The Pileup
Newsletter of the CDXA

The Carolina DX Association

AA4ZZ	Paul Trotter	President
K4CEB	Eric Sossoman	Vice-Pres.
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K4MD	Joe Simpkins	Cluster Mgr.
W1AJT	Art Tolda	Contest Mgr.
W3GQ	Paul Sturpe	4th Call Area Bureau Mgr.
WB4BXW	Wayne Setzer	Webmaster
K8YC	John Scott	Editor

A Word from the Contest Manager. . . .

Hello CDXA, I have volunteered to be your new Contest Manager (foolishly?). First I would like to thank John--NV4A for all his great efforts managing contests and scores, and his series of "Pileup" articles.

Although comparatively new to contesting with my first contest in 2003 despite being first licensed in 1960; I contest. I hope to stimulate activity, perhaps pass along some advice, and keep our scores up to date for everyone.

First however, I would like to define what we mean by "contest". "Contest" is both a verb and a noun. The verb's definition is: to compete or strive for; struggle to gain or control. The noun contest means: a competition, especially one in which entrants perform separately and are rated by judges .

Why contest? Perhaps a good place to begin is to ask the question, why get involved with contesting at all? People enter the sport of radio contesting from many different places, but usually for the same reason--it's a lot of fun. While this may seem like stating the obvious, it's an important point to keep in mind. There are many different ways to have fun contesting, and not everyone's idea of fun is the same.

Some of us get a kick out of the simple act of "Can you hear me now? Yes I can!" In contests, we get to repeat that feeling over and over, and it's a non-stop thrill. For some operators, staying up all night scraping QSOs out of the noise level is fun. For others, running high rates for hours on end is fun. Some operators find their joy in serious competition. Other operators enjoy mixing radio contesting with travel. Some find their joy in building the ultimate station. Some enjoy building teams and competing in the multi-operator categories. The point is to find out what rings your bell, and then go after it. Some contesters seem to like a challenge. There are plenty of challenges to be faced in contesting.

I submit that the most important competition for us is against ourselves, be your own judge. Each of us should work towards doing something today better than we did yesterday and not as well as tomorrow. The best way to do this is to set attainable and not grandiose goals. Goals involve setting expectations that help to boost motivation and sustain enjoyment. Just trying to make small incremental improvements will hone both skills and performance. This could be just making an increased number of contacts in a shorter time, or using a different mode. For me I change goals as the contest progresses perhaps starting out with a goal of 100 contacts or 50 multipliers then, when reached and I am still *HAVING FUN* increase those goals. I would suggest that until comfort is reached try a low pressure contest

(Continued on page 2)

CDXA PacketCluster & Other Communication Systems	
K4MD (AR V.4 Cluster via Telnet)	k4md.no-ip.com:23
K4MD (AR V.6 Cluster via Telnet)	k4md.no-ip.com:7373
W4DXA (AR V.6 Cluster via Telnet)	w4dxa.no-ip.com:23
W3GQ (CC Cluster via Telnet)	w3gq.no-ip.com:7373
CDXA Repeater 147.18 MHz (+600)	W4DXA, Near Fort Mill, SC
World Wide Web Homepage	www.cdxa.org
Wednesday Luncheon (11:30 AM)	Skyland Family Restaurant, 4544 South Boulevard, Charlotte, NC

(Continued from page 1)

like a state QSO party then progressing to a larger contest like the North American QSO Party (NAQP) finally when comfortable dive into a CQWW or ARRL DX contest.

You may not have a lot of time to get into the contests, or you might have a small to medium station and feel that there is no need to get on in the contests, right? WRONG!

It's been proven time and time again that it is not only the big guns of clubs who enable a club to score well. They are a necessary part of the mix, but it is the small and medium guns and contesters with limited amounts of operating time that are an equally important part of the mix, and CDXA will never score high without getting nearly ALL of its members, large and small, on the air this contest season.

To spice things up a bit look for a new contesting section on the CDXA website in the near future. There will be a section titled "CDXA Claimed Scores" which I encourage everyone to participate in. In that section, I will list the claimed scores submitted either directly to me or through the 3830 Scores website at https://www.3830scores.com for all contests where there is more than one submittal. This is a fun place to see what other members are doing and perhaps create a little local competition. Take a look at the site, and I am sure that in any major contest you will see some very familiar calls.

During these cold months give contesting or a new contest a try with goals that you set for yourself.

See you on the air – Art - W1AJT / VE3UTT

The Pileup
Official Newsletter of the Carolina DX Association

Published bimonthly 6 times per year.

The purpose of the Association is to secure for the members the pleasures and benefits of associating with persons having a common interest in Amateur Radio.

Members of the CDXA shall adhere to "The Amateur's Code" as published from time to time in *The ARRL Handbook for Radio Amateurs*, and shall consist of those valid licensed amateur operators having an interest in promoting amateur radio. Long distance communications (DX) is of special interest to members of the Association, but said interest is not a requirement of membership.

Yearly dues are $25.00. A second licensed Amateur family member living in the same household can join for $5.00 for a total family price of $30.00 per year. The total price for 3 or more licensed family members living in the same household is only $35.00 per year. All family members enjoy full member status. Dues are payable annually in December by check to the Secretary/Treasurer:

Ray Weeks,, N4APR
3017 Cutchin Drive
Charlotte, NC 28210

Address, telephone, and email address changes should be directed to the Secretary/Treasurer at the above address or via email at: rweeks1@carolina.rr.com.

Contesting and Health

Art Tolda – W1AJT / VE3UTT

Contesting is good for your health! Before you think that Skyland's chicken soup distorted some vital parts of my mind, let me elaborate.

According to the National Institute on Aging a critical factor in mental health is keeping your mind active as you get older. We are all fortunate at being engaged in a hobby that is so multi-faceted that it would be very difficult if not nearly impossible to focus on all of it. However, any one of Amateur Radio's facets can be engaging and rewarding.

There is strong evidence that being intellectually engaged may benefit the brain. People who engage in meaningful activities, like volunteering or hobbies, say they feel happier and healthier. Learning new skills may improve your thinking ability, too. For example, one study found that older adults who learned quilting or digital photography had more memory improvement than those who only socialized or did less cognitively demanding activities.

Lots of activities can keep your mind active. For example, reading books and magazines, playing games, taking or teaching a class, learning a new skill or hobby, or working or volunteering. These types of mentally stimulating activities have not been *proven* to prevent serious cognitive impairment or Alzheimer's disease, but they can be fun!

Scientists think that such activities may protect the brain by establishing a "cognitive reserve." They may help the brain become more adaptable in some mental functions, so it can compensate for age–related brain changes and health conditions that affect the brain.

Formal cognitive training also seems to have benefits. In the Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) trial, healthy adults 65 and older participated in 10 sessions of memory training, reasoning training, or processing–speed training. The sessions improved participants' mental skills in the area in which they were trained. Most of these improvements persisted 10 years after the training was completed.

Stay Connected

Connecting with other people through social activities and community programs can keep your brain active and help you feel less isolated and more engaged with the world around you. Participating in social activities may lower the risk for some health problems and improve well-being.

In conclusion, I think that the reader can insert any one of the many facets of amateur radio for the aforemen-

(Continued on page 3)

(Continued from page 2)
tioned activities. We certainly have some of the social aspects covered just by being active members of CDXA.

Welcome New Members

Two new members have been added to the roster since the last Pileup was published. **Gene Tyree (N4ANV)** of Fayetteville, NC joins us from the eastern part of NC. Also new to the roster is **Rebecca Milligan (N4EFS)** of Chapin, SC to add to our South Carolina representation. All members look forward to getting to know our newest members—either as a radio-based QSO or an "eyeball" QSO. Welcome to both of you.

Publication Notice

Over the years many of the functions the PILEUP originally fulfilled have been replaced by web-based or online services. Notifications of upcoming events—especially those with a short planning horizon—are now posted to the CDXA website. Individual results of contests are submitted via email or by filling in a form available on the CDXA website. Dues notices go out as a email addressed to all members and payment can be made using PayPal. Many events can arise and take place in the interval between publication dates of the PILEUP. Yet, there are some announcements that benefit from being committed to printed media. Examples are: new member announcements, reports of events such as Hamfests, equipment reviews, or technical papers.

For 2020, the PILEUP will only be published six times per year instead of the former 10 times per year. It will continue to report rules for club-centric contests so that they are readily available, and will track results of year-long contests for participants. Of course, informative materials submitted by the membership are always welcome. Current plans in this transition are to publish bi-monthly at or near the beginning of the even numbered months: February, April, June, August, October, and December. Adjustments may be made in these dates based on our experience with the new format. *–The Editor*

Don't Forget When Working DX King 2020

If you plan on participating in DX King 2020, please note that there are 6 entities in the contest that CQ Magazine includes in addition to those on the DXCC list. They are: ITU Vienna International Center (4U_VIC), Scotland-Shetland Islands (GM/Shetland), African Italy (IH9/IG9), Sicily (IT), Svalbard-Bear Island (JW), and European Turkey (TA1). These are usually easy to work if you keep an eye out for them.

DX King News

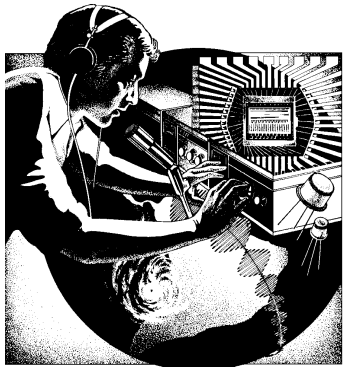
Art Tolda,W1AJT / VE3UTT

It's the end of another DX King Competition. Conditions this year were challenging to say the least. On a positive note there were approximately 283 entities activated only 5 less than 2018. We all need to thank those hardy souls who ventured out on DXpeditions sometimes to very difficult and dangerous places. Not all were successful with the most notable being that of the 3Y0I expedition in-sight of their target yet couldn't land. Hopefully you all got your CQ Marathon entries in by the January 5th submission date. The winners of 2019's DX King Competition will be announced after the formal results are published by CQ magazine, as well as the winner of the $100 Amazon Gift Card

Ready to try it again in 2020? See the announcement in this issue of the Pileup.

Here are the final score rumors for 2019. Remember that these are preliminary.

Callsign	Class	Countries	Zones	Totals
K5EK	Unlimited	270	40	310
K3WA	Unlimited	263	40	303
N4PQX	Unlimited	245	40	285
VE3UTT	Unlimited	240	40	280
W1AJT	Unlimited	238	40	278
W3GQ	Unlimited	206	38	244
KD4RH	Unlimited	199	40	239
W4PNY	Unlimited	189	36	225
K8YC	Unlimited	189	33	222
W3OA	Unlimited	144	33	177
NV4A	Unlimited	134	30	164
W3DQS	Limited	124	34	158
AA4SC	Limited	118	32	150



DX King Contest for 2020

Art Tolda -- W1AJT/VE3UTT

It's that time of year again and we will be running our DX King competition which is based on CQ magazine's DX Marathon for 2020. The goal is to "work as many countries and zones as possible at least once during the calendar year". For 2020 we will again raffle off a $100 Amazon gift card. The rules of our DX King competition follow those of CQ Magazine's DX Marathon exactly, and we use their scoring spreadsheet as well. The goal stated above couldn't be simpler. You can work countries/zones both inside and outside of other contests. Working contests is a really easy way to add to your score, and help CDXA's total contest scores as well. DX King/CQ Marathon is also a way to keep up with how you're doing with your country count during the year. The scoring is easy. You add the number of countries that you have worked that are on the CQ list of countries to the number of zones worked all during calendar year 2020. The final scores will be announced after CQ announces its DX Marathon scores. Then, we will have a drawing among all the DX King entries which were included in the CQ participant list. …In other words, *don't forget to submit your final score to CQ Marathon by 5 January 2021*.

amazon.com gift card

$100.00

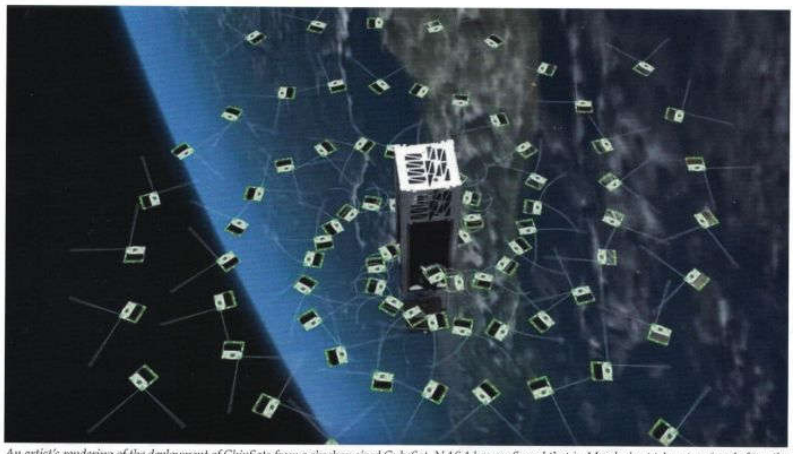
Full rules are at http://dxmarathon.com/Rules/2020 Rules.htm . CQ magazine provides an Excel spreadsheet for score calculation and submission along with information on how to submit it at http://dxmarathon.com/Submission/Submission2020.htm . If your logging software won't directly convert your submission into the required spreadsheet format, check out this easy-to-use program: http://software.ad1c.us/marathon/ . Note that the 2020 CQ Marathon score sheet has already been posted so download it and start collecting zones and entities.

Please read the official DX Marathon rules first, but here is a capsule version.
There are 3 entry classes:
Unlimited - according to your license
Limited - 100 watts, antennas may be directional
Formula – 5 watts or less or up to 100 watts, simple vertical or wire antennas only
QSL verification is not needed.
You may use packet cluster or other forms of spotting assistance.
You **must** have your scores to CQ by January 5, 2021

Here are the specific rules for the CDXA DX King competition:
Certificates will be awarded for the top five scores in each of the three classes.
For 2020 there will be a $100 gift card from Amazon.com awarded by raffle among the entrants who have scored 150 or more points.
Final standings will be determined by the DX Marathon scores published in CQ.
After reaching a score of 100 (or sooner if you wish) fill out the on- line form on the CDXA Website. We'll be updating the form, but in the meantime, the current form works fine. You should do this by the 5th of each month, starting in February, or after you have 100 points.

This has proven to be an exceptionally popular contest with our members and we're hoping that it continues to grow. The scoring is about as simple as can be imagined and remember that even contacting someone close to your QTH will still give you Zone 5. Also, a reminder: Don't assume that all US stations are in the Zone matching the number on their licenses. Check QRZ to be sure.

Good luck and wishing you good DX and a winning score.



An artist's rendering of the deployment of ChipSats from a shoebox-sized CubeSat. NASA has confirmed that in March short telemetry signals from the ChipSats were received by a ground station at Cornell.

"Sprite" mini satellite developed at Cornell Engineering.

Cracker-Sized Satellites Demonstrate New Space Tech

Reprinted from *Cornell Engineering*

Demonstrating a new type of space technology, 105 of the world's smallest free-flying satellites have orbited the Earth, sending short telemetry signals received by a ground station at Cornell University.

An engineering team from Stanford University and NASA Ames first made contact with the payload of tiny satellites, called Sprite ChipSats, on the night of March 19, 2019 one day after they were deployed from their carrier spacecraft, KickSat-2, a shoebox-sized CubeSat. The team has since worked to complete the first phase of mission data analysis—a triumphant accomplishment for the engineers, who began the novel project back in 2011 at Cornell.

The cracker-sized Sprites weigh just 4 grams each but carry their own power source, a variety of sensors and a communications system on a 1.4 inch square circuit board. Using solar power, they transmitted short bursts of frequencies in the 400 megahertz range with only milliwatts of power, demonstrating for the first time the feasibility of spacecraft that swarm like insects.

"The goal of the Sprites on KickSat-2 is to demonstrate basic capabilities, one of which is communications that do not interfere with other satellites. In a few years, we expect game-changing scientific and commercial applications. The next generation has GPS navigation capability and can measure atmospheric behaviors, magnetic fields, and so much more," said Mason Peck, professor of mechanical and aerospace engineering at Cornell and director of the Space Systems Design Studio.

Early November, 2019--

I have just returned from a trip to Germany and Rome...yes, working for Flex has certain benefits!

During this trip, we installed a Flex at HV0A in the Vatican and operated it remotely from Francesco's (IK0FVC/ Station Licensee) home, which is about 5 miles from the Vatican. Francesco and his close Friend Luciano (I0JBL) were very welcoming.

See the attached photo...Francesco is on the left and Luciano is on the right with St. Peter's overlooking his shoulder. You can see some of their antennas seemingly atop my head! Their antennas, atop the North American University (seminary) in the Vatican, are amazing. The SteppIr has a full 360 shot to the horizon.

Sitting in Francesco's kitchen, he called CQ and the pile-up was almost immediate. Following the first Q, he handed the mike to me. I ran about another 30 Qs. CDXA member K5EK was in there!....

EU was loud...of course.... but so was NA.... exceptionally loud! We had a fantastic time with two of the most warm and welcoming individuals I have ever met. Hams are Hams...wherever we are!

73, Lou N2TU

Christmas Past

The month of December usually brings with it the CDXA Annual Meeting and Election of Officers along with a Christmas dinner. The event also gives the contest manager an opportunity to present awards to those who've participated in the Fall CQWW DX contests.

There are some new faces in the lineup of Officers for 2020. Here are the elected officers.

President:	Paul Trotter, AA4ZZ
Vice President:	Eric Sossoman, K4CEB
Sec./Treasurer:	Ray Weeks, N4APR
Pileup Editor:	John Scott, K8YC
Contest Manager:	Art Tolda, W1AJT
Webmaster:	Wayne Setzer, WB4BXW
Cluster Manager:	Joe Simpkins, K4MD
W4 Buro Manager:	Paul Sturpe, W3GQ

Many thanks to those who've served CDXA well in their former roles:

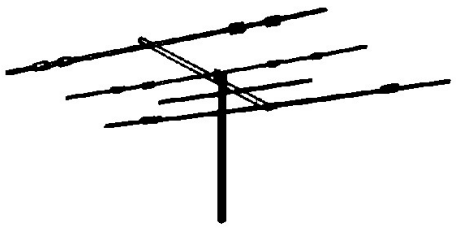
Bill Fisher, W4GRW	Vice President
John Forbus, NV4A	Contest Manager
Cliff Wagoner, W3ZL (SK)	Secretary Treasurer

Characteristic Impedance (Z_0) of Transmission Lines

On Pages 7 and 8 of this newsletter is an informative article sent to your editor by Lou Dietrich, N2TU. It explains how amateur radio and most broadcast radio ended up with 50 ohms as the choice for the characteristic impedance (Z_0) of our transmission lines. The article gives insight that the transmitter is designed to work into a 50 ohm impedance rather than the other way around.

Why is it so important that the impedance looking "into" the transmitter matches the impedance looking "into" the transmission line? We all know if the impedances don't match we'll get reflections on the transmission line that will result in standing waves. The standing waves resulting from energy being reflected at the point of the mismatch can play havoc with the solid state finals in a transmitter. Most solid state power amplifiers will reduce power (fold back) output when experiencing high reflected power to prevent damage.

Another very important reason that the impedance of the transmitter should match the impedance of the transmission line is something that all fledgling electrical engineers learn early in their careers. It can be shown mathematically that maximum power is delivered to a load if the impedance of the load matches the impedance of the source. (https://info.triadmagnetics.com/blog/maximum-power-theorem) This is particularly important in communications where we generally want to put a lot of energy into the ether from your transmitter! I'm sure you'll enjoy reading the article Lou has provided us on the following pages.



The Story Behind

Why Is 50 Ohms The Standard?

By Barry Mishkind

[November 2019] Many of the things technical people deal with have names or origins that are not necessarily clear or have been forgotten. This is one of a series answering the question: Why is it? In this installment, why is the coax impedance in broadcast usually 50 Ohms.

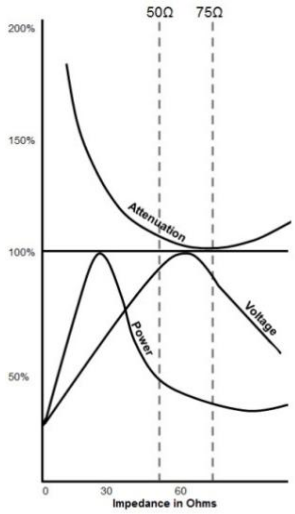
Although there are different impedances needed for different purposes and manifested by different sizes of coaxial cable, in broadcast, power transmission is almost always via 50 Ohm coax.

Why is it 50 Ohms?

WHAT DO YOU WANT TO CARRY?

When you look at this chart, developed a century ago, you can see where and how choices had to be made by the telephone engineers of the time.

One of the major concerns was the ability to carry a signal without Voltage breakdown.



As can be seen from the bottom half of this chart, the best capacity for carrying Voltage efficiently is right around 60 Ohms.

This is near, according to the upper half, the point of least signal attenuation, which is around 75 Ohms.

So, why are the coaxial cables in broadcast usually 50 Ohms?

THE CHOICE

As seen, the power handling capacity of coax cables is the highest at around 30 Ohms.

But the best impedance for Voltage transmission is about 77 Ohms. With no perfect impedance to match both parameters, a middle ground was both needed and desired.

For example, with broadcast transmitters running thousands (even megawatts) of power, it was deemed prudent to find a compromise of where the power and Voltage were as equally good as possible. Since power handling falls off rapidly above 30 or 40 Ohms, to balance Voltage, Power, and signal Attenuation, engineers of the day settled on 50 Ohms.

(When there is a relatively small signal, like receive antennas, 75 Ohms is almost perfect for passing on the Voltage of the signals. Hence, microwave and television cables usually run at 75 Ohms.

CABLE SIZE

Next, manufacturers needed to design and build the cable to the right impedance – and in a manner that sections and ends can be reliably connected.

Calculations led to a ratio of inner conductor to outer conductor that results in the characteristic

impedance for cables of varying sizes. For cable of 50 Ohms, for example, a center conductor of one-inch would require an outer conductor of 2.3 inches.

This can be scaled up as a ratio for the larger coax cables used in the highest power applications.

On the other hand, perhaps you may have heard of some cable and/or rigid line having an impedance of 51.5 Ohms. This came about because in the early days, the easiest materials available for the center conductors were common ¾-inch rods – and outer conductors made from 2-inch water pipes.

It so happened that they ended up measuring as 51.5 Ohms.

GETTING DOWN TO 50 OHMS

As precision manufacturing processes improved (or maybe water pipes changed a bit), 50 Ohms became adopted as the standard, although 51 or 51.5 Ohm cable an still be found, and occasionally 52, or even 53 Ohm products.

Another change was flexible coax made possible by materials like polyethylene. With its dielectric constant (2.3), filling a 77 Ohm air-filled cable with polyethylene resulted in an impedance of 51 Ohms. A slight change in dimensions and 50 Ohms became the common, default impedance for coax designed to carry higher powers.

And that is why your transmission coax cable is 50 Ohms.

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Do you find articles like this helpful? Then you are invited to subscribe to the one-time-a-week BDR Newsletter. Please take 30 seconds here and we will let you know when new articles are posted.

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Return to The BDR Menu

Winter Field Day 2020

By Bill Fisher, W4GRW

On Saturday 1/25, 6 CDXA members operated from the summit of Morrow Mountain State Park in the 2020 Winter Field Day using the N4ZC callsign. N4ZC operated two stations as an under 100 watt outdoor operation on emergency generator power.

Winter Field Day (WFD) was first held in January 2007. In 2016 a new organization was formed to carry on the WFD tradition.

Scoring is different in WFD than in the ARRL Field Day where sections count as multipliers. In WFD, multipliers are bands and modes (CW/Phone/Digital, but with FT-8 excluded as a digital mode).

To maximize scoring, N4ZC worked all three modes on HF, but only phone and CW on 50mhz,144 MHz, 222 MHz and 432 mhz. We received bonus points for operating outdoors, with generator power, and under 100 watt output.

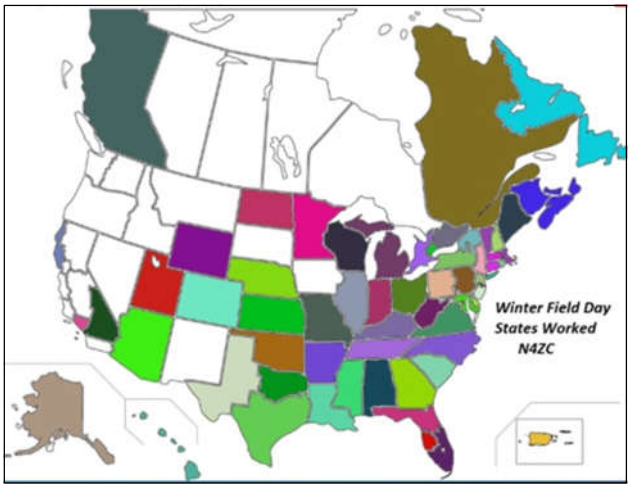
Starting early Saturday morning Eric K4CEB started shooting ropes into the trees for wire antennas with assistance from Wayne N4HWH. Bill W4GRW and David N4DKF started setting up the stations, laptops and generator. Bill W4WNT was our CW/PSK31 captain, and he worked to interface the rig and laptop. Jack K4LRH was our floater/gofer and assisted wherever assistance was needed.

Our goal was to work as many bands on all three modes to maximize the multiplier count. As the event started we had two stations making contacts, while the others started putting up tarps so we could knock off the cold winds to permit us to operate all night. Even though Morrow Mountain is only at 965 feet elevation, on a normal day there are almost always breezes. Temperatures were in the 50's in the afternoon, but as nightfall came upon us, the temperature dropped to the low 30's and the wind continued to blow, making wind chill in the mid 20's! Brrrrr. Our 60K BTU propane heater, and the tarps we had hung helped keep the wind and cold temps under control.

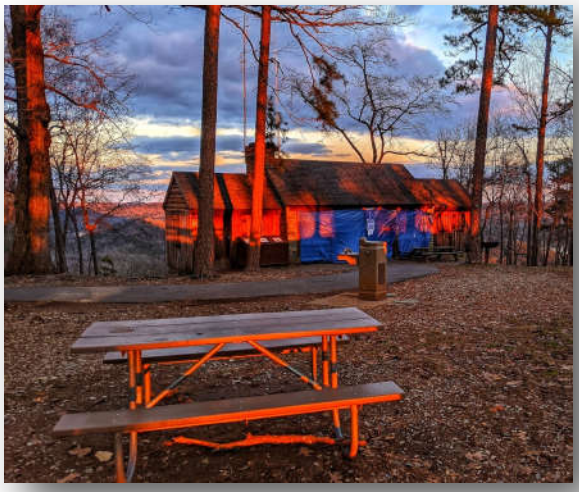
Band conditions were not very good and we only made contacts on 20/40/80M on HF.

The hardy souls of CDXA's Winter Field Day: Bill Turner (W4WNT), Eric Sossoman (K4CEB), Bill Fisher (W4GRW), Wayne Helms (N4HWH), David Funderburk (N4DKF), and Jack Cureton (K4LRH). More photos are on the next page.

WINTER FIELD DAY 2020 ATOP MORROW MOUNTAIN



Contacts were fairly wide-ranging.



With tarps hung on our "shelter" and a 60K BTU heater, we awaited the onslaught of a cold winter night.

The shivering during the night was warmed by the glory of a winter morning sunrise.

The Back Page (What's Inside)