

# FEEDBACK

MAY 2016

## JCRAC Learns About Remote Operations

Three club members shared their experience with remote ham radio operations at the April 8 club meeting.

**Herb Fiddick, NZØF**, led off with an explanation of RemoteRig, a mostly-hardware solution. RemoteRig is commonly used on rigs with detachable control panels. In the normal case, a ham would use a cable to connect the control panel to the main rig. With RemoteRig, the operator connects the control panel to a RemoteRig device and then, through the Internet, connects to a second Remote Rig device that is attached to his main rig. An operator may, instead, use a suitably equipped PC in place of the detachable control panel. Herb reported that this system had been used successfully to handle phone operation from inside the National World War I Museum at the Liberty Memorial.

**Charlie Van Way, NØCVW**, followed with what he called the simplest remote operation mode. He used Team Viewer software (free for personal use) on a local laptop to view a remote PC desktop. The remote PC, running Ham Radio Deluxe (or other software, such as fldigi) was attached to and controlling a transceiver. Charlie recommended this combination as being the easiest way to set up remote digital operations.

**John Raydo, KØIZ** has his station in Colorado, but--because he may be in Kansas City for extended period--has designed his station for unattended operation. This, he notes, adds complexity.

John uses a PC or laptop to run TRX Manager, LPRemote and Skype. TRX Manager displays the front end of his Elecraft K3 and allows complete operation of station--frequency, bands, volume, a secondary

**see REMOTE on page 8**

### MARCH MEETINGS

**May 13 -- 2m Fox Hunt -- Meet at the Church parking lot at 6:30 to form teams**

**May 27 -- High altitude ballooning - Keith Kaiser, WAØTJT**

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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## First Timers

Please be sure to greet **John Cassiday, KEØHWD** (left) and **Caylin Hartshorn** (right) who first attended JCRAC meetings in April.



## **-> FEEDBACK <-**

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

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### ***Do You Tap?***

Although I had been working on code for some time, my answer to the question "Do You Tap?" was an emphatic "no". I knew that the questioner, a choreographer for one of the summer musicals out at Shawnee Mission Theatre in the Park, was interested in my feet, rather than in my fist.

The auditions, not that you asked, went very well. I landed a fun role in the delightful musical comedy "The Drowsy Chaperone". (Appropriate for all ages, though some of the gags work better if you're old enough to have had experience with a record player.)



Although many Broadway musicals feature foot-tappers, to my knowledge, only one show has featured a fist-tapper, in which a performer sings of the joy that radio operation has brought to his life. I've got two Drowsy Chaperone tickets (cast members get two complimentary tickets) for the first FEEDBACK reader (other than my wife) who can name the show before I publish the answer in the next issue of the FEEDBACK.

**-- Chip Buckner -- ACØYF**

## **PRESIDENT'S CORNER**

How did May get here so quickly? Not only May, but Field Day, too, is upon us. June 25 and 26 are the dates and as we did last year we will set up Friday afternoon and evening. Testing will be held on Saturday.



Set up for the phone station antenna will be a new challenges. We will not have the push-up mast we have had in prior years. There will be a plan for that as well as the solar station being setup this year. We are returning to Shawnee Mission Park, so the meeting Friday evening will be at the observation tower. Join the group that will be camping overnight Friday. This is a good opportunity to make contacts and check out the equipment. Field Day starts at 1:00 pm CDT Saturday and runs until 1:00 pm CDT Sunday. We will need help with break down Sunday. Dinner will be Saturday evening, more detail to come but plan on bring the family.

A reminder that nominations and election of officers will take place during the second meeting of May.

**-- Bill Gery -- WA2FNK**

## ***Johnson County Radio Amateurs Club - April 8, 2016***

Attendance: Self introduction with name and call sign. 37 signed the check in sheet. This was followed by the Pledge of Allegiance.

The Minutes from the March 11, 2016 were accepted with 1 opposed vote.

The Treasurer's report, as follows, was read and accepted unanimously.

Cash on Hand	\$ 156.20	Repeater Operating Reserve	\$ 762.44
Checking Account	\$ 686.69	Memorial Fund	\$ 310.00
Savings Account	\$ 9,878.94		
Total	\$ 10,721.83	Active Members	152

### Old Business:

- Repeater Update – All Repeaters are working well.
- WW1USA – The Club is Sponsoring the May 7 – 8 Event at Liberty Memorial and Museum. This event will take place outside.
- Field Day 2016 – June 25-26 at the Observation Tower in Shawnee Mission Park. Looking for someone to coordinate the dinner on Saturday.
- Ensor Museum - Larry Woodworth WØHXS manager of the Ensor Park and Museum has asked the Club if we would be available to volunteer at the Ensor Museum again this year. The Club would be responsible for covering the months of May and October. Because of our efforts last year the City of Olathe (who is the Caretaker of the Museum) gave the Club \$720.00. Please go to the Club's website to sing up.
- Rod Rodriguez, K6TBJ has Ararat Shrine Hambash tickets for sale at a discounted price.

### New Business:

- None.

### Reports:

- 6 m – NR.
- 10 m SSB Roundtable – 5 participated on April 7.
- 440 Wheat Shocker net – NR.
- 2m Wheat Shocker net – 20 participated on April 7 and 19 participated on March 31.
- HF Activity – Missouri QSO Party Rob Underwood, K0RU and John Morse, N0EI made 200 contacts. Heard Island on 160m.

### Announcements:

- Welcome to all the 1<sup>st</sup> time visitors and those with new licenses.
- Ham 101 Class Saturday May 14 and 21 at Wyandotte EOC.
- Olathe Marathon April 19.
- We will have a Testing Session at the Field Day this year.
- Watch Larry's List for upcoming events.

Business meeting adjourned at 7:55 PM

Program: The Program for this meeting was a presentation on Remote Operations by John Raydo K0IZ, Herb Fiddick NZ0F and Charlie VanWay N0CVW.



## JCRAC Members Operate a Radio Clinic at the Shrine Hambash

Tom Wheeler - NØGSG

On April 16, 2016 we operated a "Radio Clinic" at the Shrine Hambash. This is the first time we've tried this as a club, and from the feedback I received at and during the event, we were a hit.

The Radio Clinic provided an opportunity for hams to check the performance of radios on site; we used laboratory-grade equipment to provide measurements of power output, transmit signal purity, receiver sensitivity, and other related parameters, and provided each participant with a printed summary of their unit's performance.

We served a total of eight hams. That doesn't sound like many, but on average, it required about 20 minutes to serve each individual, because our focus was not just to measure their radios, but also to visit with them and learn more about how they use their equipment, and help them develop insight into what we were measuring (and why).

- Many club members supported the operation, including Rod K6TBJ, Rich KCØVDH, Bill WAØCBW, Jaimie ADØAB, and a few of the other usual suspects!

- We learned some very interesting things about hams and their equipment:

- Many hams are bewildered by the array of features and settings in newer radios. Many of these settings are buried a mile deep in menus that are difficult to navigate. As an example, we had an ICOM 706MKIIG that couldn't reproduce the 1 kHz test tone from the FM signal generator on 2 meters. It turned out that the radio's DSP automatic notch filter (ANF) was turned on, and the DSP treated the 1 kHz test tone as an interfering signal, so it canceled it!

- Older equipment can still be top-notch performers. Al Gallo, WØERE, brought in a pristine Gonset G-50 six-meter AM transceiver (1950s vintage) that not only worked perfectly, but had transmit signal purity that easily met current FCC requirements.

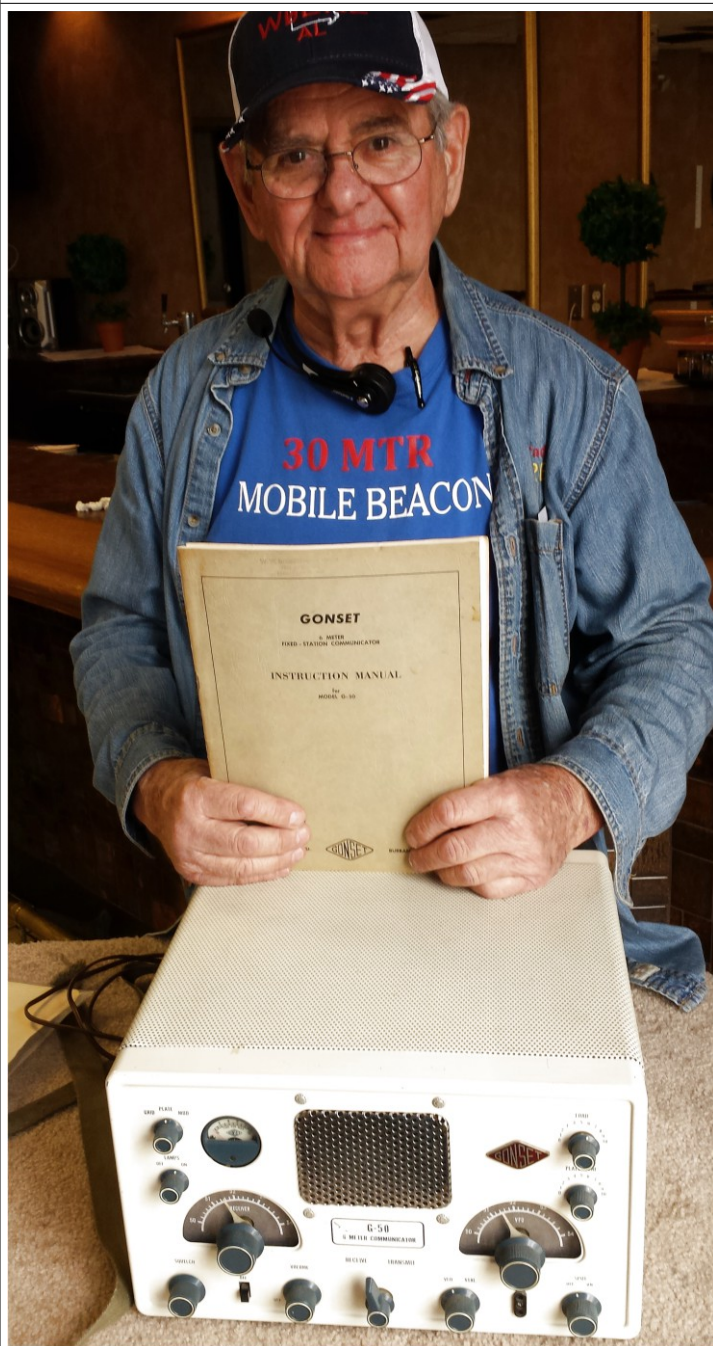
- No matter how good they look, Yaesu microphones will not work on Icom equipment!

Many of the Chinese Baofeng radios are not compliant with FCC rules for signal purity. *None* of the Baofeng UV5R units we tested met Part 97 FCC standards.

### *Spectral Purity of the Baofeng UV5R*

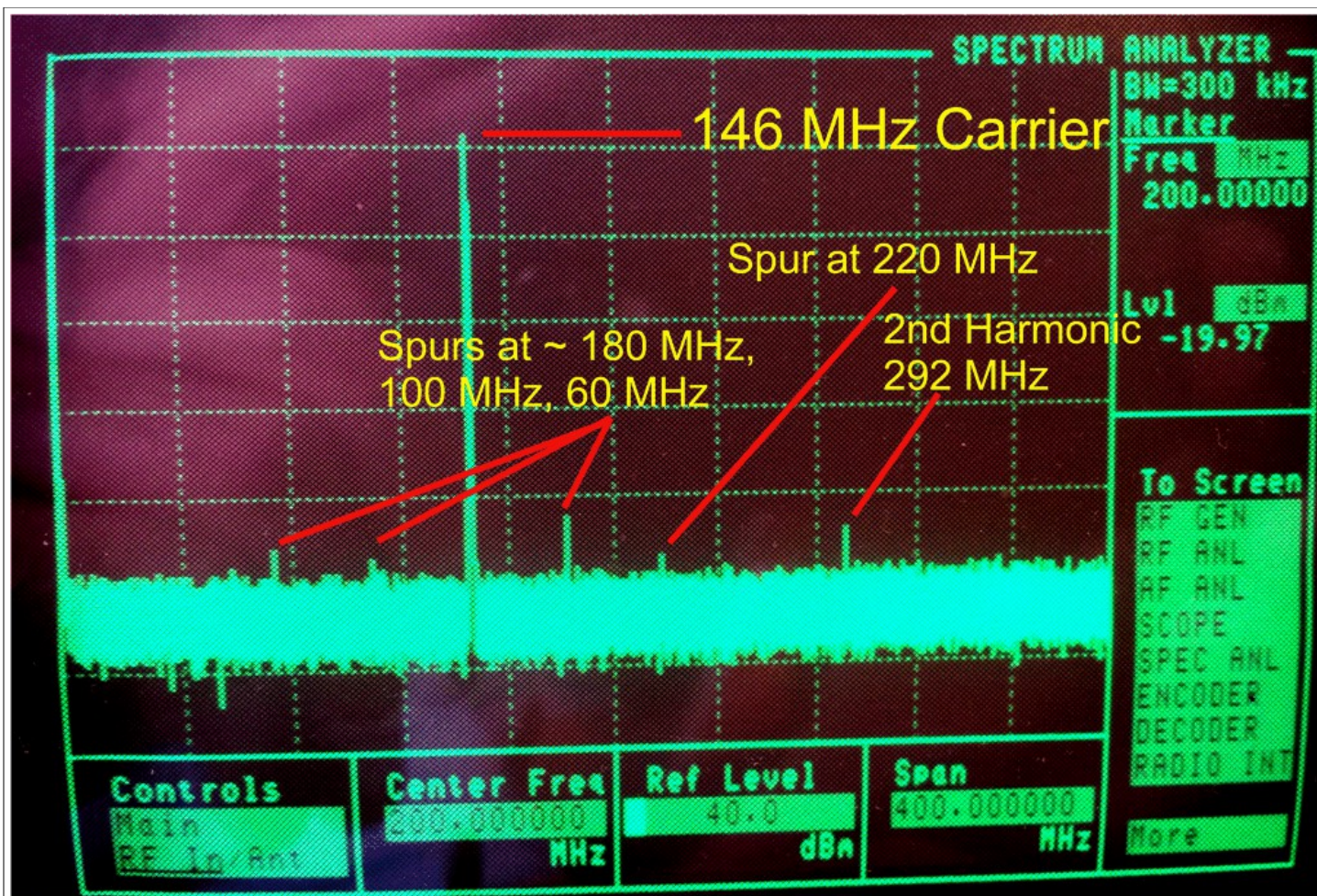
We tested a total of four UV5Rs, none of which met Part 97 requirements. All of the units had significant spurious signal emissions in excess of FCC rules, which specify that the total of unwanted emissions must be at least 60 dB below (a million times weaker) the fundamental carrier signal. We only tested four units, which is not a large enough sample to generalize

*see CLINIC on page 5*



*Al Gallow, WØERE and his Gonset G-50 Communicator*





*Spectral Display of a Baofeng UV5R transmitting on 146 MHz*

from CLINIC on page 4

to a population, but these four were spectrally quite dirty! One of the offenders is shown above.

This is a picture of the spectrum analyzer display reading out the signal from the UV5R. The horizontal axis is frequency (40 MHz per grid square left to right), and the vertical axis is signal strength (10 dB per vertical square - each 10 dB represents a 10:1 ratio of signal strength). The horizontal center of the screen is 200 MHz, the left is 0 Hz (DC), and the right is 400 MHz. The very top line of the screen represents a power of 10 watts (+40 dBm).

A properly operating transmitter normally displays just one vertical

spike on the display, which is the carrier frequency energy. Everywhere else, the energy should be 60 dB or more (six vertical divisions) down (for VHF transmitters).

This particular UV5R was putting out spurious signals everywhere, at 60 MHz (that's between TV channels 2 and 3), 100 MHz (right in the middle of the FM broadcast band), 180 MHz, 220 MHz (in or near the ham 220 MHz band), and a healthy dose of 2nd harmonic energy at 292 MHz (probably close enough to the Part 15 band at 315 MHz to interfere with garage door openers, car key fob remotes, and so forth).

On top of that, this UV5R was only producing around 2 watts of RF.

output (+33 dBm on the display)...which was quite a bit less than what it was rated at (4 watts), so this particular example might be good for an alternate use (paperweight, emergency flashlight, campfire starter, etc...).

#### Summary

Our event was a success. We've already received a request to perform this service at another hamfest, and I've got some ideas regarding how we can streamline some of the process to allow us to more efficiently operate the clinic and serve more hams. Thank you to everyone that supported this concept; we'll be doing this again!

>> JCRAC FEEDBACK <<



## A Hambone Adventure - Jaimie Charlton, ADØAB

### *That Can't Work or Why Dude Was Wrong*

"Hammy, why are you still messing around with that dumb antenna? You know it won't work. You're doing everything wrong!"

"Be still and learn," responded Hambone, smiling condescendingly as he continued to cut two pieces of black antenna wire to 138 feet each.

"Look here," countered his younger brother, Dude, opening up a large, well-worn book. "The *Antenna Book* says that dipole antennas should be a quarter wavelength high or higher. That's more than 130 feet up for your antenna. It also shows the arms of the dipole extending straight out in both directions and a current choke up at the feed point to keep common mode current from running down the coax into the shack and zapping your dumb ass."

"Dude, you know nothing about antennas. You're not even a ham!"

"I know Uncle Elmer's gonna be mad at you for wasting his antenna wire. I saw you take it out of his garage and I'm telling."

"Go ahead. He said I could use it, sort of. Besides, hams are supposed to experiment. That's part of our tradition and you know Unck is very big on tradition.

And, I'm not wasting wire. I'm following this HamAntCal app on my phone. It tells me how long to make each part of the antenna. So there, this is going to be a great 160 meter antenna. I'm going to use it in that 160 meter contest. You'll see."

With that, Hambone continued cutting and splicing his big dipole. He proceeded to string the wire from his feed point located on the rain gutter on the back of his parents' house, up through



two trees, one for each leg of the antenna, and down to the six-foot backyard fence. He ran the rest of the antenna wire along the top of the fence. Uncle Elmer's garage did not yield any stand-off insulators so Hambone simply laid his plastic-covered wire along the edge of the fence.

One dipole leg ran south for about forty feet and made an abrupt turn to the west at the end of his backyard. The other leg ran north along the edge of the fence for nearly sixty feet until the fence veered west taking the wire with it. This was more than his little brother could stand.

"Hammy, you gotta be crazy, nobody strings an antenna along a six-foot high wood fence. That will never work."

"Dude," replied Hambone. "This is a great design that I got from Jerry, a great ham and a lot smarter than you. He ran his antenna along his fence and got awesome results. I'm calling this antenna the Jerry Rig in honor of his ground-breaking work in 160 meter antenna design."

"I'm calling it Hambone's Folly," sneered Dude.

Undaunted, Hambone went on. "The original Jerry Rig antenna was a stealth antenna. By running the wire along his fence Jerry was able to hide it from his neighbor's prying eyes. Jerry's coax ran under ground and he even buried a grounding strip under the antenna and drove it all with a balun. Now, I'm making some modifications and improvements."

"I've seen your *improvements*, you'd better stick with the original design."

"You're wrong, again, Dude. I don't have to hide the feed point so I put it up here on the rain gutter. I could've put it up in the tree, but Unck, er, I, didn't have enough coax to reach that far."

"You mean you stole Unck's coax, too?" Hollered Dude.

"I borrowed it. If Unck wants it back he can have it. It's still in one piece. Anyway, I'm sure Unck would have agreed it's for a good cause."

"Since the feed point was already gutter high, I ran one side of the dipole up into this tree and back down to the fence. The other side is going up into that tree over there and down to the fence at the far end of the yard. It'll work great."

"No it won't! The two sides of your so-called dipole aren't even the same height and they slope up to two different trees at two different angles. Eew, you don't even have a proper center connection. You just wrapped your coax around a plain old ceramic insulator and tied it with a tie-wrap. I'll bet the original Jerry Rig doesn't look like this mess. Oh, and you don't even have a balun. Or, couldn't you find one in Uncle's garage?" Countered Dude in disgust.

"Shut it Dude, and watch your master antenna builder work."

With that, Hambone ran the last hundred feet of wire on each side of the dipole along the top rail of the six-foot high wooden fence that enclosed his back yard.

"Notice that I put ten feet of extra length on each side of the dipole to tune it. Right now I am just folding it back along itself. That way I can make the sides longer or shorter without having to cut or splice extra wire. Now it's time to tune," said

**see HAMBONE on page 7**

<p><b>from HAMBONE on page 6</b></p> <p>Hambone getting out his antenna analyzer and, with a short piece of coax, connected it to the antenna's feed point.</p> <p>"First, let's find the antenna's resonant frequency. That will tell us whether we need to lengthen or shorten it and by how much," said Hambone as he turned the knobs on his antenna analyzer.</p> <p>"You see, Dude, I adjust the frequency until the reactive part of the antenna's impedance is zero or as close as it's going to get to zero. The analyzer shows the impedance as two numbers, the real part of the impedance is the number on the left and the reactive part is the number on the right."</p> <p>"You see, Dude, I adjust the frequency until the reactive part of the antenna's impedance is zero or as close as it's going to get to zero. The analyzer shows the impedance as two numbers, the real part of the impedance is the number on the left and the reactive part is the number on the right."</p> <p>"But I thought impedance was just a number of ohms, like fifty-ohm coax. Why does this thing show two numbers?" asked Dude warming up to the project.</p> <p>"That single number is really a combination of these two numbers – sort of a short hand way of writing them. This little meter here on the side shows that number."</p> <p>"Okay, I guess," replied Dude.</p> <p>"Then, why don't you just tune for the lowest possible reading on this meter and skip that part with 'real' and 'reactive' numbers?"</p> <p>"Watch," continued Hambone. "As I change the frequency, both numbers go up and down and so does their combination. The meter doesn't necessarily show its lowest reading when the reactive part is zero or close</p>	<p>to it. That's because the real part has gone up."</p> <p>"I think you're just trying to screw me up with those numbers going up and down and then adding up in some funny way."</p> <p>"No, no," countered Hambone. "It seems screwy, but if you want to understand antennas and feed lines, you've got to learn it. Just remember, it's not the combination of the numbers, or total impedance, we are interested in. We want to know the frequency that causes the reactive number to be zero regardless of what the other number is. That's the resonant frequency of the antenna."</p> <p>Turning back to his analyzer, Hambone continued, "It looks like the resonant frequency is 1.79 MHz. That's close to the 1.82MHz I want. The fact that it's lower than 1.82 MHz means the antenna is too long."</p> <p>"So, you have to shorten it. How much?"</p> <p>I'm sure even you remember that the length of a dipole antenna is proportional to its resonant wavelength. And, wavelength is inversely proportional to frequency.</p> <p>So, we simply take the ratio of the actual and desired frequencies:</p> $1.79/1.82 = 0.9835 \text{ or } 98.35\%$ <p>"There you go again, getting complicated"</p> <p>"It's easy. This tells us that the antenna should be only 98.35% as long as it actually is. When I put it up, I made each leg to be 138 feet long. So, now I need to shorten each one to be only 98.35% of that or:</p> $0.9835 \times 138 = 135.72 \text{ feet long.}$ <p>Hand me that tape measure. I'm gonna fold two feet and three inches more wire back on itself on each end."</p> <p>"Why don't you just fold it all back on one end, that would shorten just as much?"</p>	<p>"Can't do that," responded Hambone. "A dipole is a balanced antenna and that means both sides should be the same. If I make one side shorter than the other it would cause different amounts of current to flow in each half.</p> <p>But the total amount of RF current leaving the transmitter through the center coax conductor must equal the amount coming back to the transmitter through the inside of the shield. Since an 'unbalanced' antenna will force the currents to be unequal, the difference must be made up somewhere."</p> <p>"Isn't that extra current just sent off into the air?" asked Dude.</p> <p>"No, no, no! In any antenna, the current causes the radio waves to be created, the current itself stays in the wires."</p> <p>"Then where does it go?"</p> <p>"It comes back to the transmitter on the <i>outside</i> of the shield. It's still underneath the plastic insulation, but it's on the outside of the copper shield braid. Since it is coming back to the transmitter on the outside of the braid, it eventually ends up on the outside of the transmitter's metal cabinet. That's why you get a shock when you touch the metal knobs. It's called common-mode current."</p> <p>"Are you shittin' me? Are you saying there's one electrical current going one way on the inside of the coax shield--not the center conductor--and a different current going the other way on the outside of that same shield?"</p> <p>"Yes," continued Hambone in his best professorial tone. It's called skin effect. It's too complicated for you to understand, but suffice it to say that RF doesn't travel inside conductors like DC does. Instead, it travels on the surface, or skin.</p> <p style="text-align: right;"><b>see HAMBONE on page 8</b></p>
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<p><b>from HAMBONE on page 7</b></p> <p>That way one current can travel on the inside skin of the shield and a different current can go over the outside skin and they never meet.”</p> <p>“It’s not too complicated, you just don’t know how it works,” countered Dude.</p> <p>“Do too. I know I can minimize it by making both sides of the antenna the same length and putting a choke in the coax.</p> <p>Stop bothering me. Either bring me that ladder or get out of here. I’ve got work to do.”</p> <p>“Yeah, after all that, your SWR is still over 2:1! So much for trimming! Hambone’s folly, Hambone’s folly, Hambone’s folly,” chanted Dude as ran off.</p> <p><b>The Next Week</b></p> <p>“So, Hammy, are you taking down Hambone’s folly before anybody sees your big screw-up?”</p> <p>“Dude, you couldn’t be more wrong. The Jerry Rig antenna worked great! Using only a hundred watts, I made over sixty contacts as far north as South Dakota, as far south as Texas, as far east as Pennsylvania and as far west as Nevada. So, don’t tell me the Jerry Rig 160 meter antenna doesn’t</p>	<p>symmetrical, and it’s hanging on a wooden fence. Hammy’s just making up his contacts because this antenna can’t work.”</p> <p>“Take it easy, Dude. In the first place, I’m pretty sure Hammy made all those contacts. Otherwise, why would he submit them to the contest only to have all of them rejected?</p> <p>In the second place, ham radio is all about experimentation.</p> <p>In the early days of ham radio, nearly all equipment was home made and lots of hams figured out great circuits for receivers, transmitters, antennas and all sorts of other stuff.”</p> <p>“That’s nice.” scoffed Dude, “But how did they know what would work?”</p> <p>“Most ideas didn’t work. And sometimes the hams themselves didn’t really understand the principles behind the ones that did. But they got an idea and tried it.</p> <p>Nowadays, hams mostly buy their rigs. From the ads, you might think that every antenna, tuner, transceiver or whatever is a must-have if you want to make contacts. But they aren’t.</p> <p>Beginners like you and especially new hams are led to think that the</p>	<p>magic of radio is a delicate thing that won’t happen unless everything is letter perfect. They agonize over minute details and don’t seem to ever get on the air. That is a big mistake.</p> <p>You should try experimenting. Antennas are a very easy and cheap place to start. Just string up some wire, hook it to your transmitter and see what happens. If it works a little bit, figure out how to make it better. If it doesn’t work at all – which is a pretty common result – try to figure out why. In any case, you’ll learn a lot. I think experimenting is how the first Jerry Rig came to be.”</p> <p>“Well, Hammy’s antenna was really cheap. He took the wire and coax out of your garage,” countered Dude.</p> <p>“You rat!”</p> <p>“You did!”</p> <p>“Knock it off, you two. I’ve told you before, it’s okay to borrow stuff, but ask me first.</p> <p>Since we’re on the subject, how about you two experimenting with ways to clean the garage? Be sure to sweep out all the dead leaves and then wash the floor. It’s spring cleaning time, you know.”</p> <p><b>&gt;&gt; JCRAC FEEDBACK &lt;&lt;</b></p>
<p>work,” boasted Hambone.</p> <p>“I think you’re wrong, that crappy antenna couldn’t reach that far no matter what.”</p> <p>“Well it did, look at the contest logs.”</p> <p>“Hey boys, what’s the big argument about?” asked their Uncle Elmer as he arrived on the scene with his ubiquitous cup of coffee.</p> <p>“Hi Unck, Hammy says his crummy 160 meter antenna has worked stations all over the place. I say no way!”</p> <p>“Why do you say that?” asked Elmer, trying to defuse the situation.</p> <p>"Easy, just look at it. According to the Antenna Book it's too low, it's not</p>	<p><b>from REMOTE on page 1</b></p> <p>receiver, filters, etc.--remotely. The LPRemote software controls an LPRemote board in Colorado. The board has sixteen relays to turn things on and off and to select antennas. The board has digital and analog inputs for monitoring station status and operation. John has connected a vintage 1500 watt amplifier, tuned to 20 meters.</p> <p>Skype makes the audio connection to a PC next to the K3. Sometimes he uses Teamviewer software to look at a panadapter display.</p>	<p>John uses a PC headset and VOX to transmit. He reports that operating his system remotely works as if he were sitting in front of the K3. He reports that during the February WWIUSA event, his station made more than 2000 contacts at a rate of more than 100 per hour.</p> <p><b>&gt;&gt; JCRAC FEEDBACK &lt;&lt;</b></p> <p><i>Club member Lynn Kuluva, KØIMI offers additional thoughts on remove operations on the next page.</i></p>



## All Mode Remote Operations -- Lynn Kuluva, KØIMI

I found the program at the recent meeting on remote operation very interesting. I have been interested in remote operation for a number of years and always like to see how others are doing it. The three presenters gave us three great ways to go about it and presented them very well. Some questions came up about how to add additional modes to your remote operation. I have been operating digital, SSB and CW remotely and found it not as hard as you might think to add more modes.

I started out some time back with the configuration that **Charlie Van Way, NØCVW** so well described for PSK and other digital modes. If you have digital capability configured with your rig, simply add "remote desktop" software on your home and remote computers and you are ready to go as Charlie explained.

So, how hard is it to make the jump to SSB? You are already 90% of the

way there. I'll share a trick that **Jay Burgherr, NØFB** told me. If you have digital modes running, you already have audio flowing both directions between your transceiver and your home computer. The audio is flowing through your digital interface such as SignaLink USB.

All you need now is a way to get the audio to and from your remote computer. To do that, install Skype on both computers if you don't have it. Just make two changes to the settings in Skype on your home computer: 1) Direct Skype to use the same sound card you use for digital modes and 2) Set Skype to answer incoming calls automatically (this is optional, but makes things easier). Now you are ready to go remote on SSB or even AM or FM as you like. How easy is that?

Okay, so now you want to add CW to your remote operation. If you can copy SSB with Skype as described above, you can copy CW using

Skype. Sending CW adds just a little more complexity. I don't use a key for a couple of reasons – latency being one. I cheat a little and send from my remote keyboard using DM780 just like I do with PSK. This takes one little piece of hardware. You can see the schematic at [www.n3fjp.com/cwschematic.html](http://www.n3fjp.com/cwschematic.html). If you don't want to build one you can buy one for about \$30 from the same web site. Plug one end into a serial port on your computer and the other lead into the key jack on your transceiver. Then make the appropriate settings in DM780 to key the CW through the serial port. Select CW as your mode in DM780 and you are on the air with CW.

That's it. Enjoy operating remote on any mode and from anywhere this summer.

>> **JCRAC FEEDBACK** <<

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

### More HT Adventures

On a ridiculously pleasant February day, Deb and I pulled out reciprocal Christmas presents—a pair of bicycles—and made for a nearby church parking lot. It had been many decades since either of us had attempted to ride. We thought our first attempt should involve maximizing space between obstacles and minimizing the number of spectators. Fortunately, we discovered, that there is a reason people refer to easily-relearned skills as being "like riding a bike". In no time, we were off to the Indian Creek bicycle trail.

Our riding single file made us easy-



to-pass, but inhibited conversation. Occasionally the person in front had to stop and look around to see why the other had fallen behind. Other times, the person in back wanted to propose a route change or rest break. What we needed were small, instantaneous, hands-free, personal communication devices. Cell phones were not practical, but a headset attached to an HT with a PTT button mounted on a handle bar might be.

*Behind the Scenes at THE  
FEEDBACK*

Awhile back, **Tom Wheeler, NØGSG**, submitted the first draft of

his article discussing how to interface microphones to transceivers.

Jaimie Charlton offered Tom a bunch of suggestions.

I responded:

*One (or two) of the stupid little projects I want to do is/are to connect (a) a simple computer headset and (b) a code practice oscillator to an HT. The former will let Deb and me talk as we ride our Christmas bicycles on the Indian Creek Trail. The latter will let me send Morse over an HT.*

**see AMATEUR on page 10**

## from AMATEUR on page 9

*(Yes, I could buy the official ICOM headset, but one does not learn anything by plugging the official ICOM headset into an ICOM HT.)*

Tom responded to Jaimie's suggestions and offered some encouraging words about my projects.

But then:

*Hi Chip,*

*You are right, one doesn't learn anything by just plugging in a commercially made mic. What you can look forward to learning by doing it as you suggest is why people generally just plug in a commercially made mic.*

*LOL! -- Jaimie*

*Jaimie: That was a somewhat-less-than-encouraging observation. -- CHIP*

Jaimie continued with comments about Tom's article observing that

*I still think this is a great subject and when Chip tries his DIY project you will even have some material for comic relief. (Sorry, Chip).*

*Actually, Chip, I don't mind admitting I had a hell of a time trying to figure out how to hook a mic and earphone to my Yaesu FT60 HT. It is way simpler than the mic Tom is hooking up. These things are not as easy to do as they might first appear.*

*Jaimie*

Undaunted, I reply:

*Jaimie/Tom:*

**PROJECT LOG – DAY ONE:**

*I need to do three things.*

- (1) Earphones need to work.*
- (2) Microphone needs to work.*
- (3) Need to wire a switch for PTT.*

*First, stick 3.5 mm connected to earphones into 3.5mm jack. Turn on radio. Hear sound in ears. Well, one ear, actually, but if you're going to be using this on a bicycle, you only want sound in one ear. So hearing in one ear is a "feature" rather than a "bug".*

*I'm one-third of the way there.*

*Pfft. There's nothing to this engineering stuff.*

**CHIP**

### **What Really Happened**

Well, I told Tom and Jaimie that it was "Day One", but "Day One" wasn't really the first day.

### **PROJECT LOG – DAY MINUS THIRTY:**

I always begin with the assumption that my first experiment will destroy something. I went on-line and purchased a couple of ridiculously inexpensive UHF-only Bao Feng 888s HTs. Because I can buy a dozen of the Bao Fengs for less than I paid for the Icom, I think it wise to do my initial experiments on the Bao Fengs.

### **PROJECT LOG – DAY ZERO:**

*The Bao Fengs arrive. I get the computer headset. I open the package and ... there's no place to plug in an external headset!*

Hmm. Perhaps "wise" was not the best possible word to use to describe my decision to do my initial experiments the Bao Feng 888s.

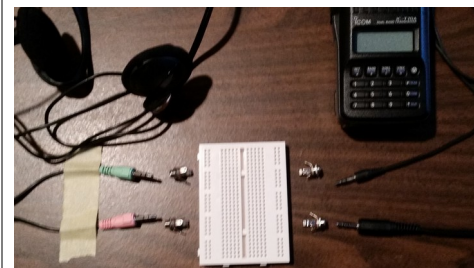
But Tom and Jaimie don't need to know that, now do they?

Back to my experiments ...

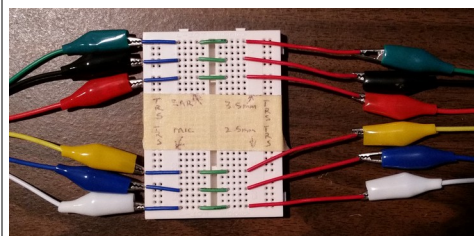
### **PROJECT LOG – DAY TWO**

I can't find anything in my Icom documentation or on-line materials about wiring a mic and PTT for the T70A, but there are lots of diagrams

that suggest that many Icom units use the same scheme for mic and PTT. I need to use a capacitor and a resistor to connect a couple of wires in the mic circuit to give myself PTT capability. How hard can this be?



I have a cheap computer head set with two 3.5mm plugs on my left. I have an ICOM T70A HT with a 3.5mm jack and a 2.5mm jack on my right. Let's use a breadboard to build an interface unit in the middle.



In the picture, the connections just go straight through. Before I connect anything to them, I need to figure out which wire corresponds to what point on the plug and jack. Anyone who knows anything about plugs and jacks could follow a wire to a connection on a jack and determine that connection #1 is the tip, connection #2 is the ring, and connection #3 is the sleeve. (You will note that I used the terms "tip", "ring" and "sleeve" as if I knew what I was talking about. NOW, I do. Thank you Wiki.) I, however, am not that person. Besides, I have a pretty new orange multi-meter I'm dying to try out.

**see AMATEUR on page 11**

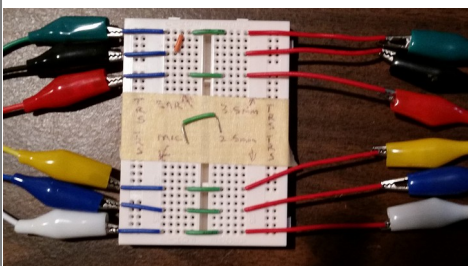
### **from AMATEUR on page 10**

Continuity testing is pretty easy to do. I'll spare you the blow by blow and just tell you that I plugged a 3.5mm cable into a 3.5mm jack and tested each of the three jack pins against the tip, the ring and the sleeve of the plug at the other end of the cable. When the resistance was something other than infinite, I knew that I had matched the pin to the appropriate place on the plug.

I know (see PROJECT LOG – DAY ONE, above) that the 3.5mm jack on the HT is audio. Audio works in one (I'm going to call it the "right") ear when I plug the headset audio plug into the HT. I would expect the same thing to happen when I plug the headset and HT into my interface unit. It does. [Whew.]

But why don't I get sound out of both ears? In turn, I disconnect each of the three wires from my interface. Tip and sleeve carrier the current. Disconnecting the ring does not affect the audio. Might the HT be supplying one channel of audio through the "tip" and the headset be looking for left and right audio channels through the "tip" and "ring", using the "sleeve" as a common ground?

This will be easy to test. I put a little jumper on my interface so that audio channel from the HT goes into both the tip and ring wires into the headset.



I turn on the HT and ... there is no change. Audio in the right, but not the left, ear.

Oh well. Working in audio in one ear is all I really need. I decide that working on the mic and PTT are more important to my project than getting sound in the second ear.

OK. If the 3.5mm jack on the HT is audio, the 2.5mm jack is extremely likely to be mic and PTT. I plug a 2.5mm end of a 2.5mm to 3.5mm cable into my HT and connect the 3.5mm to my interface unit. I don't add the capacitor or resistor. This is a straight through connection. I turn on the HT ... and the meter on my HT shows maximum output. Oops. I wonder what I was transmitting. I add the capacitor and resistor to circuit, per the diagram. I disconnect one wire to simulate the PTT button. I'll touch the wire to the terminal to complete the PTT circuit when I'm ready to talk. I turn on the HT and, before I engage my touch-the-wires PTT, the HT meter shows maximum output.

At this point it occurs to me that I should probably be doing my testing on something other than the input frequency of the club 2m repeater. (To anyone monitoring the repeater that Saturday morning ... uh, sorry.)

My HT has a setting for the NOAA weather radio channels. I discovered—you'll just have to speculate as to HOW I discovered—that if try to transmit on top of one of the NOAA channels, the HT displays "OFF" and refuses to transmit. This looks like a good idea: let the HT the block the transmission of my mistakes.

My situation is that the mic isn't working the way I expect it to work. I look down at the headset and notice there the wires have some controls—a push button and

a knob—on them. Might that be a PTT button? I connect things in a variety of configurations and cannot see that the button does anything.

I resolve to run a similar set of experiments with the knob in different positions. I wonder whether the knob is full-on or full-off. I move the dial to the middle position and turn on the HT. It turns out that the knob had been in the full-off position. Sound—whose volume varies with the knob position—comes from the previously silent left earpiece.

At this point, readers have more minutes—and I have more hours—invested in this project that we would care to admit, so let's wind up today's installment with a series of:

### ***Lessons, Speculations and Observations***

- (1) As Hambone's Elmer observes elsewhere in this issue, most experiments end in failure.
- (2) I'm working with too many unknowns. I don't know what my headset demands/supplies. I don't know what my HT demands/supplies. I could (and, in retrospect, should) have attached the computer headset to a computer soundcard and tested voltages and current on my computer headset.
- (3) Another term for "working with too many unknowns" is "pervasive ignorance".
- (4) I have, although I would never confess this to Jaimie, learned why most people "generally just plug in a commercially made mic".
- (5) I have not yet begun to fight.

**>> JCRAC FEEDBACK <<**