JOHNSON COUNTY RADIO AMATEURS CLUB, INC.
P.O. Box 93
Shawnee Mission, KS 66201

FEEDBACK

SEPTEMBER 2016

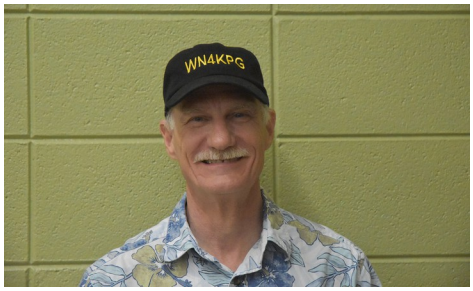
DMR Brings New Faces to the JCRAC

Chuck Kraly, KØXM, of the Backyard Repeater Group, (right) gave the club a presentation on "DMR-The Basics" at its August 12 meeting. Chuck spoke of his experiences, both as a user and as the administrator of a group of digital UHF repeaters.

DMR or "digital mobile radio" is a European commercial standard that is being adapted to amateur use. Several JCRAC members offered testimonials as to the breadth of local coverage the clarity of the sound and the extended battery life commonly associated with the mode.

KD7MXY - Barbara Siefken

WBØGAC - Walt Rausch



WN4KPG - Rick Dimos

KØFRD - Fred Parks

KDØGDX - Dave Stickel

KDØIJT - John Ross

WØWJB - Bill Brunkhardt

SEPTEMBER MEETINGS

***Sept 9** -- Field Day Videos, John Raydo, KØIZ*

***Sept 23** – Smith Charts - Dennis Baker KEØQM*

The Johnson County Radio Amateurs Club normally meets on the 2nd and 4th Fridays of each month at 7:30 PM at the Overland Park Christian Church (north entrance), 7600 West 75th Street (75th and Conser), west of the Fire Station.

Much of the membership travels to the Pizza Shoppe at 8915 Santa Fe Drive for pizza buffet and an informal continuation/criticism/clarification of the topics raised at the meeting ... or anything else.

LEAVE THE CHURCH, TURN RIGHT (WEST) ON 75TH. TURN LEFT (SOUTH) ON ANTIOCH. TURN RIGHT (WEST) ON SANTA FE. PIZZA SHOPPE IS JUST PAST THE SONIC ON YOUR LEFT.

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A publication of the
Johnson County Radio Amateur Club, Inc.

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Repeaters for All!

The first article in this month's FEEDBACK refers to DMR. The opening paragraph of "Hambone's" adventure refers to DMR. "The Amateur" experiments with DMR. The club's repeater guidelines point out that two of the club's repeaters "require" digital transmissions (the two Fusion repeaters) and two repeaters either "encourage" or "highly encourage" DMR use. One repeater, the 443.725 FM repeater, is strictly analog FM.

Most club members, however, are not using digital modes on the club's repeaters. Speaking in round numbers (because the club roster includes but one name per family) 25 of the club's 150 members have DMR ID numbers, which means that 125 JCRAC members do not have DMR ID's and, necessarily, do not use DMR. The effect is particularly pronounced with our newest members. Of the JCRAC members who do have DMR ID's, for example, only three of them have callsigns beginning "KD" or "KE".

Our digital users are having fun pursuing the laudable aim of advancing the radio art. We must be careful that our requiring or encouraging digital modes on four of the club's five repeaters does not come across as indifference to or exclusivity from the larger part of the membership.

Enjoy the digital modes. Use the digital modes. But listen for and call out to the longtime club member who chooses to keep his analog equipment or the guy with the new ticket and the new analog FM HT. The JCRAC and its repeaters are there for all of us.

– Chip Buckner – ACØYF

PRESIDENT'S CORNER

Where did August go, let alone summer 2016? The season's public service events are winding down as well. We hope you had the opportunity to volunteer for at least one of these events. Take a look at Larry's List for events in September. There is still time.

October is the Club's time to provide volunteer tour guides for Ensor Farm and Museum in Olathe. Please sign up for one of the slots. It only takes a few--typically, very leisurely--hours on a Saturday or Sunday.

The Ensor auction planning is under way along with other activities. Club events begin on the evening of Friday, October 29. The auction follows at 11 am on Saturday October 29. Look through your shack to see whether you have something that needs a new home ... or a home that needs some new things.

– Bill Gery – WA2FNK

Keep It Cool: A Fan for Your Station Equipment

Tom Wheeler, NØGSG

Heat is the enemy of electronics. That nice new rig of yours (that runs for hours on end) may make a significant amount of heat. Some new radios get very warm to the touch after they've been on for a little while. A radio that's merely warm on the outside may be much hotter inside!

The trend towards miniaturization has resulted in some trade-offs, and one of these is heat dissipation. In radios the size of paperback books, it simply isn't possible to cram in huge cooling fans. There's no room! Instead, manufacturers have gradually shifted to a relatively new method of construction - - using a cast aluminum chassis, with precise-fitting circuit boards and carefully designed cooling channels, and an occasional miniaturized fan.

Even so, some modern radios can still get very warm - - largely a function of the power they use in standby - - and a little help is in order. Figure 1 shows a simple fan that you can put together in a single evening. This fan has a dual-speed setting to permit slower-running operation when you need quiet in the shack.

The fan of Figure 1 is easy to build, and you may have almost everything you need in the shack. The parts list appears to the right.

The schematic for this circuit is shown in Figure 2, and a pictorial representation is shown in Figure 3.

The circuit is pretty simple. Resistor R1 controls the amount of current available for low-speed operation, and R1 is bypassed when S1 is closed, providing the full 12 volts of the power supply to the fan for high-speed mode. You can experiment with the value of R1 tosee the impact it has on fan operation, and adjust it to suit your needs; 75 ohms is a good starting point. Since I didn't have a half-watt 75 ohm resistor, I simply paralleled two 150 ohm 1/4 watt parts, as you can see in Figure 3.

To keep things neat and prevent unwanted short circuits, apply heat-shrink wrap (or good quality electrical tape) over the switch connections after you've chosen the

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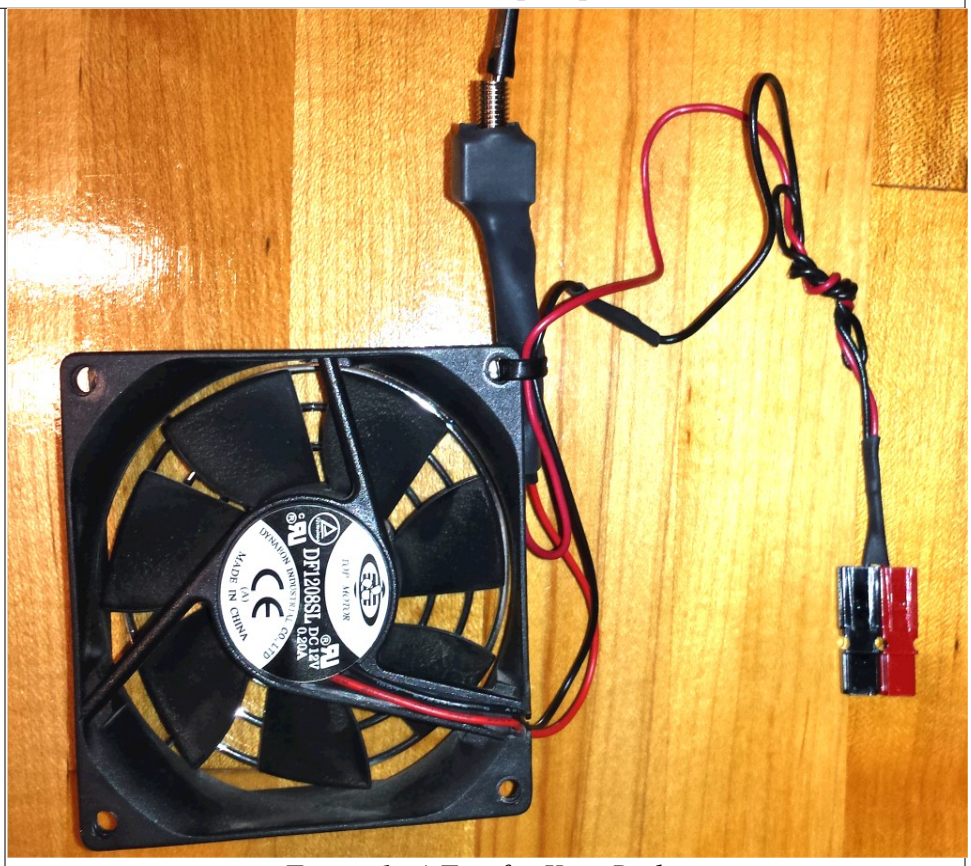

Figure 1: A Fan for Your Radio

Qty	Description
1 Pair	Powerpole 30A connectors (Associated Radio)
1	12V DC Fan,80 mm, 70 mA (Cooler Master SAF-B83-E1 or equivalent - available through Micro Center)
2	150 ohm, 1/4 watt resistors OR 75 ohm, 1/2 watt resistor
1	Toggle switch, SPST, general purpose (junk box)
1	Protective Screen for fan (junk box or Micro Center)
2.5 cm	Shrink-wrap insulating tubing, 1.5-2 cm initial inside diameter
1	Small ratchet tie band

Parts List

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final value for R1. To protect the delicate wiring, use a ratchet tie wrap to secure the switch and its wiring to one corner of the fan.

Conclusion

It's not hard to provide a little extra cooling for your equipment. I've been using this exact fan with an Icom 9100, which is a radio that generates fairly large amounts of heat (it draws about 3A @ 13.8 V in receive, and up to 22 A in transmit--that translates to a power dissipation between 41 watts just in receive, up to 300 watts in transmit. The 41 watts of heat in receive is enough by itself to raise the radio's case temperature about 30 degrees F above ambient room temperature (the Icom's internal fan cycles on an off periodically just sitting in receive). With this external fan just pointing at the rear panel of the Icom's chassis in low-speed mode, that temperature rise falls to 4 to 5 degrees F and the radio's internal fan never activates in receive--which means that the radio is likely to live a longer, happier life.

So if you've got a radio that's running a bit warm, do it a favor --give it a cooling breeze!

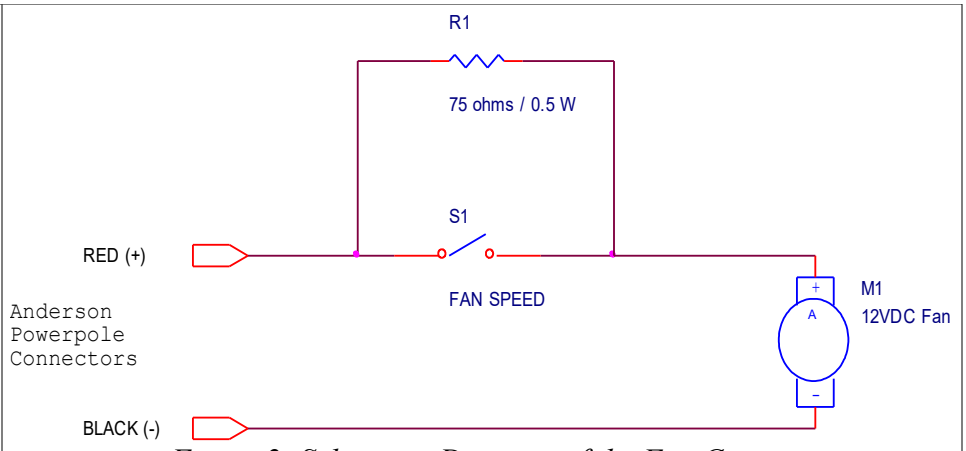

Figure 2: Schematic Diagram of the Fan Circuit

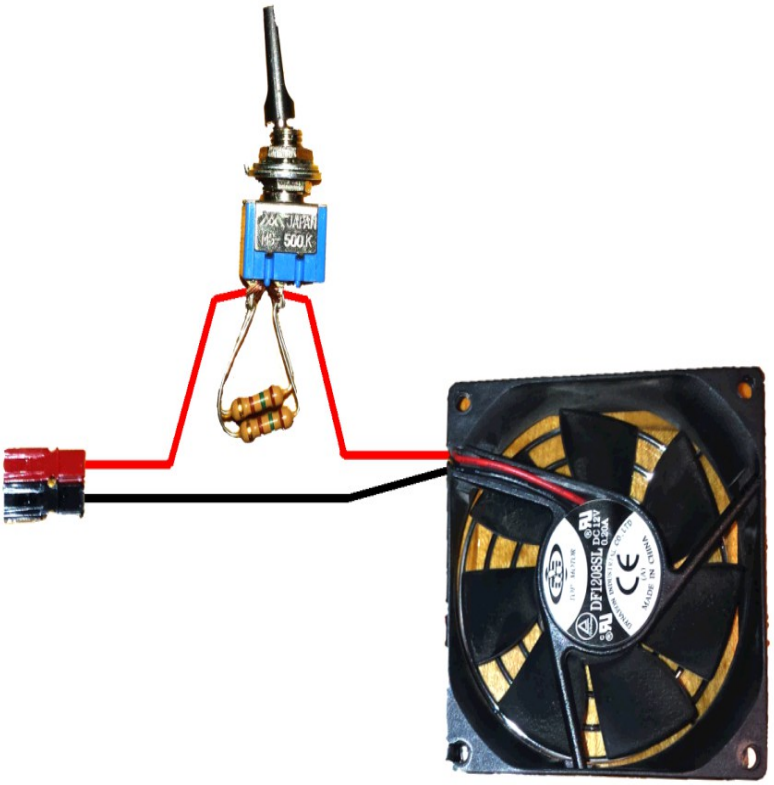

Figure 3: Construciton Details of the Fan Circuit

Dueling Keys: A Hambone Adventure - Jaimie Charlton, ADØAB

"Well, one of the biggest differences is DMR has two time slots which means you can have two independent conversations over the same repeater at the same time," explained Dill for about the tenth time to a new owner of a TYT HT who hadn't a clue as to what he bought.

A little farther down the table Dom offered some wisdom to a new ham who had been agonizing over which of many expensive antennas to buy for his first attempt at HF, "I really like simple wire antennas. They are easy to build, almost invisible and work great." This was not what the newbie wanted to hear. He was sure that he could just spend his way to DXCC and WAS awards if he only knew what to buy.

Of course, there was the ubiquitous duo, Elmer and Gerry, in an intense discussion over the virtues and problems of dynamic versus condenser microphones.

But the most interesting conversation was at the end of the table where Hambone and Dude were enthralled by Kit's stories of his childhood with the moonshiners in rural Tennessee.

Such was a typical morning breakfast club of the Johnson County hams. Now, the breakfast club isn't a real club. It has no membership lists, no dues, no regular meetings, no clubhouse – nothing that would identify it as a traditional club. But, a club it is. Just ask any of the guys or ladies at the table that morning.

The club meets nearly every morning around 8:45-9:30 AM at some local restaurant. Somebody gets on the local 145.29 Mhz FM repeater and asks if anyone was going for breakfast. Literally out of thin air, voices appear and quickly a time (usually right then) and place are established. Like every other day, that's how this meeting of the breakfast club kicked off. But this day was different.

At first, nobody noticed a tall, thin and very elderly gentleman walk up to the table. "It sounds like you guys are hams, too," he said. "Me and the missus are just passing through on our way to visit our son in Utah," he continued, offering a little too much information as hams are inclined to do.

"Well, why don't you join us? We've got an extra chair right here if Dom will just move down a little," invited Dill. "By the way, I'm Dill and this is Dom. Right over there is Elmer and his two nephews Hambone and Dude and that's Kit at the end. Where are you coming from?"

"My name's Alber, not Albert, and we're from Tennessee and …" He started to say but stopping mid-sentence.

"I don't believe it! You are the spittin' image of my great-great grandfather when he was a kid! His name was Hammish," exclaimed Alber. "Do you have any kin in Carter County?"

"I, I ah, don't know," stammered Hambone, caught off guard. "Unck, do we?"

"I sort of remember grandpa saying something about his grandpa living in Elizabethton where the fishing was better than any place else in the world," offered Elmer, not sure where this was going.

"I bet you are a CW operator, aren't you?" Asked Alber getting more excited by the minute.

"Well, I do run CW quite a lot," said Hambone getting his composure back. "But I also like SSB and PSK31."

"I am almost sure we are kin!" shouted Alber. "I bet you aren't even aware that your great-great-grandpa, I'm not sure how many 'greats', Hammish was a famous CW operator. There's a statue and a street named after him in Elizabethton and, even to this day, he's a legendary hero to moonshiners."

"Moonshiners?" asked Elmer. "I don't think our family was ever involved in anything illegal."

"Yeah, moonshiners," continued Alber as he pulled up a chair and settled in with the group. "Let me explain."

"Way back at the beginning of the twentieth century a pretty large number of immigrants from Scotland came over and some of them settled in Tennessee. They were simple people, mostly farmers and craftsmen, who didn't bring much with them, except the knowledge of how to make whisky."

"I think I remember dad saying something about us having roots in Scotland when we were watching a curling match on TV," added Dude.

"Well, they soon discovered that Tennessee was way different from Scotland," continued Alber.

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from HAMBONE on page 5

"Mainly, it was warmer and they didn't have the ingredients to make their traditional whisky. But then they discovered corn and it could be made into excellent whisky.

Even back then, it was against the law to make and sell whisky without paying tax on it. But the rugged Tennessee terrain and the fact that most of the product was made and transported at night made enforcement nearly impossible. Eventually, the distillers became known as 'moonshiners' and the tax men as 'revenuers'.

Well, time passed and the dark shadow of prohibition fell across the land and out of it came a new and stronger breed of revenuer. The new revenuers had faster cars and were so skilled at catching moonshiners that a whisky production crisis was at hand. Not to mention that a lot of good ol' boys were in jail."

"Did they put Hammish in jail?" asked Dude.

"No, no, they never really caught him. He was a big guy, mebe twice your size, dreadlocks, beard and tough. Some say he would bring a knife to a gun fight just for the hell of it. But that didn't happen very often because he was amazingly clever at avoiding the revenuers. Sometimes they would see a wisp of smoke up on the bluff, but they could never find him or his still.

"All that aside, Hammish made the best whisky in the county. It is said that one sip of his crystal-clear white lightnin' and you could hear angels sing. All that made Hammish the prime revenuer target and he knew it. He also knew that the revenuers were getting closer. Something had to be done. But what?"

The answer came one summer when Hammish was visiting a show in the big city of Nashville. World War 1 had been over for several years and companies were displaying their new marvels for the consumers. Everything from shiny red cars, to gleaming white refrigerators and chrome toasters was on display. But, what caught Hammish's eye was two guys who called themselves 'hams' for some unknown reason. They had some funny-looking boxes they called radios sets and were sending telegraph messages back and forth without wires!

Okay, radio was not new, but Carter County was not exactly on the leading edge of technology. Hammish had seen the telegraph operator in Elizabethton send messages over the wire. But these guys were doing it without wires! That gave Hammish his big idea. He bought several radio sets and took them home.

The local telegraph operator, a moonshiner himself, was all too happy to teach the guys to send code. He also helped Hammish install the radios in some of the transport trucks and in hidden spots in the hills.

Now, when the 'shine was on the move' spotters in the hills would watch for revenuers and radio their locations to the drivers who could then avoid getting caught. It worked great and Hammish was a hero–at least among the moonshiners.

In fact, the radio system worked so well that the boys began using it to send all kinds of other messages when they weren't transporting 'shine. And that became a problem because the new chief revenuer in Elizabethton was also a ham and could easily read all of the boys' messages.

Discovering this, the boys jumped around in frequency and developed secret words for their activities. But, that revenuer also learned to jump in frequency and eventually figured out what the secret words really meant. The revenuer even started talking to the boys on their radios."

"Are you saying that the moonshiners actually talked to the cops while they were smuggling?" asked Hambone.

"Yes. To the revenuers, it became sort of a game of hide and seek, but with serious consequences for the moonshiner who got caught.

To the boys, it was not a game. They started sending faster and faster and keeping their messages very short and hard to read. And on it went, more frequency jumping, more secret words and faster and faster code speeds. Finally, standoff was reached.

The revenuers were finding only a few stills and catching a few of the boys' transport runs. So few that the cost in money and man-hours greatly exceeded the value of the whisky they captured.

Likewise, the moonshiners were hiding their stills better and the radios were helping the transporters avoid traps. But again, the cost of adding more and more watchers, buying more radios and faster cars was so high it almost wasn't worth it. Then, the big surprise came.

Nobody knows why he did this. Some speculate that the chief revenuer also had a secret still someplace, although that was never proven. Some say he was just tiring

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of the game. Still others say he needed to end the problem so he could get a promotion and move to Nashville.

Whatever the reason, that glistening Tennessee morning heard the revenuer send Hammish a message offering a deal (Yes, by now they all knew each other's names.). He proposed a duel between himself and the moonshiners' best telegraph operator. Not with guns, with telegraph keys. If the moonshiners won, he would back off and let them make and sell whisky as long as they did not sell it out of Tennessee. If he won, the 'shiners would stop all production and tear down their stills.

After a long meeting, the boys accepted the duel and selected Hammish as their contestant.

The rules were simple. Both contestants would meet in a park with their radios and as many supporters as could fit in the park. Each contestant would bring pages of text to send. On his turn, a contestant would send a page of his text and the other would copy it or simply recite it. If the received text matched the sent text, as judged by the audience, the receiver won that round. Then they'd switch. The duel would continue until one contestant could not copy the other's text.

The hot Tennessee sun rose that July 5th upon a park filled on one side with moonshiners and their fans and customers and on the other side with revenuers, revenuer-wanna-bes and lot of snooty people who were against anything that seemed like fun. In the center were two radio sets on two tables with two operators settin' at them. Each operator had snacks and a pitcher of water on his table. A hush fell over the crowd as the revenuer won the coin toss and sent the first message.

'You are going to lose this match, Hammish,' came across at a leisurely fifteen words per minute pace that Hammish copied easily. The crowd cheered.

Upping the ante, Hammish tapped out a 20 WPM version of, "Oh, say can you see …." The first verse of the Star Spangled Banner. This caught the revenuer by surprise, but he recovered and not only copied it correctly, he sang it to the spectators. The crowd went wild.

Buoyed up by the cheering, the revenuer retorted with, "I was dancin' with my darlin'…," the first verse of the Tennessee Waltz at a much too fast – for a waltz - 40 WPM. Not to be out done, Hammish began singing that old time favorite and some of his fans started dancing.

Tiring of the softball musical references, Hammish shot back, "And for the support of this Declaration, with a firm reliance on the protection of divine Providence … ." He hoped that the revenuer would be unable to copy the last line of the Declaration of Independence at 50 WPM, but he did.

Sweat glistening on his brow, the revenuer's fingers were a blur as he pelted Hammish with a long piece of text from an obscure Tennessee law.

Not expecting such a long text, Hammish struggled to capture it all. He actually missed a word or two, but the audience gave it to him anyway.

The Tennessee afternoon sun blazed hot and the telegraph keys spit fire as the transmitters struggled to keep pace with Hammish and the revenuer as they dueled for the future of moonshining.

On they went through the afternoon and into to the gloaming. Sweating like glasses of lemonade, they fought into the night. Keys blazed and bugs buzzed around the red Dietz lanterns as a full moon rising replaced the sun adding metaphorical punctuation to the evening that nobody noticed. Even in the moonlight, it was clear that Hammish, sweating and shaking, was in dire straits.

Sensing his opponent's exhaustion, the revenuer continued to pound him with long obscure texts at stratospheric speeds. Hammish copied all, but just barely.

To the average listener, dots and dashes are indistinguishable at seventy words per minute. It just sounds like an annoying buzz. Even to the skilled telegrapher, those speeds require full concentration and that is what Hammish was losing. Sweat was running down his arms and off his hands. He could feel a tingle as the salty liquid leaked over the button on the key and bridged the gap between his fingers and the voltage on the upper contact.

Nevertheless, he managed to fire off a long Shakespearian sonnet whose antique English words, he hoped, would end this brutal duel. The revenuer wavered, but didn't collapse and responded with yet another withering barrage of dots and dashes.

Hammish could not go on. He called for his last one-minute break, mopped the sweat off his brow and

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prepared to admit defeat. But something in his snack bag caught his eye. Some say it was a wink from an angel, others say it was just a reflection. It was the metal top of a Mason jar filled with his legendary 'shine that someone had slipped into his bag.

Clear as the finest spring water, a beautiful liquid, so pure that it captured the moonbeams and shone with its own silvery light. Hammish unscrewed the metal ring, popped off the top and took a big sip.

It's hard to say what exactly happened next and a lot of people have different opinions. But Hammish himself said he heard music, like angels singing and encouraging him to go on. Although the entire experience lasted less than a minute, he now knew how to win.

He set down the jar and reached for the wreckage that his key had become and began to tap out his final message. Not fast, but with perfect precision and a compelling musical rhythm.

This strange message caught the weary revenuer off guard. Instead of a blistering attack, this was a sweet melody. So taken by the musical sounds and rhythm, the revenuer missed all the text except 'wire', the last word of the short string. Well, I'm sure you know what Hammish sent.*

What was left of the crowd went wild and carried the victorious Hammish around on their shoulders. True to his word, the revenuer stopped chasing the moonshiners. And true to their word, they did not sell their booze out of state.

And that, my boy, is why there is a statue of Hammish, your ancestor, in the town square and why in Elizabethton, Independence Day celebration is always a two-day event.

So, Hambone that's your name, right? Keep practicing your code, you may be another Hammish."

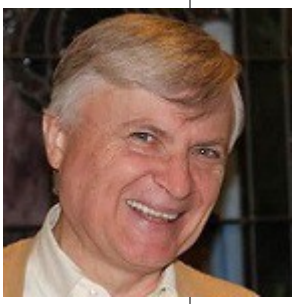
"C'mon. Alber, you've been jawin' long enough, we gotta get goin'" she said dragging Alber from the table.

**Author's note. If you don't know the rest of Hammish's last send, it is, "Ben's best bent wire." This unusual phrase sounds like a song when sent properly in Morse code. In fact, it is so musical that it was featured at a ham club Christmas party one year.*

The "Amateur" in "Amateur Radio" - Chip Buckner, ACØYF

Discovering DMR

As noted last month, I was in the market for a new HT and was "all ears" when DMR evangelist **Chuck Kraly, KØXM** gave a presentation to the JCRAC on a variety of DMR topics.



My introduction to DMR came a year or so ago when a ham made a presentation to the JCRAC. **Deb, KDØRYE**, and I concluded that we had wasted forty-five minutes of our respective lives. **Tom Wheeler, NØGSG**, who has a bit more technical knowledge and experience than I, on the other hand, positively glowed with excitement.

For those of you who were not at the meeting "Digital Mobile Radio" or "DMR" is a digital communications standard developed by the European Telecommunications Standards Institute (ETSI). There are various "tiers" of DMR operation. For our purposes, hams generally use Tier II, which supports repeaters and uses a 12.5 kHz bandwidth, just like narrowband FM.

Of course, if a system is "just like narrowband FM", there is no reason to prefer it to narrowband FM. DMR differs from FM in that it is a digital mode that uses Time-Division Multiple Access (TDMA).

Digital Audio

When I speak my call sign into a transmitter, the transmitter uses the audio to modulate a wave that goes out over the air. The wave gets to the receiver which extracts the audio information from the transmission and plays the audio. Sometimes, depending upon a variety of factors, noise creeps into the signal. When the receiver picks up the now-noisy signal, it faithfully reproduces the noise. When that happens, listeners sometimes have a hard time telling whether the last letter of my call is an "eff" or an "ess".

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I can improve comprehension if I spell out my call. A listener may not be able to tell an “eff” from an “ess”, but most of the time, he can hear the difference between “foxtrot” and “sierra”. The “foxtrot” and “sierra” sounds are sufficiently different to our ears that they are hard to confuse.

With a digital protocol, your transmitter converts the audio into a series of signals—(and although DMR uses four-states) let’s call them “ones” and “zeroes”—that will “sound” very different to the receiver. The digital brain on the receiving end asks itself whether what it heard was more like a “one” or more like a “zero”. It then uses the series of ones and zeroes to rebuild the original audio. Because it takes a LOT of noise to make a “one” sound like a “zero” (or visa versa), the digital brain on the receiving end will be able to pick up the digital signal out of the noise and reproduce a clean audio sound.

So, all other things being equal, the--although there are circum-stances in which noisy analog can deliver a message that baffles digital--digital transmission gives us cleaner, more intelligible audio over a larger area than was possible with an analog transmission.

Chuck Kraly, KØXM, who happens to run the Backyard Repeater Group's set of UHF DMR repeaters observed that--but for the east coast of the United States, the rest of the DMR world used UHF.

Tom Wheeler, NØGSG, made the not-unreasonable observation that which unit to buy depended upon what I wanted to do with it. In either case, he said, Associated Radio in downtown Overland Park carries the "cheap,reliable, well-constructed" Tytera MD-380 that has "very good local support".

To get onto the club repeater, I need a VHF HT. To give DMR a fair shake, I need to go UHF. Clearly, the only thing to do is to get one of each. I resolved to start with VHF, however, so that I could use the HT on the club repeater.

Saturday morning meant a trip to Associated Radio in downtown Overland Park. I like to buy locally. If we don't support our local retailers, we won't have local retailers. Associated was, however, sold out of both VHF HTs and the low-end UHF DMR HT. I'm on the list for a VHF HT which should be in "in a couple of weeks".

On Sunday, I checked on-line for a source of inexpensive Tytera MD-380 UHF DMR HTs. I ordered a pair that evening and found them on the breakfast room table when I returned from choir rehearsal on Thurrsday evening.

Now What Do I Do?

Well, the FIRST thing I did was to charge the battery. The second thing I did was to turn it on. I get a happy little beep and a menu that invites me to set up zones and contacts other settings. I figure out how to set today's date. And that is it. I see nothing that looks like a frequency setting. (At this point you should stop reading about my adventures and refer to the first paragraph of Hambone's adventure elsewhere in this issue.) I see nothing that looks like a frequency. Perhaps I should follow some instructions.

Tom Wheeler, perhaps because I warned him that I was very likely to quote him in the FEEDBACK, told me that the basic steps in getting started with DMR are:

(1) Register your callsign with DMR-MARC at www.dmr-marc.net. This gives you an ID number that identifies you in the world-wide DMR network. I do this late (10:30) Thursday evening. Given my call sign, the on-line form figures out who I am and where I am. I read that it will take at least day and that I should allow 48 hours for the ID assignment.

Ten minutes later, I check the on-line database. What's taking so long?

While waiting, I notice that I can query the DMR ID database in a number of ways. I limit the search to "Kansas". I get a list in ID number order and, perusing the list,

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see that there are about twenty entries for names (or very local addresses) that I recognize. I also notice that all Kansas numbers begin "3120" and that the last guy on the list has "3120191".

Being a kid with a new toy, I check the Kansas list--more times than I care to admit--on Friday, on Saturday and on Sunday. Mr. "191" is still the last guy on the list. I reocgnize that I have paid nothing for this number, which means that someone is volunteering his time ... but, waiting is hard.

On Monday, I look at my email and see that an ID was assigned to me on Friday evening.

Huh? I go back to the database. Mr. "191" is still at the end. But I am "075". I scan up the list and find myself. Tip: there is a sequence of Kansas numbers that starts at "001" and another that starts at "101". I'm in the first group. Prominent club members **Larry Staples, WØAIB**, **"Van" Van Daveer, KØHCV** and **Bill Brinker, WAØCBW**, for example, are in the second group. (I am enjoying the thought that someday, someone will look at the list and reach the erroneous conclusion that I was one of the earlier-adopters of this technology.)

Anyway, next task.

(2) With your DMR-MARC ID in hand, program a radio with the approriate codeplug. The codeplug contains your DMR-MARC ID (and identifies your radio) and also contains the channel and contact information needed for your radio to talk ont he DMR network. Step 2 requires that you have a PC with "Customer Programming Software" (CPS) loaded on it. The CPS is typically provided on a CD ROM with a new radio.

In retrospect, perhaps, I could have figured out what to do with the CD, but I was in a hurry, became quickly frustrated and cast about the Internet for help. The Tytera website was no help, but someone else who had an MD-380 had links to drivers and the requisite software.

I see that I can read and write to the radio and, because Tom's instructions told me to go to either the Backyard Repeater Group (byrg.net) or the club (www.w0erh.org/digital-dmr) sites to get a code plug, that's what I did.

Because I had a UHF HT and the BYRG focused on UHF and the JCRAC focused on VHF, I downloaded the BYRG code plug and loaded it into my radio.

Now we're getting somewhere. I turn on the HT. One of the knobs on my HT controls volume. I understand volume. One of the knobs changes the display from BYRG Local, to BYRG US--where someone is who is plainly hearing more than I am hearing is answering questions about how to interface something with a Raspberry Pi. I can hear answers, but I can't hear the questions.

Back to Tom's email.

Like most modes, it's important to understand the rules for operation and listen carefully to how others operate. An Elmer is a super-valuable person to have around when you are getting started as DMR has quite a few details that are quite different than analog FM ... and because certain DMR talkgroups and repeaters literally reach around the world, etiquette is very important.

Tom!?!!

I schedule a phone call with theever-patient Tom Wheeler. I have one eye one a computer screen, one eye on my HT, one ear to the phone and one ear on my HT. Tom has me turn dials on the HT until we both are see BYRG-Local on our HT screens. Tom simulcasts his next instructions over the cellphone and over the BYRG-Local DMR talkgroup.

"Simulcast" is probably not the right word. When Tom's speech is coded (digitized and compressed), sent to the repeater, relayed to my HT, decoded (expanded and de-digitized--I'd say analogized, but that has a different meaning), it hits my ears noticeably later than does the sound from the cellphone. It is not so long as a second, but I would hazard that it is on the order of 200 ms.

Now Read This

The substance of Tom's instructions, however, was critical. When you turn on the HT, you'll see the word "Menu" on the screen above the green button. Press the green button to get to the menu. When in the menu, you can see that the green button is now "Select" and the red button on the right is for going "Back". Use the arrow keys--which work exactly the way you think they should work--to navigate down from "Contacts" past "Scan" to "Zone". Use the green button to select "Zone".

When you have loaded an appropriate "codeplug"--which is a fancy way of saying that you have used someone else's hard work to program your radio--you will have a variety of zones. Tom's--and now MY--codeplug has six zones. They are:

see AMATEUR on page 11

from AMATEUR on page 10

BYRG
KØUSY Systems
WØWJB System
KC Analog
Peculiar
Simplex/Scratch

"Zone" has nothing to do with geography. It is simply a group of sixteen channels. When you turn the channel selector knob on your HT, you move among the sixteen channels of your currently-selected zone.

The BYRG zone--as programmed in this particular code plug--has channels for various BYRG repeaters (Mission, Plaza and Peculiar), a national talkgroup, a world-wide talkgroup, various other BYRG things and, in position sixteen, the JCRAC WØERH UHF 443.725 FM analog repeater.

If I select the KC Analog zone, I have a menu full of local FM analog repeaters. If I select the Simplex zone, I have a menu full of the recommended DMR simplex frequencies.

Performance

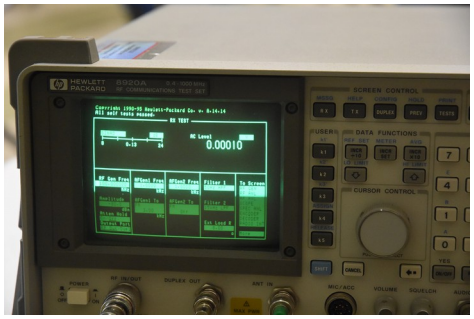
I had no problem using the 4" rubber duck from a ground floor room on the north side of my home near 119th and Antioch to talk to Tom Wheeler via the BYRG Mission repeater, which they tell me is at Metcalf and Shawnee Mission Parkway. Later, I tossed my call out to the silent repeater and Chuck Kraly came back to me. I knew it was Chuck because DMR units have a sort of caller ID function. Because Tom Wheeler had included the local DMR users in the "Contacts" section of his codeplug, Chuck's name and callsign popped on to the screen when he was speaking. Chuck reported me as being "on the edge" when I was on the south side of the house.

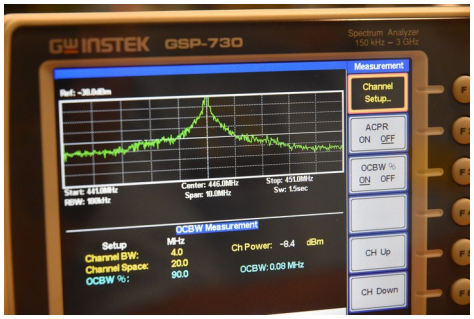
On another occasion, Deb and I switched to the "Simplex" zones on our HTs and engaged in a bit of impromptu public service. You see, there were these Pokemon wandering about the park and we could relay information about sighting to the kids in different parts of the park. (One should never waste an opportunity to be an ambassador for amateur radio!)

Discovery

Discoveries are, of course, initial impressions. Reports of initial impressions are typically superficial and inevitably colored by the experiences of the observer. My reading and experiences to date are such that I know I want to continue playing with this mode.

First Annual UHF Handheld Shootout





JCRAC members arrived ahead of the August 26 meeting to conduct the club's "first annual" UHF HT antenna shootout. The rules were simple: bring 440 MHz HT to which is attached an antenna that would fit in a three foot cube.

Tom Wheeler, NØGSG, (top right) tested each antenna-less HT to compare its output to a known value. Participants re-attached their antennas and keyed up at 446.00 MHz. **Lon Martin, KØWJ,** (below right) measured the signal received at a spectrum analyzer roughly ten wavelengths away.