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

FEEDBACK

JULY 2016

JCRAC Field Day Summary

Bonus Points:				
100% Emergency power				400
Media Publicity				100
Public Location				100
Public Information Table				100
Formal message to ARRL SM/SEC				100
W1AW Field Day Message				100
Formal messages handled - No.=10				100
Natural power QSOs completed				100
Visit by invited served agency official				100
Youth participation				100
Youth participants=22				
Submitted via the Web				50
Educational activity				100
Social media				100
Safety officer				100
Total Bonus Points				1,650
QSO Points:				
	CW	Digital	Phone	Total
Total QSOs	651	247	1312	
Total Points	1302	494	1312	3108
Power Multiplier				x2
Total QSO Points				6,216
Total Score				7,866

JULY MEETINGS

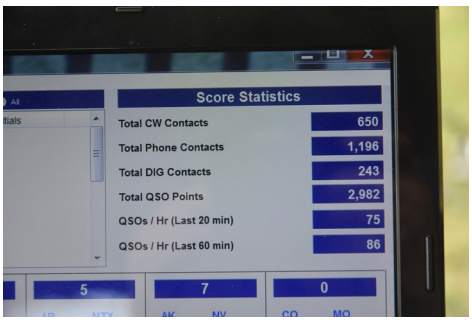
***June 8** -- Field Day Debriefing*
***June 22** – TBA.*

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.

IN THIS ISSUE



-> FEEDBACK <-

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

Bill Gery, KA2FNK, President

Aaron Boots, AAØRN, Vice President

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All email addresses are available at w0erh.org

KEØIDD

KEØIUE

NØGMD

N9GB

Sheldon

FIRST TIMERS

Please welcome our first time visitors for June.

Top row: Patrick Davidson, KEØIDD; Jonathan Otsuka, KEØIUE; John Crutchfield, NØGMD;.

Bottom row: Greg Best, N9GB and potential ham Sheldon.

PRESIDENT'S CORNER

Field Day 2016 is over and we have submitted the paper work to ARRL. Numbers were the best

I have seen since I have been submitting the report. As with past years there is a large list of persons that put in the extra effort that resulted in a successful Field Day for the club

Jay Greenough, WJØX, did a great job with coordinating the event again this year. The networking of the stations log was watched over carefully by Bill, KC4TKL. **Brian Short, KCØBS**, served as the head coach for the GOTA station. There was standing room only at times in the Salvation Army communication vehicle. Eleven persons visited **Norma Libby, WØKC** and her testing team. **Barbara McKinney, KEØEGG**, **Vince Sabia, KEØCGR**, and Jay worked on the food for Saturday evening. Barbara made sure that we had dessert to top off a good meal.

No rain again this year, but the temperatures and humidity made for some stress. For those that camped out Friday night the air was really close overnight. We had plenty of water to keep hydrated which really helped I know Sunday afternoon we all were feeling the heat. I was glad that I took leave Monday to recover. I really needed it.

– Bill Gery – WA2FNK

Johnson County Radio Amateurs Club - June 10, 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 May 27, 2016 were accepted with 1 opposed vote.

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

Cash on Hand	$ 109.20	Repeater Operating Reserve	$ 784.44
Checking Account	$ 582.43	Memorial Fund	$ 310.00
Savings Account	$ 9,799.94		
Total	$ 10,491.57	Active Members	157

Old Business:

- Welcomed 5 1st time visitors to tonight's Club meeting.
- Repeater Update – All Repeaters are working well, however the 145.29 Repeater's cooling fan is not working properly. Temperature inside the cabinet was 127°F. Bill Brinker, WA0CBW will work on replacing it.
- Field Day 2016 – June 25-26 at the Observation Tower in Shawnee Mission Park.
- The Club has the opportunity to purchase a second Military Type push up mast from the gentleman that sold us the first one for no more than $500. A motion was made to purchase this second push up mast. The motion was seconded and passed with a unanimous vote.

New Business:

- Herb Fiddick, NZ0F approached the Club about the possibility of negotiating an agreement with the Ararat Shrine Amateur Radios Club for the cooperative use of their trailer mounted tower. Details include:
  - JCRAC will make an initial one-time payment or equivalent in-kind donations to the Shrine of up to $500, the exact amount to be negotiated.
  - JCRAC will make annual payments and/or equivalent in-kind donations for continued use of the trailer on Field Day and at least 3 other times per year. The annual payment to be negotiated and shall not exceed $250/year.
  - JCRAC will provide insurance coverage on the trailer covering liability, loss, or damage while the trailer is in possession of JCRAC.
  - The Ararat Shrine will retain ownership ofthe trailer and provide storage for it.
  - The Ararat Shrine will maintain the tower in good condition and pay any annual registration fees and/or taxes.
  - A motion was made to have Herb NZ0F and Bill, KA2FNK negotiate an agreement with the Ararat Club. The motion was seconded and passed with a unanimous vote.

Reports:

- 6 m – None.
- 10 m SSB Roundtable – 7 participated.
- 440 Wheat Shocker net – 14 Check-ins on June 8 and 7 Check-ins on June 1.
- 2m Wheat Shocker net – 24 Check-ins on June 9 and 14 Check-ins on June 2.
- HF Activity – Cuba on 40m.

Announcements:

- Johnson County ARES meeting Monday June 13 – presentation on Fusion Repeaters.
- 442.600 and 146.91 Repeaters are connected via Wires X.
- New DMR Repeater on 443.100
- UHF Shootout the 2nd meeting in August (August 26).
- Watch Larry's List for upcoming events.

Business meeting adjourned at 8:16 PM

Program: The Program for this meeting was a planning session for Field Day.

Johnson County Radio Amateurs Club - June 24, 2016

The meeting tonight was held at the Field Day site (Observation Tower at Shawnee Mission Park).

Although there was no formal meeting, one order of business was discussed

New Business:

- A request was made by Calvin Lewandowski, KCØCL, Treasurer that he be allowed to switch to a different bank for club funds. The reason given is that the current bank, The Mission Bank, does not supply debit cards for businesses and that the club has need for a debit card to be used to support subscription services that require either a credit or debit card number such as web hosting and Online QuickBooks. A motion was made and seconded. The vote was unanimous to allow Calvin to select and move the club's funds to a new bank.

Experiences with Solar Power -- John Raydo, KØIZ

As cost has come down solar panels are becoming more popular. Applications include power backup, QRP excursions, Field Day, and so forth. At my Colorado home I have had a solar backup system for seven years. My system includes four 130 watt panels in series, a MPPT controller, six GC-6 golf cart batteries, and a 1.25 KW inverter.

The open circuit voltage of a single solar panel is about 21 volts. Loaded voltage is about 17.6 volts. Since most all ham gear is rated for nominal 12 volts (13.8), a solar panel should never be connected directly to such equipment. Immediate equipment failure will likely result from the application of 21 volts.

What this means is that either a battery or some type of controller is needed to prevent over voltage.

A solar panel is a current device, not a voltage device. The panel will try to maintain its rated current regardless of load. Suppose we have a panel rated for one amp current (in full sun light). What will happen if we connect the panel to a 12 volt battery that is nearly discharged? One amp will flow from the panel to the battery. The output voltage of the panel will match the battery voltage (which I am assuming is 12 volts for this simple example). Power (current of one amp times battery voltage of 12 volts) is 12 watts.

Suppose we short the output of the panel. Bad news? Nope. Only one amp will flow through the short circuit. The panel will not be damaged in any way. The panel output voltage will match the load, i.e. zero volts across the short circuit. Power (current of one amp times voltage of zero) is zero.

Solar panel power rating is based upon loaded voltage (typically 17.6 volts). Suppose we have a 15 watt panel. 15 watts divided by 17.6 volts is 0.85 amps. If we connect our panel across a 12 volt battery we only get 10.23 watts from our 15 watt panel (0.85 amps times 12 volts). Bummer! Remember, solar panels are constant current devices.

How about solar controllers? Are they needed?

Maybe, maybe not. Suppose we have a very small panel being used to trickle charge a fairly large battery. The possibly of overcharging is slight. A controller is a waste of money and actually uses of some of our meager solar power.

Another instance where a controller is a waste of money is an application like field day or a QRP excursion. With a small or modest sized panel and a radio as a load, there is little likelihood of overcharging.

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from SOLAR on page 4

A small battery with a medium or large panel needs a controller. A UPS type setup may have little or no load for extended time. In either instance overcharging is a definite possibility.

There are two types of controller. The simplest (and cheapest) controller monitors battery voltage and acts like a variable resistor between the solar panel and battery. Cheap but inefficient. The controller is throwing away the voltage difference between 17.6 volts and our battery volts. In the example above, we only got 10.23 watts from our 15 watt panel. Adding the cheapo type controller we still only get 10.23 watts (now actually a little less since the controller uses some power).

The better, newer type of controller is called MPPT (*Maximum Power Point Tracking*). This microprocessor-controlled unit converts the 17 volts down to what is needed. This actually increases the available current. Using the example above, the nominal .85 amps @ 17.6 volts (the rated 15 watts) becomes .85 x 17.6/12 = 1.25 amps at 12 volts . Deduct a little to power the controller and we get about 30% more power from our panel. That's the beauty of MPPT controllers.

A solar panel naturally needs the sun.

What angle should the panel be positioned for maximum power (i.e. maximum sun)? Kansas City is at latitude 40 degrees. The panel should be angled 40 degrees up from horizontal. Faced due south, the panel will point at the sun at noon (CST) on March 21 and September 20.

During summer the sun is higher in the sky and the panel should be angled progressively lower (25 degrees from horizontal on June 21st). Conversely, during winter the sun dips lower and the panel should be higher (55 degrees from horizontal on December 21st). In other words, the best panel tilt is 40 degrees plus/minus 15 degrees from horizontal.

Can't remember the angles? At the equator on March 21/Sept 20 the sun is directly overhead. Equator latitude is zero. Panel is zero degrees from horizontal.

As the sun moves across the sky the panel should be repositioned to continue pointing at the sun. At solar noon (about noon CST in Kansas City), point due south. A 15 degree error pointing (either up/down or sideways) will reduce panel output by 20 percent or so.

Daylight is much longer in the summertime vs. winter. So we should get several more hours of power from our panel. Right? Probably wrong!

The sun crosses a much wider angle across the sky during the summer. If our panel is fixed in position much of the additional sunlight will come from behind the panel or at extreme angles to it. Virtually no power. However if we manually reposition the panel throughout the day we will get more hours of power.

Output power also falls off dramatically with reduced sunlight. Even a little shade on part of the panel will probably reduce current by 2/3 or more.

N3PDT makes the July CQ

John Raydo writes to observe that the July CQ magazine has an extensive article entitled *W7P: The "Year of Pluto" Special Event.* Lowell Observatory celebrated the 85th anniversary of Clyde Tombaugh's discovery of Pluto. Tombaugh's nephew, JCRAC member **Doug Tombaugh, N3PDT**, served as a guest operator for W7P and is shown operating his uncle's telescope.

Ham Jeopardy Beats Hambone

A Hambone story by Jaimie Charlton, ADØAB

"I don't care what anybody says, those questions were rigged. Everybody knows that stuff and everybody knows I was right. That's the last time I'm gonna play that stupid game."

"But Hambone," countered his younger brother, Dude, unsure of which he relished more. Hambone's public defeat or Hambone's whining and sniveling afterward. "You said that a ham radio version of the TV program 'Jeopardy' would be fun and increase interest in the hobby.

You arranged for the local clubs to send their best hams to compete.

It was you who arranged for Professor Bunzen J. Bernier, a ham himself, to write the questions and answers. In fact, you even got Mr. Trebek from the real TV show to host the event.

And, it was you who chose yourself to represent our club even though that turned out to be a bad choice.

So Hammy, why are you so upset?"

"Don't push me, Dude! You know those final two questions were designed to trick me."

"But Hammy, how can that be?" inquired Dude in his most sarcastic voice. "The other contestants got them right. Do you suppose that Professor Bernier made those questions about stuff he knows you don't know? Or, maybe you only think you're smart and don't really know much about anything. Or was it some trick by Alex Trebek?"

"Whoa!" said the boys' Uncle Elmer as he walked up dodging an empty in-flight soda can originally destined for Dude's head. "What's the big fight about?"

"I was screwed in the Ham Club Jeopardy game, that's what," whined Hambone.

"No he wasn't, he lost fair and square."

"Was too!"

"Okay, okay, tell your ole Uncle Elmer what happened."

Calming down, Hambone explained, "I was in the final round of questions with two hams from other clubs and the topic was impedance. We had only two questions to go and the winner would be champion."

"Yeah, and Hammy blew both of them!" added Dude.

"Shut up!

The emcee asked, 'If a load impedance of 50 ohms is connected to a 50 ohm coaxial cable, is the SWR always going to be 1:1?' I said yes because both the load and the cable have the same impedance."

"BUZZZZZ," added Dude, making the sound of the wrong-answer buzzer on the TV program.

"The other contestants said no and the emcee agreed with them. I didn't agree, but I let it go."

"Okay, what was the second question?"

"For the second and final question the emcee asked, 'what output impedance of an RF amplifier will result in the least loss in the amplifier when driving a 50 ohm resistive load?'

"I said that 50 ohms would be best.

Dude, don't …!

The other contestants said zero ohms and the emcee agreed with them.

I should have won. That nasty professor and that emcee tricked me."

"From what you've told me, I don't think they tricked you," purred Uncle Elmer. "You've just been getting sloppy in your understanding of simple electronics.

Take that first question, for example. You forgot that you only get a 1:1 SWR when the 50 ohm coax is terminated by a 50 ohm *resistive* load."

"Isn't that what the emcee asked and what I said?" responded Hambone.

"No, the emcee said *impedance* and impedance can have both resistive and reactive parts.

Remember, impedance is a complex thing, that to be expressed completely must be written:

$Z = R \pm jX$ ohms

But, we usually simplify things by using only the magnitude of the impedance which we further simplify by leaving off the vertical lines around the letter, Z, which indicate we mean magnitude:

$$Z = |Z| = \sqrt{R^2 + X^2}$$

see HAMBONE on page 7

from HAMBONE on page 6

Where:

Z = common way to write the magnitude of the impedance in ohms but, mathematically really means the actual complex impedance, not just its magnitude

$|Z|$ = the mathematically correct way to write the magnitude of impedance

R = Resistance in ohms

X = Capacitive or inductive reactance in ohms

j = $\sqrt{-1}$ The letter, j, indicates which part is the reactive part of impedance

As you can see from the formula, there are a lot of different values of R^2 and X^2 that would give $|Z|$ or Z = 50 ohms. But, only when $X^2 = 0$ do you get a perfect match and SWR = 1:1.

You just assumed that there was no reactance, but you assumed wrong."

"Remember, Hammy," added Dude. "The word assume can make an *ass* out of *u* and *me*."

"Of course I remember that formula, but I don't get how there can be a lot of different values."

"Suppose you have an antenna that is a little too short for your operating frequency. Your analyzer might show R=40 ohms and X= -30 ohms. That means your antenna looks like a 40 ohm resistor and a capacitor whose reactance is 30 ohms connected in series," Elmer explained.

"Whoa! How can you have negative ohms?" Interrupted Hambone.

"The minus sign just tells you the reactive part looks like a capacitor. A plus sign would mean it looks like an inductor," added Dude, anxious to rub more salt in Hambone's wounded pride. "Everybody knows that!"

Unfazed, Elmer went on, "You want to find the impedance of that load so, you plug those numbers into the formula above and get:

$$Z = \sqrt{40^2 + \left(-30^2\right)}$$

$$Z = \sqrt{1600 + 900}$$

$$Z = \sqrt{2500}$$

Z = 50 ohms

Well, look at that! It's 50 ohms.

Do you think that's a good match for a 50 ohm coax and would give a 1:1 SWR if you hooked it up?" asked Elmer.

"Of course, why wouldn't it?" asked Hambone.

"I think so," added Dude. "Someplace in the Antenna Handbook it says that if your load impedance is a match for the coax impedance you will have an SWR of 1:1."

"You are both WRONG!" Said Elmer. "The actual SWR would be nearly 2:1."

"But the book says …" countered Dude.

"Read the book more carefully. Somewhere it says something to the effect 'if your load impedance is a conjugate match to your coax characteristic impedance you will have an SWR of 1:1'. Conjugate means that if the reactive part of the coax impedance is inductive, then the reactive part of the load (antenna) must be capacitive so they cancel each other out and vice versa."

"But isn't the characteristic impedance of any coax purely resistive?" asked Hambone.

"Yes, and that's where the problem comes in and why your answer was wrong. Remember, the reactive parts of both the coax impedance and load impedance must be equal but opposite (capacitive versus inductive) so they cancel each other out.

Since the coax characteristic impedance has zero reactive part (it's pure resistance), the load – antenna – must also have a zero reactive part. If it doesn't, the reactive parts can't cancel each other out.

Another way to look at it is, it's the job of the antenna to absorb, or radiate, all the power sent to it. That's what the R part in those formulas does. But if the antenna is somewhat capacitive or inductive, that is, the X part is not equal to zero, it can't do that."

"Why?" asked Dude.

"Because capacitors and inductors only store energy and return it later. In a sense, that energy is rejected by the antenna and goes back down the coax as reflected power and raises the SWR. As a result, even if the antenna's impedance is fifty ohms, if that fifty ohms includes some reactance, you still get standing waves."

"Yeah," mused Hambone, not certain if he believed his Uncle who may have been in cahoots with his professor buddy. "A formula is one thing, but real life is another. Where is this of any use?"

"Okay, let's suppose you have that antenna that is a little short for the frequency you want to operate on."

"That means it would appear to be capacitive, right?" asked Dude.

"That's right," said Elmer. "We run into short antennas all the time, especially with mobile installations. So, what do we use to make them match our transceivers?"

see HAMBONE on page 8

from HAMBONE on page 7

"Loading coils!" shouted both boys in unison.

"Right!" cheered Elmer. "We put loading coils on those short antennas to cancel out the capacitive part of their impedance and get a good match for the coax. Some people call it 'tuning' and some companies call the extra parts 'resonators', but whatever you call it, the idea is to cancel out the antenna's reactance."

"I knew that," mumbled Hambone.

"But what about that amplifier question. Everybody knows we always want to match the load to the transmitter."

"But what about that amplifier question. Everybody knows we always want to match the load to the transmitter."

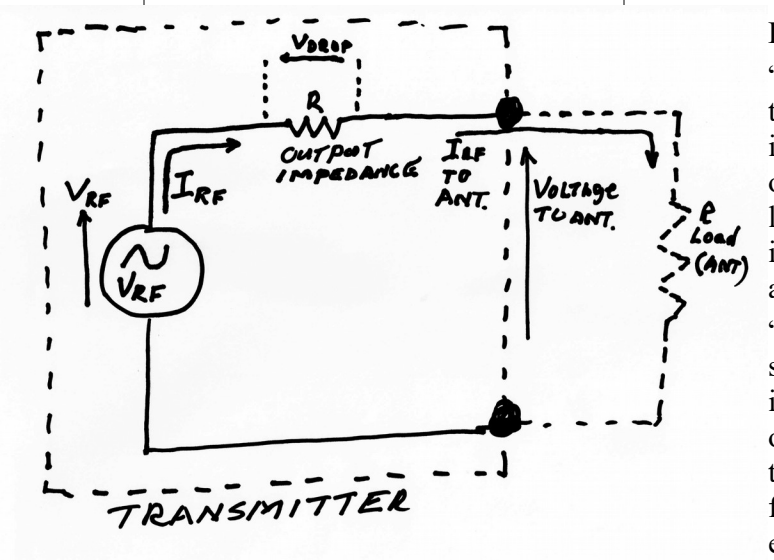
"Here again, you didn't listen to the question. In the question, the load was fixed at fifty ohms and you were adjusting the output impedance of the transmitter for least loss."

"What's the diff?" asked dude.

"The 'diff' is," continued Elmer, "To have the least loss in the amplifier, you want to reduce its output impedance to as low a value as possible."

"But," countered Hambone, "doesn't least loss in the amp mean maximum power sent to the load? After all, if the power is going to the load–which is really the antenna – it isn't getting lost in the amp."

"These are really two different things," replied Elmer digging out his ever-present pocket sketch pad. "Here is a super simplified view of what's inside the output stage of your transmitter. This is sometimes called an equivalent circuit because it is functionally the equivalent of the real circuit, but without all the parts.



The transmitter is what's inside the dotted box. First, is the source of RF power. It's the circle with the sine wave in it. It's not a separate part inside the transmitter, but it is the result of all the transmitter parts. It provides the RF voltage and current that eventually go to the antenna.

The next item is R, which represents the transmitter's output impedance. Again, this is super simplified. There is no actual R. Like the RF source, it's the result of all the design decisions and parts selections made by the originator of the transmitter. This is the item the question was addressing."

"Yeah Unck, I get the equivalent circuit thing. But everybody knows to get maximum power out of a source, like the transmitter, the load impedance must match the output impedance."

"Hammy, listen, you're still not getting the question."

"He never listens!" added Dude. "He's an alligator, all mouth and no ears."

Ignoring Dude, Elmer continued, "The question did not ask about transferring power, it asked about minimizing loss inside the transmitter. So, in this drawing, what is the only source of power loss inside the transmitter?"

"I guess it must be R," answered Hambone, wary that this might be a trick question.

"That's right. How do you find the power lost in R?"

"Well, we know the RF current, I_{RF}, so I guess the power lost would be:

$$P_{lost} = I^2R$$"

"Right again!" cheered Elmer. "Now for the big finish. Since it makes no sense to stop I_{RF} by turning the transmitter off, what is the only other way to minimize that power loss?"

"Minimize R!" shouted Dude.

"And since R is the transmitter's output impedance, the lower the output impedance the lower the power loss inside the transmitter," added Hambone.

"By Jove, you've got it!" said Elmer. "In fact, this is the very reason that the output impedance of most transmitters is lower than fifty ohms. Most hams erroneously think that because their transmitter is specified to drive a fifty-ohm load, its output impedance is also fifty ohms."

"Yeah, but I still hate losing like that," moaned Hambone.

"You lost because you assumed too much. Don't let it happen again. Next time, be sure you understand what's actually going on. Don't just repeat what you've heard because it sounded good. EVERYTHING in electronics is logical and makes sense if you understand the basic principles," admonished Elmer waving his cold coffee cup for emphasis as he walked away.

>> JCRAC FEEDBACK <<

The Amateur in Amateur Radio - Chip Buckner, ACØYF

Worrying About Radio in Other Hobbies

The technical problem was to select the appropriate antenna to ensure simultaneous, uninterrupted reception from thirty-two transmitters. Each transmitter had its own frequency somewhere between 500 and 698 MHz. The transmitting antennas consist of three-inch (roughly 1/8 wavelength) moderately-flexible wire whip antennas. The transmitting units moved with unpredictably changing polarities relative to the receiving unit. The good news was that the transmitters would always be within a sixty degree beamwidth and would not be more than 50 wavelengths from the receiving antenna. Further complicating the challenge, however, the signal from the 0.05 watt transmitters would frequently have to pass through one or more people before reaching a receiving antenna.

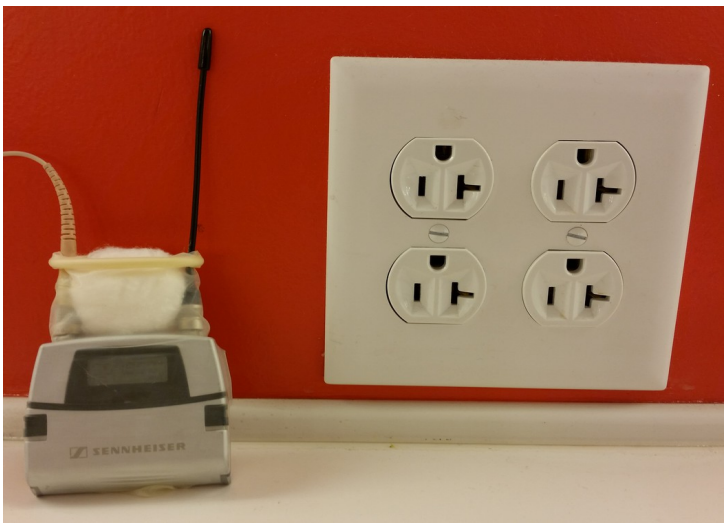


Figure 1: The transmitter the author used on Field Day.

Radio Transmitters in Theater

Regular readers may remember that I missed Field Day because I was at the other end of Shawnee Mission Park, on stage in a production of "The Drowsy Chaperone". It will not surprise those readers to learn that the physical domain of the radio reception problem was the stage at Shawnee Mission Theatre in the Park. Nowadays (largely excepting opera) virtually every theater of any size uses puts wireless UHF microphones on performers. The transmitter sits inside a waterproof barrier (it's a condem, if you care) inside a cloth bag that is attached to the performer with an elastic belt. These are typically worn about the waist or chest. Figure 1 shows such a microphone. The cotton ball on top of the transmitter provides—depending upon whom you ask—additional moisture protection or a bit of support for the microphone and antenna connections. The technical specs call for 5.5 hours at “high” power (50 mW) operation on an AA battery.

The trick to making this work is likely to be the receiving antenna. It needs to work with signals of unpredictable polarity, over a broad range of frequencies, in a relatively confined area. I am certainly not qualified to give anyone an exhaustive analysis of optimal antenna design, but the problem was such that I found it interesting to consider what was done and what might have been done.

Frequencies

Let's start with the frequency problem. This particular set of frequencies corresponds to what some of us remember as being UHF television 19 through 52. Those of us who grew up in Kansas City with KCET (now known as KCPT 19) will remember the 7 3/4 inch diameter loop antenna that attached to our television sets. When channels 41 and 50 set up shop in town, the loop continued to work fine. Sort of. The loop was strongly bi-directional. When there was only one UHF station in town, you could set it and forget it. Because the new stations transmitted from different locations, changing channels meant adjusting the loop.

My neighborhood was close enough to the UHF stations that a well-aimed loop offering (what I have read is) 0 to 4 dBi gain was all we needed. My friends in the far-away suburbs of Leawood and Overland Park had antennas on their roof. I won't pretend to remember what people used forty and fifty years ago, but WIKI tells ms that rooftop antennas were commonly a combination of log-periodic dipole arrays for VHF and a Yagi for UHF.

I'm a bit surprised at the use of Yagi's for UHF television, in that the most efficient reception occuprs within a couple of percent of the center design frequency. I suppose, however, that if the transmitter is putting out something on the order of 55 kilowatts,

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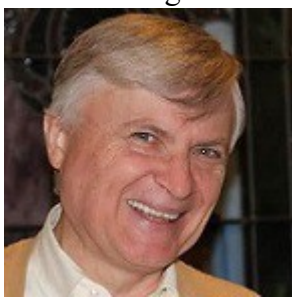
from AMATEUR on page 9

the system can handle a bit of inefficiency at the receiving end.



Polarity

Commerical television signals--once again, on the authority of WIKI--are horizontally polarized, which corresponds with my observation of what sits on Johnson County rooftops.. Horizontal polarity isn't going to work on stage, though. Performers are typically standing, which would mean that the transmitting antenna worn on the back would run parallel with the performer's waist. If the receiving antenna were facing forward and the antenna were at the back of the house, all would be well. As soon as the performer turns to the right or left, however, he is aiming the tip or base of the antenna to the receiving antenna, which ought to pretty nearly eliminate communication.

Vertical polarity would be a better choice. A performer wearing an antenna oriented vertically could spin about without affecting vertically polarized antennas, whether at the back of the house (which is the case at "The Barn Players" in Mission, KS) or in the wings (which is the case at Shawnee Mission "Theatre in the Park"). Unless, of course, the performer sings or recites lines while reclining, in which case he is once again going to create polarity problems for the receiving antenna.

Eddy Paul, KYØF, and the "Hams in Space" satellite-tracking guys have faced and solved the varying polarity problem. Satellites tumble through their orbits. There is no telling which way a satellite's antenna will be aligned at any particular moment. If the transmitter and receiver are both oriented the same way, the communication will work well. If the transmitter and receiver are oriented in different ways, the communication will be dreadful. Rather than have a signal bops from good to dreadful and back, the satellite guys go for "good enough" all of the time. The satellite guys typically use crossed Yagi's (two yagi pointed the same direction, but constructed so that one rotated on its beam 90-degrees relative to the other) to send and receive circularly polarized signals. We'll skip over the "handedness" of circular polarity and just say that a circularly polarized receiving antenna is going to be "good enough" no matter which way the satellite--or the actor--is facing.

But, for whatever reason--it may be the narrow frequency range or the narrow beamwidth or something else that hasn't occurred to me--I have not seen Yagis' (traditional or crossed) used in local theater.

On either side of us, the transparent polycarbonate cylinders looked down from the two towers. Inside the twelve-inch cannons, a menacing copper helix wound downward, aimed right at us. Pointing up, I asked my ten-year old companion what he thought they were.

"Death rays", he intoned, somberly.

Although I have seen performances that might deserve an on-stage death ray, the audio tech guy at Shawnee Mission Theatre in the Park confirmed my suspicion that these were, instead, antennas to pick up the on-stage wireless microphones. Although I had a variety of questions about things like bandwidth, beamwidth, gain, polarity and rejection, the audio tech guy had but one answer for me. "I like the power", he said.

I like the choice. Helical antennas, which use circular polarity, are often used to communicate with random-polarity satellites. They are

wide-bandwidth, usable from 3/4 to 4/3 of their design frequency, which means that a helical designed for 600 MHz will easily cover the range from 500 MHz to 700 MHz. The sound guys at the Park use a pair of them. I started to ask about whether the signals were combined or selected, but decided I wasn't likely to get a knowledgeable answer.

What do you think? Did the techs make a good choice?

Do you have a non-radio hobby that uses radio communication? Does that radio system make sense?

see AMATEUR on page 11

Hunting for pre-Field Day chiggers at Shawnee Mission Park.

A towering achievement.

from AMATEUR on page 10

Backstage, in the men's dressing room at Shawnee Mission Theatre in the Park's production of *The Drowsy Chaperone,* I was catching my breath and--quite literally--cooling my heels after a high energy dance number and an up. A fellow performer was leafing through the program. "Are you in to amateur radio?", Steve asked.

I was a bit taken aback, as this is not a typical backstage banter. I had forgotten that I had listed radio as being an interest of mine in my bio for the program. "Yup", I said.

"I'm KTØB", Steve continued. He told me that he had been active for years but that, of late, he had done more theatrical work than radio. We chatted about the club. He asked about people he remembered. I knew some. I didn't know others.

"You know, tonight is Field Day. The club is in the Park."

"Really? I bet they're out by the Observation Tower".

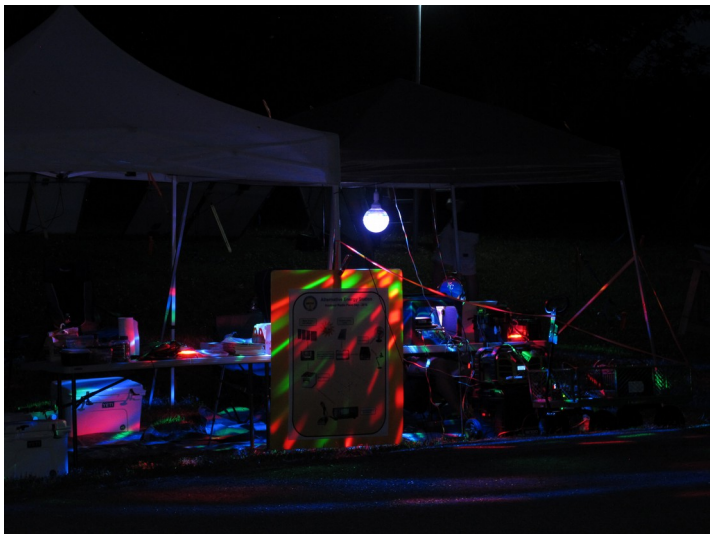
We talked about dropping by after the show, but the closing night cast party ran late and Steve had other things he needed to do in the morning. (I, incidentally, DID go to the site. I delivered left-over Minsky's cast party pizza at 2:00 a.m. But did *I* get a mention in the President's Corner?)

It took no effort (and only two words of my forty-word program bio) to mention my amateur radio hobby. At least one person noticed and asked me about it.

Do the people with whom you work and play know of your radio hobby?

>> JCRAC FEEDBACK <<

Norma Libby, Larry Staples and friends - Photo by NØCVW



Three views of the Wheeler/McKinney solar-powered station. Photos by NØGSG.

John Morse, NØEI, wanted to be sure that everyone knew that, although he made an effort to get to the food line "before the vultures tore into the food, but" failed because "you can clearly see who is staged at the beginning of the line". Photo by NØEI