna also has models for ham radio and an active shortwave antenna along with their scanner Ventenna. I have a friend who uses a scanner Ventenna on the roof of his condo since he cannot put up a regular scanner antenna. His busy-body neighbors will never know the difference. Ventenna reception is pretty good on VHF-Hi thru 900 MHz, particularly on UHF but not so good on VHF-Lo; it is not physically big enough to be very effective on that band. Remember, you don't get something for nothing! VHF-Lo antennas must be fairly large by nature of the lower frequencies. CB antennas are also good VHF-Lo antennas.

If you live in an apartment or condo, you can try different indoor and outdoor antennas that are available from most any radio dealer. A lot of apartment dwellers use mobile antennas which are attached to outside deck and porch railings. I have read about hams doing the same thing with mobile antennas for use in their apartments and condos. If zoning restrictions allow you to put up a TV antenna, you could probably put up a scanner beam. Most people would never think it is anything other than a TV antenna!

Earlier I mentioned discones having strange characteristics on certain frequencies. On one particular area near 460 MHz, I could actually get better reception by using my scanner's attenuator! To this day I don't know exactly why that happens on certain frequencies. I did a frequency sweep of two different discones with my MFJ 269 antenna analyzer, nothing jumped out at me as being the cause of that problem. Even after discussing it with an engineer, I never did get a conclusive answer. I just chalked it up to antenna characteristics particular to my installation.

Coax cable considerations: All coax cable has loss; the trick is to find a cable with low loss, is easy to work with and doesn't cost an arm and a leg! I know people who only run Heliax (also known as hard line) because it is very low loss and is very durable. Heliax is also very expensive, as much as several dollars per foot or more! Heliax is also very rigid and is not so easy to work with and requires expensive connectors that are beyond the ability of the average hobbyist's capabilities to work with. But we will use heliax as the ultimate example and work our way down to something you and I can afford and can work with! Okay we have a starting point. One popular low loss cable is Belden 9913 and 9914, sometimes called "poor man's hard line" because of its low loss but it is much easier to work with because it is flexible and can accept standard "N" connectors. It is also much cheaper, under $1 per foot. There are also other competitive cables in this class such as LMR-300 and LMR400 which are also very low loss and semi-flexible. 9913 is 50 ohm cable, 9914 is 72 ohm cable.

Okay, so how do you know whether to pick 50 ohm or 75 ohm cable? Without getting into a super technical discussion, there is a simple rule to remember. When talking about Ohms as it pertains to antennas and coax cable, "Ohms" is an expression of impedance, which is simply the resistance of an alternating current (AC). There are also ohms in direct current (DC) but the formulas are different for AC and DC. Okay, so we know that impedance is basically resistance. Many people will tell you that you must use

Continued on page 35



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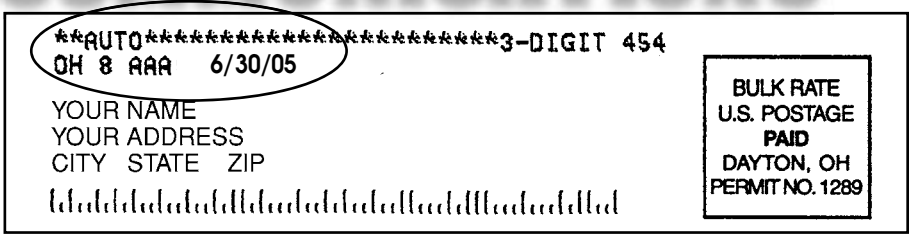
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PART 1

Scanner Antenna Systems

50 ohm coax for your scanner but is that really necessary; especially since many of the low loss cables are 75 ohms? You read John Phillips article "All About SWR" in the May/June issue of NatComm. SWR is a measure of impedance mismatch. You will recall that a SWR of under 2:1 is good. We can determine the SWR of using 75 ohm cable where your scanner calls for 50 ohms at the antenna connector. This is a simple math exercise. 75 ohms divided by 50 ohms is 1.5. That is the SWR, 1.5 to 1! The loss is so minor that for all practical monitoring purposes this is a perfectly acceptable ratio. There is one more basic thing to remember, impedance changes with frequency. This is simply Ohm's Law. The antenna may be 20 ohms at one end of its frequency range and 140 ohms at the other end. So now you can see that it doesn't really matter if the coax is 50 or 75 ohms because there is only one frequency that is either 50 or 75 ohms!

Connectors and adaptors: Here is an area of some controversy. At some point in your journey of connecting several scanners and antennas together will require connectors and adaptors. A purist will tell you the losses in each additional connector can be excessive but I read the certified lab results of a test where many different connectors and adaptors of all types were all hooked together and the loss was insignificant as it pertains to the average scanner enthusiast. Sure there is loss, but unless you are trying to receive extremely weak signals such as moon bounce or tropo-scatter, or other weak signal modes that hams mostly use, you won't notice the loss. For the purposes of the average hobbyist, use the minimum number of connectors and adaptors required to do the job and don't worry about loss. I have seen installations where having the proper connector would eliminate several adaptors which also looks messy and unprofessional, not to mention there is more to go wrong when you have too many components.

Good engineering is important if you want your scanners to perform their best. That means using the right connector. Regular old PL-259 connectors (also called UHF) connectors are lossy above 400 MHz and can also contribute to intermod if not soldered correctly. Why take chances? Specifically, I like to use N and F connectors on my scanner antennas. My Maxrad 800 MHz Yagi comes supplied with an N female connector so I use an N male connector on my LMR-400 coax at the antenna and an N to BNC adaptor that connects to my multi-coupler (which is a fancy splitter).

Speaking of multi-couplers, this is how you can use one antenna with many scanners. It's cheaper and easier than putting up separate antennas for each scanner! If you are using two scanners with one antenna, you may be able to use a regular TV splitter but you lose half the signal with each split. So I prefer to use an active (powered) multi-coupler. Mine is made by Stridsberg Engineering (www.stridsberg.com) covers 25 to 1000 MHz and has one input with four amplified outputs. They also make them with two or eight outputs. The amplification boosts the signal a little but is mainly intended to make up losses inherent in splitting a signal to several outputs. This keeps the signal at or above the level it enters the unit. It also isolates the outputs from each other. If you have ever hooked two scanners directly to a T or Y connector, you know that the scanners can interfere with each other through their antenna jacks and cause each other to lock up and do other weird things. Isolating them keeps this from happening and each scanner acts as though it has its own antenna.

I run 4 scanners directly from my Scantenna and Stridsberg multi-coupler. I also use a 2 output TV splitter with my 800 MHz yagi beam for my Trunker setup which runs 2 scanners. The local signal is strong enough that I don't need the amplification to overcome splitter loss and the splitter also gives fairly good isolation between outputs. I plan on replacing the splitter with a Stridsberg 800 MHz multi-coupler this year (when the budget allows) but for now the TV splitter works okay although it is really not up to my own engineering standards. Don't use TV splitters with shortwave receivers because the lowest frequency most splitters will pass is about 6 MHz.

Another type of multi-coupler is called a combiner which is primarily used in satellite TV installations. You can buy a 4 way active combiner at Wal-Mart or Radio Shack for under $80 or so. You just need BNC to F adaptors and short RG6 jumpers with F connectors already installed to hook your scanner to the combiner. My friend and I did some tests with a Radio Shack combiner and it definitely made an improvement in VHF-Lo and Hi and UHF frequencies up to 470 MHz. We didn't notice much improvement at 800 MHz but that could have been because of his antenna or coaxial cable.

References:

Grove Scannerbeam: www.grove-ent.com

Austin Condor: http://www.bearcat1.com/item0079.htm

Scantenna: www.antennawarehouse.com

Ventenna: http://www.ventenna.com/

NilJon: http://www.niljon.com/pages/1/index.htm

Maxrad: http://www.maxrad.com/cgi/maxrad_products_ind.cgi?product=10097&catalog=10003

Comtelco: http://www.antennasystems.com/comtelco.html

Create: www.grove-ent.com

Pryme: http://www.lentinicomm.com/brand/Pryme-Premier.asp

The second half of this article will run in the next issue of *National Communications*. As always, we welcome your email, what you are hearing and what topics you would like to see covered in these pages. I can be reached via email: jonvanallen@msn.com

Until next time, happy scanning!

Closing Comments



By: Norm Schrein, KA8 PGJ

One thing I have learned over the course of years, is that there is a time for everything. Actually none of us should be surprised at that, in fact, in Ecclesiastes, a book in the Old Testament even mentions time. ***To quote: "To everything there is a season, and a time to every purpose .....a time to be born, a time to die, a time to plant, a time to puck, a time to kill, a time to heal..."***

I have seen a lot of things change over time -- sometimes for the best other times the change was not as good -- generally, and also with regards to the radio hobby.

Certainly the hobby has made changes, with it being a technical item it would only make sense to see the technology advance and change. When ham radio began, radio buffs had to make their own equipment. Although this was crude technology, the ham operator at least knew his equipment. Now, one can walk into a specialty electronics store and lay a few hundred dollars on the counter and walk away with a fully functional HF radio and work the world. Some stores will ask to see a ham license, other don't care. It is the don't care that causes the problems for the ham radio community by making it easy for "boot leggers" to operate in the ham bands. Many times these illegal operators don't even know they are operating illegally -- they think that the ham bands are just a "super CB band".

CB radios have advanced too. For the most part those of us who operated CB radios in the "early years", did not have to build the radio either. Then (and I am talking in the early 1960's) where was a certain amount of respect and informal operating procedures in place. We knew what channels certain groups operated on and were warmly welcomed into any of the conversations on those channels. Today, one is lucky to be able to make a contact either due to "exclusive clubs" on channels or the inability to get through all the clutter.

Scanners, well yes, they have advanced too. My first "police radio" was a tunable unit where police communications could be heard just above the AM broadcast band. Then when the shift was made to VHF, tunable radios like the Regency MR-10 came into being. Eventually crystal units came about. I still have my Sonar crystal scanner. As technology advanced the programmable scanner came into being. Of course programmable scanners are still with us today, but there is a great amount of difference between the Bearcat 210 and Bearcat 296D or RadioShack PRO-96.

While you can still program in the frequencies, now additional items can be programmed in such as CTCSS and DCSS tones, alpha tags, trunking and much more. While this technology is great and keeps up with the new radio systems, the ability to program a scanner by hand is going the way of the spark gap transmitter. It is now almost a necessity to have software to program a scanner. Programs such as Scancat and others have made the programming of the new scanners simpler, but then you need to learn the program and in many cases have and learn a computer.

In trying to have everything in one package, some scanner manufacturers have included thousands of frequencies into their scanners -- on the surface, not a bad idea. However, in a practical sense it is not working out. The majority of people who purchase a scanner want to listen to their "local channels" and get confused



Welcoming the 1st Calvary back to Fort Hood, Texas.

Closing Comments continued

very easily when a scanner is programmed on a nationwide basis. Because frequency use repeats itself every 75 or 100 miles, customers will see a frequency for a city hundreds or thousands of miles away come active. Of course it is not the licensee indicated on the scanner, but being used by another agency close to the listener. However, the average person does not understand this fact. They become confused and want to "turn off" that channel or marvel in the fact at how far away their scanner can hear.

So, the old days of having just your local frequencies included in your scanner are disappearing also. RadioShack, to their credit, has initiated a policy of programming scanners for the customers local area in the store before the customer walks out. This service seems to be working out pretty well.

There have been any number of radio companies that have dealt with one aspect or the other of radio, then either drop the product line or just disappear completely. Remember Regency or Tennelec?

Yes, there is change and there always will be. Sometimes for the best other times not for the best. It is with that in mind that I want to thank Laura Quarantiello for her many years of service to National Communications. She has decided to work on other projects and will no longer be authoring her column. We wish her the best. But then the changes keep coming. Soon we will be welcoming another author to take her place.



LAST PAGE OUT

Home offices of the companies selling the largest amount of scanners in the US: RadioShack at 300 RadioShack Circle in Fort Worth, Texas and Uniden America Corporation at 4700 Amon Carter Boulevard also in Fort Worth, Texas.



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- Built-in NOAA receiver
- Skywarn button – hear local trained weather observers
- 200-frequency memory
- Covers 800MHz band

#20-501

PRO-99 Race Scanner

- Preprogrammed for listening to drivers, pit crews & spotters
- Store/recall channels by car number, including driver names
- 1-button weather alert
- 800MHz (excludes cellular)
- Backlit LCD and keypad
- Stubby antenna for better at-track reception
- Alkaline or rechargeable batteries

#20-515

PRO-97 Triple-Trunking Radio Scanner*

- Use in areas with trunked systems
- Alphanumeric display shows actual name of service
- Signal Stalker II signal finder
- Skywarn button – hear local, trained weather observers
- Backlit LCD and keypad
- Scanner bands from 25-1300MHz

#20-527

RadioShack®

You've got questions. We've got answers.®

Mobile use of scanners may be regulated by state or local laws. *Follows analog trunked Motorola I, II and I/II plus GE/Ericsson police/fire/EMS radio systems.