

The Updated History of the AK4H 27 Repeater

The two seven series of repeaters have been in operation continuously, since November 26, 1975. In the thirty-seven years of the existence of the 147.270 repeater, there have been a number of changes in the equipment, the locations, and some of the owners. We started out very modest and have advanced to where we are today. **The Johnston Amateur Radio Society does not own, nor has it ever owned, any of the 147.270 series repeaters from past to present.** The two seven repeaters have always been privately owned and operated. **The Johnston Amateur Radio Society actually was formed by amateurs that were already using the first two seven repeater. The repeater came first, and then came the JARS.**

In early 1975, Bill Lambert, then WA4IXT; Billy Massengill, WB4EBG; and Don Huddler, WA4IUY were hanging out on the 146.880 WR4AOE repeater in Raleigh. The eight-eight repeater was located on top of the former NCNB building in downtown Raleigh and had about 20 to 25 miles coverage. There were only a few repeaters on the air in those days that you could work mobile in the Johnston County area and often you had to wait in line to use one. When you got to use it, and if you could get in, there was always someone else waiting to use it so contacts were usually very brief.

Billy Massengill, Don Huddler, and myself started talking one day about how we needed our own "private repeater" so we wouldn't have to wait in line and how we needed to install it in a location where our mobiles could get into the thing. Not wanting to put a bunch of old junk on the air we decided to go "first class" and buy all brand new equipment. The three of us put on the knee pads and our begging shoes and wrangled a \$1000.00 unsecured loan out of the Bank of Four Oaks to build a repeater. A week later we discovered that we did not borrow enough money and we had to go back to the bank, put the knee pads back on, and go deeper in debt for \$500.00 more.

We now had what we thought were the necessary funds to build the repeater but we still needed a location. We eyed the new water tank in Benson and hoped to convince the local town board to allow us to place our antenna on the tank. We knew that the board members had absolutely no idea what a ham repeater was and so we figured that we would have to do some smooth talking to get approval. Before the board meeting, we tried to corner the commissioners, one at a time, and convince them that our repeater, on the Benson Water Tank, would be a great asset to the town. Billy Massengill-WB4EBG, the debonair one, was forced into being our spokesman and he gave his speech to the board about what a marvelous thing it would be to have a ham repeater on the Benson water tank. The board didn't seem to have much opinion one way or another and left it up to the Town Manager who promptly gave it a great big thumbs down. He said he was concerned about what OSHA would say. He also said an antenna would turn the new water tank into an eyesore, and having our antenna on top would attract massive bolts of lightning from the skies.

It is a well known fact that the Town of Benson has always been jealous of other towns in the county, particularly Smithfield. An old saying goes that if an airliner dumped its on board septic tanks over Smithfield, Benson would be squawking that it wanted some dumped over it too! When the Town Manager gave our proposal the veto, WB4EBG, in a moment of brilliance, told

the Board that the Town of Smithfield had already approved the placement of the antenna on the Smithfield Water Tank but we really wanted to give Benson the first chance. Of course it was a bald faced lie but it worked and the Board quickly over rode the Town Manager and gave us the permission we wanted.

The frequency coordinated to us was 147.87/147.27 and boy were we upset. All the other repeaters were in the 146 range and there was absolutely nothing in the 147 range. We figured being on the 147 would be a big disadvantage. I turned out that we were the first repeater on 147.87/147.27 in the entire country.

To get a repeater license in those days, all prospective repeater operators had to fill out lengthy applications including antenna patterns, projected coverage maps, environmental impact studies, complete system details, manufacturers equipment specifications and then wait on the commission to act. You could not simply put it on the air and hang your call on it as you can now. All repeater calls had the prefix WR. Danny Hampton, K4ITL and ex KM4OX, agreed to let us use his repeater call (WR4AOE) with a portable four designator until our license came in. I'm not sure how legal that was but we did it anyway.

The first repeater we owned was a VHF Engineering RPT-144 kit that I assembled. It ran 15 watts and gave me an education in the hard knocks of repeaters. Our duplexer was a Phelps-Dodge model PD-497 that cost \$600 in 1975 and \$4800 today. The antenna was a Ringo Ranger- the most useless repeater antenna ever, but it was on the commission's approved list. Even antennas had to be approved by the commission.

We got the carpentry class at South Johnston High School to build us a repeater shed to place at the base of the Benson water tank. The shed, being 4 feet by 8 feet, looked like a "two holer deluxe outhouse". It was pretty nice, had paneling and didn't leak.

On Thanksgiving Day, 1975, the switch was flipped and the Benson Repeater Association (BRA) WR4AOE/\$ was up and running on 147.87/27. Our coverage was about 20 to 25 miles from Benson if you were running the big 8 foot tall Hustler CG-144 antenna on top of your mobile.

The VHF Engineering RPT-144 repeater did a fair job considering we only ran 15 watts into a Ringo Ranger at 145 feet. The two meter mobiles in those days were rated at 10 watts and only put out 8. Then, as now, there was always some jughead environmentalist thinking he was saving the whales by running one lousy watt when he supposedly had ten and naturally, he was always noisy and crappy sounding. The repeater broke down about every thirty days or so. Finally, after almost a year, the repeater license was granted and I received the call, WR4ARL. We were probably legal for the very first time!

We had been at the Benson Water Tank about two years when Morris Jefferys, K4SNI of Greensboro decided to put a two seven repeater on the air in Greensboro. His repeater was uncoordinated and caused us great grief due to the higher number of mobiles in the Greensboro area trying to work his "deaf" repeater and bringing up ours at the same time. These weak mobiles were a real nuisance because they were too weak to be intelligible yet they kept keying

up our repeater and keeping the squelch constantly popping. The CVRA was absolutely no help in the matter, despite the fact that the CVRA Information was called on Wednesday nights on Morris's outlaw repeater. It was as if our little ol rural, but coordinated repeater didn't have any rights over a bib city un-coordinated repeater. Phone calls and letters produced no relief.

In the meantime, Billy Massengill, WB4EBG, bailed out as a repeater owner leaving Don Huddler, WA4IUY, and Bill Lambert, WA4IXT as the two owners. Don the lost interest and sold his share to Jerry McLamb, WB4VQP, and Bobby Byrd, WA4PPT. The Benson Repeater Association then consisted of Bill Lambert with two shares and Bobby Byrd and Jerry McLamb with half a share each. A few weeks later, Billy Grimes, WB4AXH (K4WGG), bought in and became a fourth owner. We also incorporated the BRA into a non profit corporation at this time.

While these changes in repeater ownership were going on, the problem with Greensboro had intensified. With the CVRA not being any help at all, we decided to make things just as bad for Greensboro as they were for us. An Army surplus VHF power amplifier, called the "OHJ" (Over the Horizon Jammer) manufactured by Motorola back in the sixties was obtained. That OHJ had a pair of 4CX250's in the final and ran a cool 500 watts output on two meters. Billy Grimes had a Gonset 903 tow meter amplifier that also ran 500 watts. I also picked up a 350 watt homebrew amplifier and installed it at the water tank on the repeater.

For about six months the Benson Repeater Association on tow seven repeater ran 350 watts out, the maximum the duplexer was rated at. It was very loud in Greensboro! Billy and I would get on the air every single night and run 500 watts each with 22 element arrays pointed at Greensboro. We would start around 7:30 and go until midnight. We would actually capture their repeater and they had no way to control it. Under the guise of testing our own autopatch, we would be bringing theirs up. It had no security whatsoever and we had a free run at it. Phone calls to the Honolulu Holiday Inn on their patch were possible. Naturally we never would acknowledge what were doing but since they were un-coordinated and clearly in the wrong, we didn't feel too bad about our actions.

We kept putting the pressure on those jerks with phone calls. Letters, and plenty of high powered RF. Morris kept saying we were wasting our time and were not bothering them one bit and he would never move, but suddenly, he up and plopped down on 146.61. I expect six months of Billy Grimes discussing 14th century anthropology for several hours every single night would run anyone off! I sure got a bate of it. Such sacrifices one will make for the JARS!

This left a bad taste in our mouth for the CCVRA (SERA now). True, they had no police powers but the fact that they called their weekly net on an un-coordinated repeater that was causing u trouble seemed to indicate who they sided with. We dropped our membership in the CVRA for several years. Incidentally, part of our warfare consisted of Ken Fish (N4AZQ) calling the JARS Net Aeronautical Mobile over Orange County at the same time their CVRA Net was in progress. Dirty pool, but they asked for it. Even today with the shortage of two meter repeater pairs, repeaters on the same frequency are spaced at least 150 miles apart. Greensboro was 83 air miles from us.

In 1978, I had put up with our VHF Engineering Repeater just about all I could stand. It gave lots of trouble, crapped out all the time, and I decided to find something more reliable. I located a 100 watt General Electric MASTR Pro Base Station that had been retired from use with the SBI. I made repairs to it, added some timers, a C.O.R., an identifier, and tuned it up on our frequency. The sound of the GE commercial equipment was a drastic improvement over the tinny sounding VHF Engineering RPT-144. Despite the fact it had been removed from service, it ran very reliably with very little down time. This GE MASTR Pro convinced me that commercial equipment was the only way to go with repeaters and from that time on as, now, GE, not Motorola, is the preferred equipment for great sounding repeaters.

Soon after the MASTER Pro repeater went on line, we were able to get the top of a 199 foot tall tower at McGee's Crossroads. Our coverage increased to 35 miles, plus it was closer to the Raleigh area. We had a good relationship with the owner of the tower and stayed at McGee's Crossroads for eleven years and once we move to 900 feet on the WPTF-TV tower, we kept the McGee's Crossroads location one year as a backup site.

In 1986, Jim Creswell, KJ4SW, got interested in repeaters; he bought a share and became a fifth owner. The Benson Repeater Association had become AK4H, WB4VQP, WA4PPT, KD4JQ, and KJ4SW.

One novel thing about the repeater in the McGee's Crossroads location was that the autopatch was remotored. The repeater site was on a Smithfield exchange while Benson offered the same calling area as Smithfield plus 892 and 897 in Harnett County. A system of 220 MHz transmitters and receivers was used to link the autopatch to a sort of remote base in Benson at WB4VQP's QTH to the repeater at McGee's Crossroads, ten miles away. The patch actually surprised us at how well it worked. Today several two way companies actually market a remote system using the same techniques we used in the 80's. I should have gotten a patent!

In 1989, Mike Blackman, N4UFJ (KN4JA), of WPTF fame, used his connections with the company brass to allow us to place a repeater at the 900 foot level on the ill fated WPTF TB 28 tower in Auburn. At this point WB4VQP, WA4PPT and KD4JQ were pretty much inactive and had very little to do with the repeater. In deciding to go on TV 28's tower it became apparent that the MASTR Pro was too old and bulky to be put on the platform. A new repeater was going to be needed.

The new repeater that was placed on the TV 28 tower consisted of a General Electric MASTR II equipment with an S-Com 5K controller. The equipment was financed and built by AK4H and KJ4SW. The JARS bought the antenna and paid to have the equipment installed on the tower. We had excellent coverage around seventy five miles but were plagued with very severe tower static. The static was present 80% of the time.

The club had never put insurance on the repeater, as it had promised it would do, and then the tower collapsed in an ice storm on December 10, 1989. We lost everything! Two days later I had our old standby GE MASTR Pro back on the air at McGee's Crossroads. It was a good thing we decided to keep up the rent on that location. The old antenna was still on the tower and I had been testing the 146.79 repeater I had just finished building for the Clinton group. The JARS

were on 146.79 for one day and then the old two seven repeater was moved back into the dog house the next day and despite the tragic loss on the new repeater on Sunday, we had another two seven repeater back on line by Tuesday.

That was a pretty dismal period after a couple of months in the big time. While we were not assured of going back on the new tower, several of us got together to plan the new repeater.

A new corporation was formed to attempt to put up a state of the art repeater system that would have lots of features. That corporation was the Auburn Repeater Corporation (ARC). The members of the corporation are Bill Lambert (AK\$H), Jim Creswell (KJ4SW), Glenn Johnson (N4HHH), Billy Grimes (K4WGG), and Van Lee (KM4TC). These five are the present two seven repeater owners.

As it turns out, we were allowed on the new super tower. The only difference is that the tower is a joint venture of WRAL and WRDC. We occupied the 850 foot level and had pretty much the same coverage as before except the sheer physical size of the tower caused some antenna problems. We have some tower static from time to time but it is not nearly as severe as when we were on the WPTF TV tower.

Right after Hurricane Fran, we started having all sorts of problems with our antenna system. The repeater had not had any maintenance in over a year and with the deteriorating condition of the antennas and increasing intermod from other sources, two seven was limping along. Plans were made to correct these problems and then Motorola, a big tower customer, tog into a number of problems with their new systems and they kept us from doing our work for months. It was one delay after another.

Finally, on September 22,1998 the new antenna system was installed at 1000 feet on the southeast and northwest legs of the tower. Unexpected technical problems appeared on the 22nd and the full installation of the refurbished repeater had to be postponed until Friday, the 25th. New equipment arrived ant the re-installation of the repeater started again and this time without a hitch.

This project was two years in the making and despite a number of set backs, the repeater was working very well and everybody seemed to feel the end result was worth all the delays and disappointments.

Important Milestones

The Benson Repeater Association was formed in the summer of 1975 with the purpose being to place a repeater on the air in Benson.

The BRA 147.87/27 repeater commenced operation from the Benson Water Tank on November 25, 1975. Its call sign was WR4AOE/4

The Johnston Amateur Radio Society was formed with twelve members in September 1975. Of those twelve, eight were licensed. WA4XIT (AK4H) was elected the first JARS President..

The repeater callsign, WR4ARL, was issued to Bill Lambert, then WA4IXT, in May of 1976.

An un-coordinated repeater in Greensboro on 147.87/27 started the Mother of all Repeater Wars in the fall of 1977.

A 350 watt power amplifier was installed on the repeater in January , 1978.

In early 1978, WB4EBG transferred his repeater stock to WA4IXT. WA4IUY later sold his to WB4VQP and WA4PPT. WB4AXH bought a share in the fall.

Greensboro threw in the towel and changed frequency during the summer of 1978.

The repeater was moved to McGee's Crossroads. The GE MASTR II was placed in service, Fall of '78.

In the summer of 1989, AK4H and KJ4SW built and financed a new GE MASTR II repeater that was installed on the 900 foot platform of the ill fated WPTF TV tower in Auburn on August 22,1989.

On December 10, 1989, the WPTF TV and WRAL TV towers collapsed in an ice storm. We lost everything- no insurance! The old GE MASTR Pro repeater was put back in service at McGee's Crossroads two days later.

In early 1990, Auburn Repeater Corporation was formed by AK4H, LJ4SW, N4HHH, KM4TC, and KD4JQ to build a new repeater.

The Auburn Repeater Corporation's 147.87/27 repeater was placed in service at 850 feet on the new WRAL/WRDC TV tower in Auburn on Saturday, June 29, 1991.

On September 22, 1998 a new antenna system was installed at 1000 feet on the tower legs.

On September 25, 1998 the repeater was place back in service after being out of service for refurbishing. The repeater was out of service for ten weeks and one day.

Important Miscellaneous Information

Tower Static:

The repeater is located on a balcony or platform approximately 850 feet above the ground on the WRAL/WRDC TV tower. The antennas are attached directly to the tower legs 150 feet above the repeater platform and are 1000 feet above ground. Because of the size of the tower structure and the fact that there are many other pieces of equipment on this tower, se experience mild "tower static" when the wind or other conditions on the tower are such that they allow intermittent metal to metal contact. A good example is elevator cables slapping together in the wind. They are literally hundreds of possible places for there to ne metal rubbing against metal in the immediate area of our antenna system. When a repeater with close spacing, such as the 600 KHz spacing used by amateur repeaters, is in operation, there is metal to metal rubbing nearby, it creates static. The static is annoying at times, but there is nothing we can do about it. That is the cost we pay for being on a tall tower. The static always goes away as the wind calms down and if you are being a true JARS member you have the wick turned up enough where it is not a problem anyway. When we were on the old WPTF tower, the static was ten times worse that what we experience now. Compared to then, we don't have any static.

Sometimes you may hear tower static on two seven and yet not hear it on eight eight or five one o. This is because the noise is often localized to a certain segment on the tower. I think everyone will find that the tower static will be much less common where the antennas are located now. Anything is better than having antennas attached to the platform.

Interference

Interference is becoming quite common on repeaters these days. **Regardless of who is doing it, the best way to fight it is to NOT acknowledge it.** The creep causing the interference gets his

thrills when you become angry and blow your cool. The best way to fight interference is to ignore the creep.

Never acknowledge someone throwing a carrier on a QSO.

If you miss part of what was said because of interference, act like you got it all.

Never, ever tell the offender the FCC is gonna nail him.

Never, ever tell the offender he is headed for a big fine.

Ignore bootleggers. Refuse to talk to them, Talk over them. Ignore their presence.

Crossband Repeat:

We realize that rigs with cross band repeat capability are very useful and popular. They can be a nightmare for control operators. **If you use one, do not allow it to repeat another repeater to two seven.** Keep the squelch tight so any noise bursts your rig picks up will not key up the repeater. Do not leave it unattended unless you are monitoring it and have full control of it. The last thing we need is an unattended crossband rig going berserk!

Timers

The repeater will time out if you transmit for more than three and a half minutes without resetting the time out timer. To reset the time out timer, simply un key for a second. The purpose of the time out timer is to take the repeater off the air in case of a stuck mike or other constant signal on the repeater input.

The drop out time is five seconds. That is a bit longer than most repeater drop times and there are two reasons why we have it that long. (1) With a long drop out time, there is seldom a squelch tail. (2) If someone is going to sit around and kerchunk the repeater all day, the longer drop out time will at least inconvenience them and make them wait longer between kerchunks.

Courtesy Tones

The AK4H two seven repeater does not sport a “cutesy” tweedle-dee courtesy tone. A simple beep is used during the nightly JARS Net and a different beep is used during the Trader’s Net. If you want to hear an assortment of beeps, boops, and tweedle-dee-dees every time you un key, you will have no trouble finding them on most any other repeater. We believe the repeater should come as close to actual conversation as possible. When you are talking on the phone or in person, there is no squelch tail or courtesy tone and we don’t have one on the two seven either. We also usually have a simple courtesy tone enabled during JARSFEST for the talk in station. It is unbelievable how many hams can not talk on a repeater without a musical note to tell them when to press the button.

There is one other situation where a courtesy tone may be enabled and that is to signify that the disciplinary macro is in effect. It has rarely happened but there have been times where the

activities on the repeater warranted some discipline. Many times the repeater would simply be turned off, usually after a warning, but not always, depending upon the circumstances. There may be times where the control operator issuing the command feels it will be OK to keep the repeater on the air but with all user functions turned off. The courtesy tone for this condition is none to pleasant and you will know we are in that mode if you ever notice a sour sounding courtesy tone at a time period that would not normally have one.

Power

There is only one way- All you got! Nothing is more irritating than hearing a mobile sputter and pop in and out of the repeater because the idiot mobile is fifty miles out and running five watts when he has fifty.

Repeater Behavior:

The two seven repeater has always been different from other repeaters. It has a unique personality that is like no other area repeater and good natured fun has always been a trademark on two seven since day one. People that would not be caught dead on two seven, closet listen regularly. And there are lots of them. It would be very unlikely that you would ever find discussions of a highly technical nature taking place on two seven.

There is nothing wrong with this, it is just not the personality of two seven. Some repeaters make you feel as if you must possess a degree in nuclear astrophysics to even kerchunk it. I have heard visiting amateurs hesitate to even tell to who their employer is for fear of being called on the carpet for “advertising” by mentioning their employers name. This is ridiculous yet that is how strict at least one area repeater is. Very few repeaters would tolerate the JARS and I dare say, no repeater gives its users as much freedom as two seven.

We have always engaged in good natured ribbing and kidding with one another and there is certainly nothing wrong with this... **unless it becomes a mean vicious attack on someone.** Behavior of this nature has gone on in the past when it should have been stopped. It may be hard for some people to break bad habits **but this ugly behavior has to stop. If you are having a personal problem with another repeater user, do not air it on two seven!** Take it somewhere else because you will not be permitted to “slut it out” on two seven. It will not hurt us to clean up our acts.

The personality of two seven will remain as it always has been since day one **but the deliberate verbal attacks and intentional cruel behavior will not be tolerated.** Such activity gives the entire club a black eye. Control operators have been instructed to warn anyone causing these problems and take further steps, if necessary.

Language:

Bad language will not be permitted. Remember, we cover an awful lot of territory and you never know who is listening.

CB lingo does not belong on two seven and some members have been warned a number of times but it just does not sink in. It is as if these guilty ones don't think it applies to them. If you want to talk CB lingo do it somewhere else. It is not wanted here!

Alcohol:

I have no problem with anyone having a drink. What I do have a problem with is someone getting on the repeater after they have been drinking and making a pure idiot of themselves. You are fooling on one when you are in this condition and are only embarrassing yourself. **If you are going to drink alcohol, that's fine, just don't get on the radio while all tanked up.** Don't put yourself in the situation where a control operator must turn off the repeater because you have had too many and are bumbling and slurring your words and just plain making a rear end of yourself. By the same token, name calling and referring to someone as a drunk on the air is not a very nice thing to do and has no place on the repeater.

QSO Subject Matter

The discussion of politics has come up before in the past and it usually only causes arguments and such. I do not care what your political affiliation and views are. **TAKE IT ELSEWHERE. It is not welcome on Two Seven.**

Discussion of a sexual nature are not for the repeater. If in question about this, ask yourself if you would be ashamed for your wife or daughter to be listening to you.

Use Common Sense

This section is not meant as laying down the law with a bunch of restrictions. All of what has been discussed in this chapter involves simple tasteful behavior and good old common sense.

Final Comments

A great deal of time and effort has gone into this Repeater User's Guide. Please take the time to read this manual.

Please remember that the effective date for the information in this manual to become effective is October 1998. A lot of effort has been made to assure that the Two Seven users that the information in this manual is completely accurate, Hopefully, all errors have been caught that may have crept in.

We will be happy to go over anything in this manual that you do not understand. If you have any questions, ask. Do not feel that your questions maybe dumb – we want to help.

Sincerely,

Auburn Repeater Corporation

Bill Lambert – AK4H – Repeater Trustee
Glenn Johnson – N4HHH
Van Lee – KM4TC
Paul Dunn – KD4BJD
Danny Hampton – K4ITL

At the time this was published, the main two seven has gone down and we are operating on the back up two seven located in the Clayton area. As soon as I hear if/when we are going to be able to have the main two seven back up and running, with the permission of the owners, I will revise this manual, along with any special features and functions that the owners want to pass on to the club.

Michael Callam – KD4UJC