The Repeater

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WX4BCA 147.285 + (131.8)

Amateur Radio Club of Butts County

Jackson, GA

USA

Health Department Antenna Party

In between Mother Nature's lovely tornado watch on Thursday night, and sunny skies of the weekend, a few of us gathered on Friday morning to heft the Health Department's antenna by several feet. With assorted ladders, an SUV deckful of tools, a roll of coax, and the military retiree coffee cup security blankets in hand, we lowered the old antenna, got the new one put together, painted, and remounted, all without a single mishap -- lightning strike or otherwise.

With the new antenna about six feet higher than the old set-up, not only is the radio getting 'out' now, but Buzz talked with someone in Rome, GA, via the Stone Mountain repeater. ('Hallelujah') Next, Buzz was able to contact someone at Robins Air Force Base, through the Macon repeater -- another repeater which has alluded us, thus far. (Insert 2nd chorus of 'Hallelujah'.) This means our emergency communications coverage includes much more of the state now.

Photo by Nancy Phillips 03 August 2018

The Antenna Party was deemed a highly successful event! Extra thanks go to the ladder boys! We then rewarded our grueling and dangerous work at the Lunch Box.

L to R: Ken Wallis, Chuck McCord, Buzz Kutcher, and Mike Crowe.

Nancy Phillips
Editor
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Whit's Wisdom

Whit Smith - WA4VBX

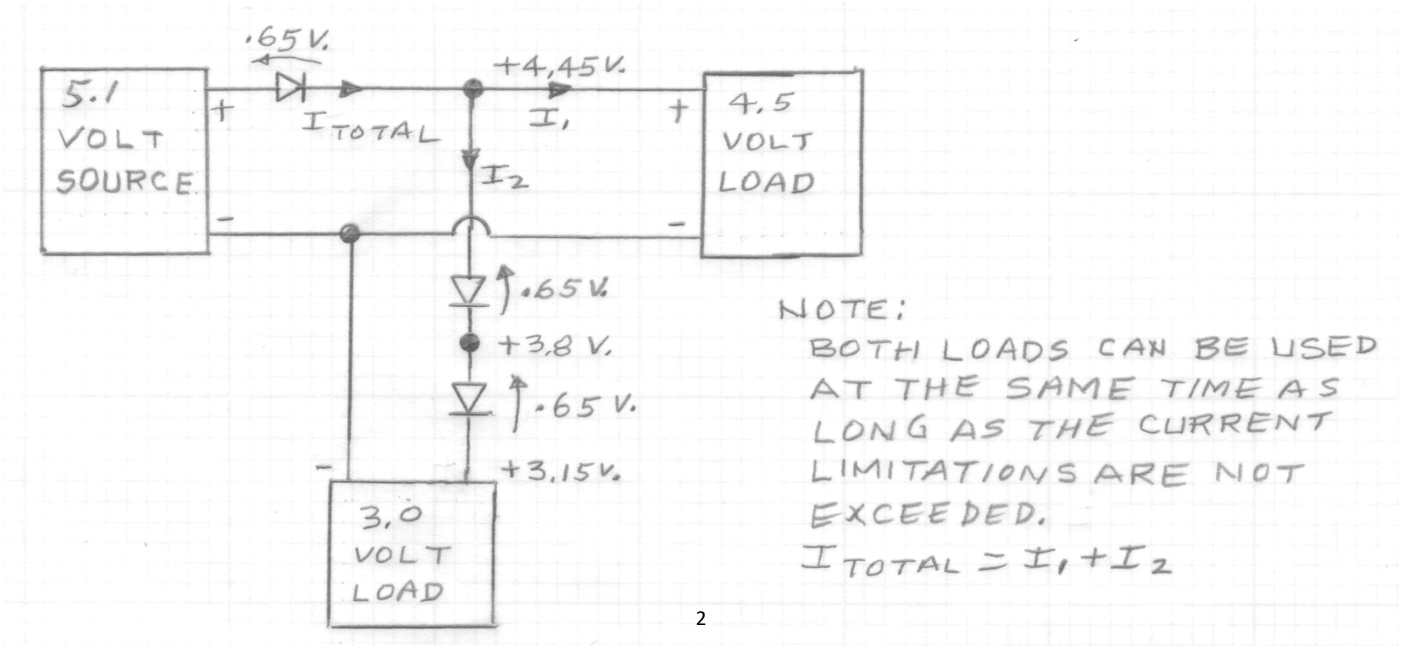
Remote Actuated Alarms

I have an alarm that has a remote activation feature. Both the alarm and the remote operate on batteries. Being battery operated has its advantages, but it also has its disadvantages. If the alarm and the remote are near a receptacle, a 120 volt (AC) battery eliminator can be made.

In the December 2016 issue of the Repeater is an article providing for a battery eliminator for a device that requires a 9 volt battery. The remote listed above used a 9 volt battery. Using the parts that were on hand, the battery eliminator consisted of a 8.71 volt zener diode, a 68 ohm 2 watt resistor, and a 10 mfd (microfarad) capacitor. The unit operates satisfactorily.

The alarm itself is powered by 3 "C" cell batteries. 3 X 1.5 volts = 4.5 volts (dc). A "plug-in telephone charger" was found to have a voltage of 5.1 volts dc. In order to obtain the desired voltage, a silicon diode was placed in series with the supply. The forward voltage drop across a silicon diode is about .65 volts. 5.1 volts minus .65 volts = 4.45 volts. This is close enough to the desired 4.5 volts. The power for the alarm is about .050 amps. The diode should be rated at least 2 times the anticipated amp. load and the PIV (peak inverse voltage) rating of at least 2 times the anticipated available voltage.. A diode rated at 1 amp., and 50 PIV was on hand and used in this project. The unit operates satisfactorily.

If you had a "plug-in telephone charger" with a voltage of 5.1 volts but needed a 3 volt source, place three silicone diodes in series with the supply. 5.1 volts minus (3 X .65 volts) = 3.15 volts. This is close enough to the desired voltage of 3.0 volts. Be sure to use diodes with amp. and PIV ratings as listed above. Below is a diagram of this information.



NOTES FROM THE BACK ACRE

_ Buzz Kutcher, K3GWK

It was a quiet month in Butts County. I guess we are all still recovering from Field Day. The main events for July were a very successful VE session (Congrats to new Extra Randy Wise, KK4UDN) and Covington Century communications' support.

It was a very hot day for this year's Covington Century bicycle ride. My usual spot is the shady front porch of Brownwood Baptist Church on Thankful Road in Madison. It is about a 60 minute drive with an early start at 0'dark thirty. My co-communicator at water stop #3 is our friend Del Davis, W4DEL, from the Newton County ARES group. Del and I were on location, waiting for the support folks to show up when we received a message from NCS. Unbeknownst to us, our position had been moved from the shady front porch of the church (with a 110 volt outlet available) to a shade-less, weed covered corner several miles away. We broke down our station and moved. The new location left a lot to be desired; I ended up operating from my very warm vehicle using my Go-Kit battery for radio power. Del was in his lawn chair using his HT to monitor the net repeater. Did I mention it was hot? Our site began to shut down at Noon and we were on our way home by 13:30. Several other Butts County ARES team members also participated: AJ4GU, KK4QJR, KM4HOS, KW4AQ and W4DED. THANKS! The next big communications support event is coming up in October. The "Spin 4 Kids" 100 mile bike ride will be held on Sunday, 21OCT2018. This is a Morgan County ARES event and Butts County ARES has supplied operators for several years. It is an important event and raises big bucks for *Camp Twin Lakes*, a very special camp for very special kids.

We are looking for additional operators for the weekly Public Health D-STAR net. If you are available in the day-time and want to get a little more active, contact Ken Wallis or me. The net is held every Thursday morning at 08:30 (arrive by 08:15) and usually lasts about 30 minutes. We currently have five operators to cover these four or five weekly nets. All of the needed radio equipment is installed at the Butts County Health Department office; this is a "plug-n-play" operation. It is a great training opportunity; ACTIVE status is not required.

The **S**imulated **E**mergency **T**est is scheduled for 06OCT2018. I will have more information at the September meeting.

Our July Technician class was cancelled due to a lack of student registrations. The next class planned for January 2019.

No update on the WX4BCA UHF D-Star repeater's connection to the Internet and the worldwide D-STAR network.

ARES* MEMBERSHIP (08/01/2018):

Deployable: 10
Active: 12 (+1)
Pending: 8 (Need to complete Basic ARES, IS-100 and IS-700 to achieve ACTIVE status)
Total: 30 (If you are not an ARES member and want to get involved, contact me at k3gwk@arrl.net)

July ARES Activities:

Drills, Tests and Training: 7 (47 ham hours)
Public Service Events: 2 (62 ham hours)
Emergency Operations: 0
Misc. Activities: 0
Total Ham Hours 108 (Value $3,315.00)

Changes are coming to ARES and NIMS and completing Basic ARES, IS-100, 200, 700 and 800 will probably a requirement for the new ARES Level Two (ACTIVE) designation. The IS-802 course is down for revision.

**ARES membership is NOT REQUIRED to participate fully in our radio club's activities.*

That's about it from Jenkinsburg Station.
(Weather Underground ID: KGAJENKI2)

Thanks again for all you do for Amateur Radio.
73, Buzz (K3GWK)

DO YOU NEED AN ANTENNA TUNER?

Maybe Yes, maybe no. It all depends upon the type of antenna and feed line used.

_ Jeff Phillips, KN4FRG

There is a large cloud of differing opinions within the amateur radio community surrounding antenna tuners – to use or not to use. This article will center upon an antenna tuner as a useful device applied with the right application. The trick for a Ham operator is knowing when to use one. The article will explore the need for an antenna tuner and provide some applications.

When an operator attaches their transceivers to an antenna, the operator must ensure the rig and the antenna agree. Every antenna has an impedance expressed in ohms. The same is true for the feedline connected from the transceiver and the antenna. Impedance in itself can be a hard term to understand, but in the simplest terms, it is the combination of inductive and capacitive reactance and resistance. Reactance is the opposition to the flow of an AC signal within a circuit. In this example, the AC is the RF generated by the operator's transceiver and the circuit to the antenna system – remember this thought for later.

The impedance of the antenna depends on a number of factors, its length, required frequency, height above ground, proximity of metal objects (type of antenna), weather conditions, soil type, and etc. The impedance of the feedline is dependent on the construction of the antenna type, cable, open-wire (ladder line), etc. The feedline does more than just connect your radio to the operator's rig. It acts as an impedance transformer. Meaning, the impedance of the antenna is transformed by the feedline into the value your radio actually "sees" when we connect the coax/cable. This system impedance (transceiver, feedline, & antenna) acts as a load for the energy created by the power outputted by the rig/radio – just like a light bulb is a load for the energy supplied by a battery or an AC receptacle.

Most manufacturers design transceivers to work with a load impedance of 50 ohms. When an operator keys the mike applying power and the radio sees an impedance of 50 ohms or something close to it, all things are golden presenting no issues. What happens when the impedance is not around 50 ohms? Most operators call this an impedance mismatch or just mismatch. When a mismatch exists, a certain portion of the power generated by the radio is reflected – like light reflected by a mirror. This reflected power travels back down the cable from the antenna to the radio. When it reaches the radio, it is reflected back toward the antenna. The reflected power combines with the forward power being generated at the radio to create standing waves in the feedline.

Note: The **reflected power in** the transmission line increases the average current and therefore losses **in** the transmission line compared to **power** actually delivered to the load. It **is** the interaction **of** these **reflected** waves with **forward** waves which causes standing wave patterns, with the negative repercussions.

An operator can use a standing-wave-ratio (SWR) meter to measure both the forward and reflected power – many modern HF rigs has this meter integrated as a feature. A 1:1 ratio SWR reading is optimum and indicates no reflected power is returning to your radio. On the other hand, an SWR of 3:1 or more means the process is reflecting a substantial amount of power. This is bad for the process and can lead to transceiver issues. A high SWR can cause considerable RF voltages to develop in the feedline and in output circuits of your radio. This will cause dangerous conditions for your rig – especially for modern radios with solid-state circuitry. As a protection parameter, many manufacturers include SWR protection circuits to reduce power automatically or shut the rig down if these

Antenna Tuner, continued on page 7

*** 72 Hour Kit Info You Need To Know ***

__ Darlene Ragon, KK4BKF

Basic Info

1) Your 72 hour kit should be in a portable container located near an exit of your house or better, sheltered in your back-yard.

2) Each family member should have their own 72 hour kit with food, clothing and water. Distribute heavy items be-tween kits.

3) Enclose the extra clothing, matches, personal documents, and other items damageable by smoke or water in plastic to protect them.

4) Keep a light source in the top of your 72 hour kit, so you can find it quickly in the dark.

5) Personalize your 72 hour kit. Make sure you fill the needs of each family member.

6) Inspect your 72 hour kit at least twice a year. Rotate food and water every six months. Don't forget to check your medi-cations. Check children's clothing for proper fit. Adjust cloth-ing for winter or summer needs. Check expiration dates on batteries, light sticks, warm packs, food and water.

7) Consider the needs of elderly people as well as those with handicaps or other special needs when building your 72 hour kit. For example: for babies, store diapers, washcloth, oint-ment, bottles and pacifiers, and other special supplies.

Shelter

One must have shelter from the elements within 3 hours whether it is from the heat, rain or cold temperatures. Possi-bilities are a tarp, be sure to add rope for securing the tarp, a camping tent or even your vehicle.

Warm bedding is required from a sleeping bag or heavy wool blanket.

Suggested Clothing Ideas

- Underwear (2)
- Socks (2)
- Long-sleeved t-shirt
- Short-sleeved t-shirt
- Long pants (sport pants or snow pants)
- Cap or beanie hat
- Mittens or gloves
- Closed-toe shoes
- Coat (consider the current night temperature)
- Rain-poncho or large trash bag

Personal and Hygiene Items

- extra glasses or contacts
- contact lens solution (eye doctor sample)
- travel toothpaste/brush ($1.00 Dollar Tree)
- shampoo, lotion, body wash (hotel size)
- deodorant ($1.00 Dollar Tree)
- lip balm ($1.00 2 pk Dollar Tree)
- razor ($1.00 10pk Dollar Tree)
- washcloth ($1.00 4pk baby wash cloths Dollar Tree)
- comb/brush/mirror (try folding brush/mirror combo)
- pocket hand sanitizer ($1.00 for 3pk Dollar Tree)
- pocket tissues ($1.00 for 8pk Dollar Tree)
- toilet paper (put in a baggie)
- cleansing wipes (put baby wipes in a baggie; or $1.00 30pk Dollar Tree)
- feminine items (gather from your own supplies)
- bug repellent spray ($3.75 REI)
- Sunscreen packets (Amazon)

Also plan to pack something for entertainment, such as a deck of cards, 'seek a word' book, crossword puzzles, whatever might take your mind off of the disaster for a bit.

Food Items

This will be a personal choice as it is most important to pack foods you will be familiar with. This is not the time to try something new.

Think of each meal and what you could eat. Example: Break-fast: oatmeal with dried fruit and nuts, tea or coffee. Lunch: Foil packed tuna salad, crackers, canned fruit, hard candy. Supper: Chili or beef stew, fresh or canned fruit, applesauce, powdered milk, granola bars.

Food Prep Items

- cup (enamelware)
- spoon, plastic (for stirring hot cocoa)
- napkins
- multi-tool which includes scissors (like Leatherman)
- matches
- mess kit
- foil
- small roll of paper towels
- small folding camp stove
- fuel tablets (in baggie or plastic container)

 72-Hour Prep, continued on page 6

Repeaters

Buzz Kutcher had an enlightening program on Repeaters for us in August. He began with a bit of history, then went over a schematic. Something called 'COR' turns on, so it can send its ID. They must be able to be turned off manually, in case transmissions go awry. They can link via their 'controller' part, and can decode DTMF and CTCSS. Some have an external controller that can record, and that also allows you to call and talk to the repeater over a phone line. They handle many digital transmitting forms, including D-Star, which stands for Digital Smart Technology for Amateur Radio, and are capable of sending data and digital voice simultaneously. Remember, they repeat what they hear, so there are no secrets when using a repeater! Buzz reminds us to be "Good ambassadors when on the repeater."

_ NP

Connectors

Tech Saturday gave us a great class by Mike Crowe on attaching connectors to coax. We got lessons on different types of coax cables, different types of connectors, and got to make our own cables by attaching connectors in different ways.

We were shown soldering techniques and had several opportunities to practice that -- (good for those of us who have basically no experience in that field.)

Mike had a array of equipment (really cool stuff!) that we all wish we had in our tool kits. Nearly everyone had a different soldering station, so we were able to see options there. We all went home with a hand-made, top quality coax cable to use, *and no one soldered themselves to anything*.
Great class, Mike. Thanks!

_ NP

72-Hour Prep, continued from page 5

- matches (in baggie)
- small cooking knife
- manual can opener

5- Gallon Bucket #1
List of items in bucket
Bucket lid (not Gamma lid if adding toilet seat)
Large flashlight or solar flashlight (put near top)
Batteries for flashlight
Family-sized First Aid Kit (update every 6 months. Could be used to help others. Put near top)
Radio, battery (put near top)
Batteries for radio (replace every 6 months)
Sun block
Insect repellant
Travel wet wipes
40 Waterproof matches
Butane lighter
Emergency flares
Emergency candles
50 Purification tablets
Water filtration bottle
Can opener
12-Function Army Knife w/scissors
Sewing kit
Large 30 gallon trash bags
13 gal. plastic trash bags (to line your bucket as a toilet)
2 Mess kits
Paper plates, paper bowls, paper cups, plastic utensils
Paper towels, small roll
Foil
Small bottle of dish soap or camp soap
Small bottle of disinfectant
American Red Cross brochures

5-gallon Bucket #2
Leather work gloves (put near top or in 72-hour kit)
Large tarp
Folding shovel
Hatchet
Whet stone
50 ft. nylon cord
Duct tape
Small folding cook stove with fuel
Small hand broom
Pliers and wrench
Crowbar/prybar

Additional Items:
Family tent (in its own bag)

Toilet seat lid made to fit on bucket
Cases of bottled water (*what you can't put in your back-packs)
Water container to refill at evacuation shelter: tote, bucket above, or jug with spout
Walkie Talkies
Battery powered TV
Chainsaw w/extra blade
Extra fuel 5-gallon gas cans

__ DR

NETS

SUNDAY:

Metro ARES FM Net - 1st Sunday ONLY at 1600L,
WA4ASI repeater, Covington, 146.925-, 88.5 PL
KK4GQ repeater, Fayetteville, 145.210 -, 131.8 PL
KC4AQS repeater, Paulding Co, 145.805 +, 100.0 PL

GA ARES/BCECA WL Express Net - Send an ICS-213 to WX4GMA and WX4BCA by 2200Z. [1700L EST, winter/1800L, EDT, summer.] Please use a Win link RF gateway; Winmore packet, if capable; otherwise, use Telnet.

GA ARES Digital Net - 210Z [1600 EST, winter/1700 EDT, summer.] 3.583 MHz USB.

GA ARES PSK 'Traffic' Net - send an ICS-213 to WX4GMA NCS, centered on 1500 MHz.

GA ARES PSK 'check-in' Net - **Even** numbered months, center on 1000Hz, 'text' check-ins only and will run concurrently with the PSK 'Traffic' Net.

GA ARES D-RATS Net - 2130Z [1630 EST/1800 EDT]. Odd months, port: gaares.ratflector.com.

GA Section HF Net - 2200Z [1700 EST/1800 EDT], 3.975 MHz LSB, voice, by callsign prefix.

SE Weather Net - 2100L, D-Rats/D-Star, on sewx.ratflector.com. D-Star Voice on REF004A.

TUESDAY:

Butts County Emergency Comm Training Net - 1930L, WX4BCA repeater, 147.285 MHz, + offset, 131.8 PL, begins with voice check-ins, followed by an NBEMS Digital Net. WL Express message accepted if not sent the previous Sunday. Send to WX4BCA with name, callsign, location, and whether you are on mobile or aux power.

WEDNESDAY:

SE Metro Digital Net - 2100L, WX4ASI repeater, 146.925 - & 444.800 -, 88.5 PL. MT63L, center on 1500 Hz. WL - ICS-213 to K4NCR, D-Rats on gaares.ratflector.com.

THURSDAY:

NCRC/ARES/ACRES FM Net - 2000L, WA4ASI repeater, 146.925 - & 444.800 -, 88.5 PL. WL - K4NCR.

Antenna Tuner, continued from page 4

conditions exist. Without this measure, the operator can be on the receiving end of an expensive repair bill. If the antenna system presents a significant mismatch, what can the operator do?

The operator needs to provide the radio a 50-ohm load to the receiver regardless of what is really present. One way to accomplish this is by using an antenna tuner. An antenna tuner in its basic form is simply a network of variable inductors (coils) and capacitors. By adjusting the coils and capacitors, the operator can counter balance and cancel the effects of the inductive and capacitive reactance at the rig end of the feedline. What does this really mean? As this process cancels the reactances, the impedance at the transceiver transforms to 50-ohms. As far as the transceiver knows, the tuner matched the load impedance and it is free to operate at full power into the antenna system. This process does not change the fact that a mismatch still exists, but now the mismatch is at the tuner's antenna output.

The tuner, in fact, protects the rig from harm while still allowing it to develop maximum output. A good tuner should be able to handle the RF voltages and currents caused by the high SWR. Remember, even with the tuner, the reflected power is still creating waves between the tuner and the antenna. This process could definitely create loss in power within the feedline, however, most of it is radiated at the antenna. This article only presents the reasoning that sometimes antenna tuners can present a solution to deter a high SWR. A well-built antenna system including feedline (appropriate balun/unun, feedline type (i.e. ladder line), & etc.) can also provide low SWR and present the appropriate match at the operator's rig, but for some folks using a G5RV, end fed, or other compromised antenna, an antenna tuner is a good solution providing the means use a single antenna across all licensed bands, and their frequencies, for example.

If an antenna tuner is a solution you are thinking about, they come in all shapes and sizes with various

Antenna Tuner, continued on page 8

REPORT SYNOPSIS

MEMBERSHIP - Nancy Phillips, Chair

As of August 6th, we have 40 regular members, 2 special members, and 1 Life Member, bringing us to 43.

VE SESSION – Dan Darsey, VE Administrator

Our recent VE session saw Randy Wise, KK4UDN, graduate to Amateur Extra. Congratulations, Randy!

TREASURY - John Lipscomb, IV, Treasurer

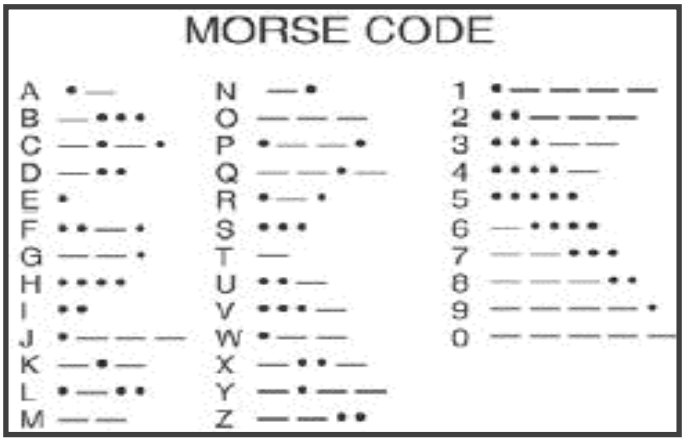
$1736.00 in the general acct. $1340.83 in the repeater acct.

SKYWARN - Ken Wallis reported we had *Severe Fun* -- as he dashed for cover with the 4-min warning he got, but all ended well.

NET NCS for September **-- Elaine**

Morse Code Keying Classes

Keying classes are on the horizon. Winford Barnes, W8XC, is planning a series of classes to teach keying. The course will consist of 1-hour evening sessions (2x/week), for a total of 8 hours. Included will be an introduction to the various types of keys available and some short cuts of keying. Stay tuned for more info. If you are considering the course, here is a Morse Code chart to get a jump on those studies.



Antenna Tuner, continued from page 7

features. There are so many options for a tuner, it is worth another article, but I will provide some examples. First, some of the modern transceivers have an integrated automatic antenna tuner that are somewhat limited, but with a good antenna system with minimum mismatch (3:1 or less) can meet several operator's needs. Next, manufacturers have manual tuners and automatic tuners.

A tuner requiring the operator to adjust the inductance and capacitance based upon the current frequency is a manual tuner. By the operator adjusting the variable inductors (coils) and capacitors, you can counterbalance and cancel the effects of the inductive and capacitive reactance at the transceiver end of the feedline. A manual tuner requires the operator to manually adjust the tune, per se, when you adjust the frequency (a good change) and after a band change. Automatic tuners, like those integrated within the rig itself, allow the operator the convenience to tune the radio to a given frequency and after a band change simply by touching the tune button. Some automatic tuners can sense when the operator changes the frequency and will adjust immediately usually when you push the PTT on your mike. Both the manual and automatic tuners can provide a solution for most operator applications, one's operating barefoot (100w power output) and/or those using max power (1.5kw).

The intent of this article was to provide a general understanding of why the radio and entire antenna system must match regarding its impedance – radio through feedline to the antenna and touch on a reason for an antenna tuner. A significant impedance, usually over a 3:1 SWR ratio can damage the circuitry within a transceiver. Some radios have built-in circuitry to protect the rig from such a mishap. If an operator has an antenna system with a high SWR, or experiments with a homebrew system, then an antenna tuner might be the right solution to trick the rig to believing it is receiving a 50-ohm impedance from the feedline. Tuners come in all sizes, both manual or automatic, built to your required power level and with the features the operator desires for their given application.

__ Jeff KN4FRG

CALENDAR

SEPTEMBER

10 - Monthly Meeting, 7 PM, Fairgrounds.
(Moved due to Labor Day.)
DRATS

15 - VE Session, 9 AM, FS #7.

OCTOBER

1 - Monthly Meeting, 7 PM, Fairgrounds.

Grounding - Mike Crowe, AJ4GU

6 - Simulated Emergency Test (SET)

20 - Tech Saturday, 9 AM, FS #7.

Satellite Operations - John Kludt

21 - *'Spin for Kids'* - Morgan Co, Need HTs & Mobiles

NOVEMBER

5 - Monthly Meeting, 7 PM, Fairgrounds.

Flu Shots, EMA Update - Glen Goens, KJ4TVO

17 - VE Session, 9 AM, FS #7.

DECEMBER

6 - 8th Anniv Family Christmas Dinner.
Buckner's Family Restaurant, 6:30 PM

15 - Tech Saturday, 9 AM, FS #7

JANUARY 2019

26 & 27 - Winter Field Day - (location TBA)

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