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Learn how on page 7

The Greensboro Amateur Radio Association

Feed Line

Providing Amateur Radio news for the Triad

Volume 17, No. 6 | June, 2008

Editor: Tom Forrest, N4GVK | Web Site: www.w4gso.org | E-mail: info@w4gso.org

Feed Line Special Feature

It's About ... Time

Many Ham Operators Set Their Clocks by WWV and WWVB

Story and Photos
by Thomas Ray, III CPBE,W2TRR
VP/Corporate Director of Engineering
Buckley Broadcasting/WOR Radio NYC

The following article appeared in Radio World newspaper and is reproduced with permission. Visit radioworld.com.

Part one of a two part series

FORT COLLINS, Colo. I had the privilege of visiting a radio station in an unrated market.

This station has had pretty much the same format for at least 35 years. It simulcasts on six different frequencies. It has no ratings but is one of the best-known in the United States. Its programming is used by millions. A great many broadcasters literally set their clocks to them.

Welcome to radio stations WWV and WWVB, Fort Collins, Colo.

It was my privilege to visit them because regular tours of the facility are no longer given due to staffing issues and security concerns. My gratitude goes out to Chief Engineer Matt Deutch and RF Engineering Technician Douglas Sutton for allowing me in to write this article (and my wife for not killing me for dragging her to a radio facility on vacation).

The National Institute of Standards and Technology runs stations WWV and WWVB, located at the northern end of Fort Collins, approximately 30 miles south of the Wyoming border. The site is 390 acres of fairly flat land.

The soil, being mostly clay, is fairly alkaline and exhibits good ground conductivity. You might not think that a soil of mostly clay would have good conductivity, but the alkalinity makes the soil conductive.

There is not much in the way of "civilization" in this area, which is relatively open prairie, though there are sizeable houses popping up around the WWV and WWVB location.

WWV building

Our tour first took us to the WWV building.

Here, in a copper lined, screened room, is where the Agilent 5071 Cesium Beam Primary Frequency References are located. These units, five in all, do not appear to be special at first glance; they look like desktop computers with time displays on the front.

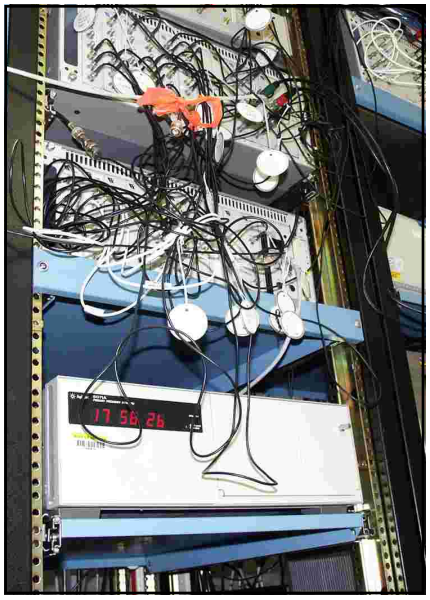
But it soon becomes apparent that the five units are connected to an elaborate comparator and control system. This system constantly compares the output of each of the five units and detects drift.

The five units are also compared to the U.S. Master Clock located in nearby Boulder.

One second has been defined as 9,192,631,770 cycles of the radiation from a Cesium-133 atom.

The original U.S. Master Clock was developed by NIST in 1949 and was based on ammonia. The ammonia time base, however, proved not to be much more accurate than the time-keeping method of the time, which was based on the movement of the earth.

Please turn to Page 2>



One of the five Cesium time standards and its comparator system at WWV and WWVB. The Cesium standards are all referenced to the U.S. Master Clock in nearby Boulder, and one will be taken out of service with as little as 5 nano-seconds drift.

NEXT MEETING June 23

The next meeting of the Greensboro Amateur Radio Assoc. will be June 23, at the Golden Corral Steak House, 4404 Landview Dr, Greensboro, NC 27407, off Wendover Ave., near Sam's Club.

The program will be a Field Day presentation by John Doggett, ARES Coordinator for Guilford County.

Above, the time code generation room at WWV. This is a shielded room that holds the three — primary, secondary and tertiary — time code generators and digital announcers used for the WWV stations. At the right, two of the three Continental transmitters used by WWVB. Each transmitter outputs 38 kW of RF, and each feeds a separate antenna. Together, the two WWVB antennas are fed in phase to form a directional antenna, concentrating the signal to the east/southeast.

In 1955, the U.S. Naval Observatory, in collaboration with the National Physical Laboratory in England, developed the first viable cesium time standard. By 1960, the cesium standards proved stable enough to be incorporated as the official timekeeping system of NIST.

An international consensus in 1967 made the number of cycles of radiation from the cesium atom the official worldwide time standard and definition of the second. Over time, as technology has progressed, the Cesium time standards have become more accurate. According to NIST, the present standard, used since 2002, is accurate to within 30 billionths of a second per year.

Know what's really cool? You can reach out and touch these units, and you can literally touch time. These units are part of what we know as time here in the United States.

Another interesting fact imparted by Douglas Sutton is that the cesium in the Frequency References needs to be replaced approximately every 5–7 years.

Much like the plutonium used in nuclear reactors, cesium will deteriorate and become unstable. The symptom of unstable cesium is frequency drift.

When the system detects that a Frequency Reference is drifting, it will take the unit off-line and inform the staff that there is a problem.

Timing stability is to within two nanoseconds

'The ticks'

A walk across the hall brings us to another screened room. This room contains the time code generators that drive many functions at station WWV.

First and foremost, they produce the transmitter carrier frequencies of 2.5 MHz, 5 MHz, 10 MHz, 15 MHz and 20 MHz. Yes, you can literally set your frequency counter to these frequencies. They are exact and stable.

The time code generators also produce the ticks heard on the WWV broadcasts; the ticks are five milliseconds of 1000 Hz. You can reproduce this sound using a digital editor.

All the tones heard on the WWV broadcasts, in addition to the time code, which is transmitted on a 100 Hz subcarrier, are produced by the time code generators.

The top-minute tone is exactly 1000 Hertz. WWV also transmits precise 500 Hz, 600 Hz and 440 Hz tones. You can tune your piano to the 440 Hz tone transmitted by WWV — and that was one of the uses when the station signed on in its original location in Virginia.

The time code generators also trigger Racom digital audio storage devices that provide the time announcements on top of every minute of every hour of the day.

WWV has been using digital storage for a long time, even before it was fashionable. Douglas told me that the time code generator room used to be filled with individual audio storage devices, each triggered individually by the time code generators.

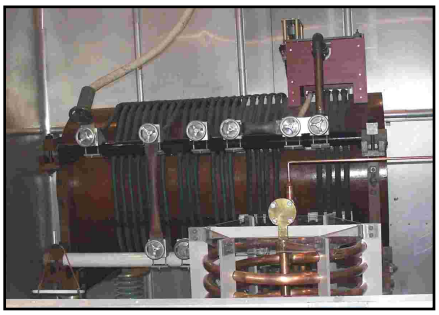
There are three time code generators in this room: main, backup and tertiary backup. There is also a homemade control system based on Z80 microprocessors.

This system monitors the time code output and will switch to one of the backups if it detects a failure in the primary. It will also sense the failure of a transmitter and automatically put the backup on the air. The system will page WWV's technicians in the event of a failure.

The transmitters

A short walk though the spotless workshop takes you into a horseshoe-shaped hallway where the transmitters are located, two for each frequency. WWV transmits with 2.5 kW on 2.5 and 20 MHz.

WWV transmits with 10 kW on 5 MHz, 10 MHz and 15 MHz. Primary transmitters are modified CCA AM transmitters; backups are Technical Materiel Corp. and are Navy surplus. The TMC transmitters are military-type transmitters and were



The variometer in the helix house, the base tuning unit for one of the two identical WWVB antennas. This is a moveable coil within a coil, and automatically adjusts for changes in antenna reactance due to wind and weather. Because the antennas are only a fraction of a wavelength at 60 kHz, the feed point impedance is very low. The cable leaving the top of the variometer carries 300 Amps of RF — for 38 kW of signal.

Please turn to Page 3>

installed in the mid-1960s. The CCA transmitters were purchased in 1990.

CCA is out of business; Douglas stated that, if the NIST stations are confronted with the unavailability of a part needed to repair a transmitter, he and the other two electronic technicians that work with him would simply manufacture it in their shop, unless the Navy happens to have the part required in its stock.

These transmitters are well taken care of, are not heavily modulated — though I did spot an Aphex Compellor in the Time Code Generator room — and are in extremely good condition.

Outside, the HF antennas are lined up all in a row. The antennas are half-wave vertical dipoles, with the bottom of the tower grounded with guy wire skirts forming a ground plane, insulators in the middle, and the top half of the tower driven.

The 2.5 MHz antenna is tall enough to require aviation obstruction lighting. I found it quite amusing to see an Austin Ring transformer hanging off the side of the tower to jump and isolate AC over the center insulator.

Up the hill from WWV, we find WWVB, a low-frequency station, operating with 50 kW ERP on 60 kHz. My first question to Matt Deutch was regarding the use of the 60 kHz LF signal.

My guess was that it was used primarily by the military. Matt pointed to the wall and quickly set me straight. The 60 kHz signal is used primarily by consumers and sets the "atomic" clocks and watches that consumers buy.

At first, this didn't make sense to me. After all, given the size of a typical watch, I would have expected it to be tuned for the HF signals. But the propagation of 60 kHz makes it ideal to reach all parts of the country relatively reliably.

Time code

My kids got me a Casio Waveceptor watch, which receives the official U.S. government time via a time calibration signal from the atomic transmitter in Ft. Collins, Colo. The watch has proven reliable in setting thus far 50 miles north of New York City.

It's interesting to note that there is no audio modulation on the 60 kHz signal. The time code generated is different from the time code on WWV in that it technically CW modulates the transmitter.

It takes 60 seconds to transmit an entire frame of time code, one bit per second. Carrier power is dropped 17 dB to represent a digital "one" exactly at the start of each second, and the time the carrier is low determines whether a mark or space is transmitted.

The station ID is accomplished by phase shifting the WWVB carrier by 45 degrees at 10 minutes past the hour, returning to 0 degrees phase shift at 15 minutes past the hour.

WWVB has three Continental LF transmitters. Two operate at any given time, with the third being a standby. The two operating transmitters each feed a separate antenna with 38 kW.

The WWVB antenna is interesting. One wavelength at 60 kHz is roughly 5,000 meters long. Obviously, it would be impractical to have a quarter-wave antenna 4,100 feet long.

So the antenna consists of a drop wire supported by four 400 foot towers, which also support wires forming a capacitive top hat. There are two identical antennas separated by 2,810 feet, or one-half mile, or 0.17 wavelength.

Each transmitter feeds 38 kW to one antenna each, which feeds each antenna a 1:1 power ratio in phase. This forms a directional antenna system which produces a 50 kW ERP signal that is approximately east/south east for the main lobe.

The short antennas have a very low input resistance, around 0.42 ohms. The tuning houses, called helix houses, contain a relatively normal sized capacitor and loading coil to match to the 50 ohm transmission line, and an extremely large coil, known as a variometer, to cancel the capacitance of the antenna.

The variometer consists of a moveable coil within the very large main coil, and its inductance is constantly varied by an automatic control system which monitors reflected power at the transmitters, as the wind can change the capacitance of the antenna and cause grief. The variometer is huge, as is the cable connecting the variometer to the drop wire. At 38 kW, this wire carries 300A of RF.

That watch of mine has tended to be reliable; there are only a handful of days, usually during the winter, when the watch cannot grab the WWVB signal overnight and synchronize. I live in an area between two mountain ranges, and when a front moves into the area, the weather it brings along will sometimes split and hit north and south of my location, with nothing occurring at home.

This makes for some interesting signal propagation, particularly at low frequencies. I have noticed, though, that there are places, usually in hotel rooms here on the East Coast, where the watch simply cannot grab the signal.

As Radio World reported in January, the National Institute of Standards and Technology, owners and licensees of WWV and WWVB, are considering putting an East Coast low frequency station on the air. The proposed frequency is 40 kilohertz, and I personally think that this station will greatly improve reception of low frequency time signals on the East Coast.

There is some speculation that station MSF in the U.K. could cause some unintended interference to the WWVB signal, as MSF also operates on 60 kHz, but my feeling is that it is simple physics; New York is a long way from Colorado, and there simply isn't enough signal strength to be fully reliable.

Since my visit to WWV and WWVB, NIST has increased power on WWVB from 50 kW effective radiated power to 70 kW, which will help with East Coast reception, but an East Coast station would work out very well.

Seeing the WWV and WWVB operation has given me a slightly different perspective on the AM broadcast band and the directional antenna at WOR. The facility is interesting, starting with the cesium time standards to seeing an LF operation.

I can truly say that I reached out and touched time.

Many thanks to Tom Ray (above) for allowing us to use his feature.

Stay tuned for the second part of this series to be published in the July edition of the Feed Line

GARA Meeting Minutes

Regular Meeting Minutes
May 26, 2008

The monthly meeting of the Greensboro Amateur Radio Association was held on May 26th at the Golden Corral restaurant located at 4404 Landview Drive beside Cracker Barrel off Wendover avenue. The meeting was called to order at 7:15 PM. President Chris Thompson asked everyone to identify himself or herself.

Chris then asked the board members if there was any business to discuss: Roy Smith N4BYU spoke about the recent soccer tournament that GARA provided communications for and the upcoming field day to be held on June 28&29 at the Summerfield community center. Roy also thanked the volunteers who helped with the triathlon at Belews Lake. Roy also mentioned that he saw in the paper that C.W. Bovender had become a silent key. He had been a GARA member in the 1990s. If you know someone who is not active anymore, give him or her a call and say "Hi."

Vice President John Strandberg AJ4BT spoke about the open house that the GARA is going to sponsor which will be held about two weeks after field day at the Lewis Recreation Center.

Engineering chairman Bob Morris W0EG said that he had purchased a call director box to use at the repeater site so both repeaters can share one phone line. He also spoke about the VHF repeater having developed a problem at the end of the soccer tournament and this will be checked out as soon as possible. We are currently operating on our backup repeater.

Treasurer Ernie Wall NC4EW said finances are good and checkbook balanced. Al Allred K4ZKQ gave the financial report stating that everything is in line with the forecast.

Gerald Donnelly KD4EQZ made a motion to accept the minutes from the last meeting. The motion was seconded and passed. The minutes were approved as published.

Allen and Madeline Bradley arrived just in time to give the official soccer report. The tournament went well with no errors on our part as usual. They thanked everyone who helped and presented an award GYSA had given to GARA. They answered questions and gave some history on our involvement with GYSA.

John Standberg introduced Jesse Lindley, N4BFD, who gave a great program on the Flexradio SDR 1000 he has been using.

Bob Mays made a motion to adjourn and Roy seconded. The meeting closed at 8:15 PM.

Ham Radio Plays Vital Role In Soccer Tournament

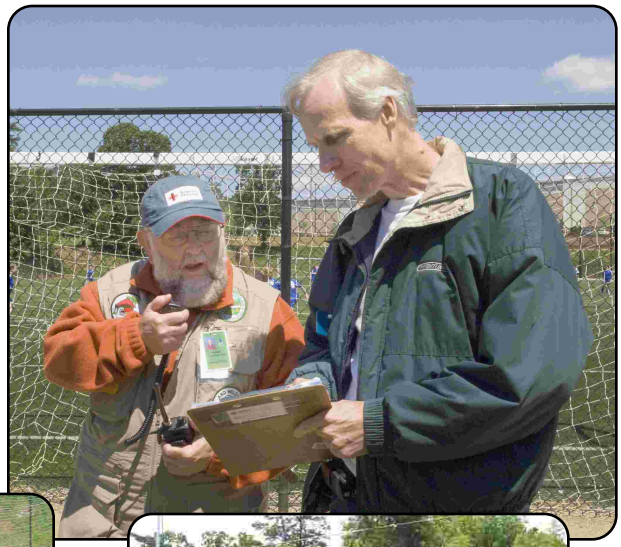
The Wrangler Jeans / McDonald's Youth 2008 Soccer Cl;assic was held May 24 & 25 at various locations in Greensboro.

Once again Ham Radio operators provided scoring reports to a central scoring/command point at Bryan Park. Those participating in the event were the following:

Madeline Bradley, KD4SVJ
Allen Bradley, KD4IUN
Ann Gibson, N4AIG
John Doggett, AJ4DV
Clark Doggett, KG4HOM
Mary Doggett, KG4ZQL
Jane Doggett, KG4ZQK
(the Doggetts like to make it a family affair)
Bob Mays, KE4MOW
Bill Blackwell, KM5DW
John Standberg, AJ4BT
Greg Spencer, KG4UQV
Larry Pike, KI4PRT
Roy Smith, N4BYU
Chan White, KJ4ADX

Thanks to all that participated!

Right photo: Chan White, KJ4ADX and Greg Spencer, KG4UQV, call in scores. Below, Roy Smith, N4BYU works one of the stations at Bryan Park. Bottom left, action during the torunament. (Photos by Tom Forrest)



(Photo by John Doggett)

2008 Dayton Hamvention A Lasting Experience For Local Ham

Photos Courtesy Jeff Davis, KE9V; Panaroma Composite Art by Tom Forrest, N4GVK

By Jim Hightower, W4JLH

The "Ninth Annual "Dayton Hamvention by Motorcoach" departed the Greensboro area at 0730 hours on May 15, 2008 chauffeured by Bill Lundy, NC4BL. Bill drives for several tour bus companies and manages each year to rent one of the coaches for the trip. Dewey Corbin,W4DJC of Franklin, Virginia was the first one to board the bus at exit 141 on Interstate 85 near Burlington. Johnpaul Harris, KI4ZVX, who lives near Asheboro, boarded with me at the Four Seasons Mall in Greensboro. In Kernersville, Rick Grubbs, N4QLX, Keith Tucker, KD4KDQ and Andy Tucker, KG4YGV joined us. A total of 24 ham operators were eventually on board with the remainder joining us along the way in Winston-Salem, Mount Airy, Hillsville, Va. and Wytheville, Va.

After a quick stop in Wytheville to fuel up the bus and grab some coffee and biscuits from McDonald's, we were all finally on board and settled in for the "no stress travel" by an entertaining and experienced chauffeur.

Two videos were shown along the way; one featuring Jeanne Robertson, a former Miss North Carolina, entitled "Flat Out Funny" which was taped earlier this year at the Elon University Theatre. The other video was also by a well know comic, Carl Hurley of Kentucky.

A stop for lunch was made at a Bob Evans Restaurant in the Huntington, West Virginia area. Another rest stop was made along Highway 35 near Winchester, Ohio. We arrived on schedule around 1800 hours at the University of Dayton. In the last few years of the Dayton trip, Bill has managed to reserve dorm rooms there for the group. The word has apparently spread among the Dayton attendees as hams from all across the country were staying there this year. Our group was housed on the 8th floor in the "South Dorm", a high-rise facility, and each unit has three bedrooms with two single beds, a kitchen with refrigerator, stove and microwave, and two lavatories, two showers and two stalls in the bathroom.

The dorm also featured a recreation area with pool tables and two televisions for us to use while we were there.

On Friday morning, as on each of the two additional days, we ate breakfast at the cafeteria on campus. After breakfast we were off to Hara Arena, the site of the Hamvention. As in previous years, those who wanted to visit the U.S. Air Force Museum were dropped off and picked up there. Bill brought that group back to the Hamvention around 1330 hours.

One of the best reasons for going on the bus trip is that you don't have to worry about parking. The group is dropped off at the front entrance in the morning and picked up for departure each afternoon at 1700 hours. Also, the bus is conveniently parked near the arena so you can load your purchases during the day. Another advantage of the group trip is that Bill knows the best eating places and makes reservations for the group each day.

The Dayton Hamvention is the largest hamfest in the world and all of the major manufacturers and dealers are here each year. And it's not just ham radio. Electronic equipment of all kind is available here, including the best deals around on computers, video cameras, HDTVs, and other electronic gadgets and gismos.

Unless you've been here, you can not imagine the size of this place. Truly, you can not see everything in one day. Numerous annex buildings have been added to the original arena floor over the years and there are acres and acres of outdoor space for "tailgate" vendors and flea market types.

As with any other purchase you are considering, be sure to shop around for the best deal. The only item I was looking for this year was a replacement battery for my Alinco DJ-V5 handy-talkie. One of the battery companies had it listed at $59.95 in their catalog. During the Hamvention most battery dealers had this particular one on sale for $45.95. I eventually found and bought one for $43.95. I also bought some "power pole" connectors. Larry King, W4VEN, who could not make the trip this year, wanted me to pick up a Hy-Gain hf vertical antenna for him. He had done his research on a particular model which covered 10, 15, 20 and 40 meters and supplied me with the funds to pay for it. I went to the Hy-Gain booth the first day and got the antenna for Larry.

A few other Greensboro hams who could not make the trip had me do some shopping for connectors and other small accessories. I took care of all of that the first day. The second day, Saturday, I just wandered aimlessly throughout the complex,taking in all the sights and sounds. As a general rule, I hate shopping for anything. But I took care of that the first day, so this was like an unguided tour of the facility and it was quite an enjoyable day.

Sunday: On the bus at 0700, stop at the cafeteria for breakfast and depart for home at 0800 hours. We arrived on schedule in Greensboro at 17:45.

If you would like to take this trip next year, Bill is planning to do it again. He will be advertising in the SERA Journal and getting the word out to the local clubs. The cost this year, which included all transportation and lodging was a very nominal $250.00 per person. You can contact Bill Lundy by email at: nc4bl@surry.net. Let him know you are interested. He will email everyone later this year with the details of next years trip.

VE Exams At Field Day

Field Day is around the corner, June 28-29. Roy Smith, N4BYU, said that VE exams may be given, but you need to get your information into either him at n4byu@bellsouth.net or Glenda at ag4nc@bellsouth.net. It depends on how many requests for the exam. Don't delay and send in your request.

Sympathy

It is with sadness we report the following deaths of friends and family among the Ham community. Our thoughts and prayers go out to these families.

• **Coleman Wade "CW" Bovender, Jr., KD4KOX.** became a silent key May 26. He was GARA member during the mid 90's.

• William H. Phelps, Jr., father of **Vashti Forrest, KA4DGS**, passed away June 8th, after a long struggle with dementia and a broken hip.

• Maude Honeycutt, wife of **Bill Honeycutt, W4WRH** and mother of **David Honeycutt, N4AXV**, passed away after a long illness June 11th.

• **Steve Rawls, K4SER**, of Williamston, (Martin County) passed away June 7th. He was the trustee of the Williamston 145.41 repeater and was a radio engineer of the NC Highway Patrol.

The Greensboro Amateur Radio Association

President Chris Thompson, K4HC
Vice-President John Strandberg, AJ4BT
Treasurer Ernie Wall, NC4EW
Secretary Greg Spencer, KG4UQV
Financial Al Allred, K4ZKQ
Engineering Chairman Bob Morris W0EG
Operations Roy Smith, N4BYU
Member at Large Clark Doggett, KG4HOM
Member at Large Dave Touvell, KN4ZO
Appointed Positions:
News letter editor and Webmaster:
Tom Forrest, N4GVK

Get Well

Information from Don Harris, W4BUZ about Rusty Hughes, WA4SAD.

Rusty's wife Sue reports about Rusty's recent fall, " The wrist is more arthritis pain and is now in a splint to keep it from flopping. We are using a sling to rest his shoulder. He is no longer able to walk on his own, and I was not strong enough to keep him from collapsing to the floor. Even the "soft" fall was enough to injure him and he is pretty fragile now." Rusty is suffering from Lou Gehrig's Disease, otherwise known as ALS."

Please keep Rusty in those prayers. Rusty is in good sprits. You can call him at 292-0227 and chat with him, or E-mail at rdh60@bellsouth.net and chat with him that way.

Connectors and Ultra Sonic Cleaners

by Ray Swan, NV2A
Strykersville, NY

So I'm gearing up to get back on the air. I found a used Johnson LowPass filter on eBay. When it comes I notice the connectors are black. That's good and it's bad! Good in that they are silver plated but bad in that I doubt the connection quality.

I have this ultra sonic cleaner that I purchased at Harbor Freight for a song and a dance with a little green sprinkled in. I put half water and half Ammonia from the laundry department of the supermarket in the thing and then dangle in the end of the filter to just cover the bottom connector. It comes out looking pretty good! So I dumped all my other connectors in they also came out looking great after a little brushing up with a stainless steel tooth brush! I figure to let this connectors sit in the sun for awhile to make sure they are all dried out before using them.

If you're interested in one of those ultra sonic cleaners I paid something $59.00 for mine. I had to return the first one because it quit on me after a few days. I suspected line issues so I put one of those cheap suppressor computer cubes in the wall socket and this one has given me no problems. You should see what they do to eyeglasses, jewelry and other small items!

Found these connectors on eBay and they were pretty cheap. Well they were cheap on both counts, monetarily and construction wise!

The adapters would not fit the PL259. I've never had an easy time of using PL259's with adapters but this was ridicules. I actually ended up busting the connector by using two pair of pliers and the adapter was nowhere near seated. These are all I have to work with at this time so I tried to fix them. I took out a 7/16 - 14 tpi thread cutter and had to clean them all up! Now they work, but, I still got cheap connectors. HI HI

Special Events Planned For Local Hams

This month has been really busy for some GARA and ARES members. ARES got an urgent call to assist with a bike race June 21. the race will be starting at Kernersville going through northern Guilford County.

The following weekend is Field Day, June 28-29 in Summeerfield.

Later GARA members will host an open house, with plans still in the organizational stages.

Also planned for the near future is a technicial class license "Boot Camp" weekend, with a tentative date Aug 9, 8-5 and Aug. 10, Sunday 12-5, presented by various instructors.

Please keep check with the GARA (www.w4gso.org) and the ARES (www.guilfordares.org) web sites for further updates.

Got something you'd like to submit - send it in - we'd appreciate it! n4gvk@bellsouth.net

Engineering Report ...

The engineering committee has been busy this past month trouble shooting a problem with the VHF2 repeater power amp. The amp apparently failed near the end of the soccer tournament and the back-up repeater VHF1 was immediately placed in service.

Engineering Chairman Bob Morris, W0EG said, “It looks like the solder connection failed on the jumper between the final and the filter board. I can see a gap between the jumper and the trace. The ceramic capacitor is coated with soot but most likely still OK, as is the Teflon mica DC blocking capacitor on the RF trace. The area needs cleaning and then I'll re-solder the jumper.”

“Chris and I visited the site and looked over the amplifier in VHF2 and initially did not see the problem. We then briefly put VHF2 back on the air and it showed only 10 Watts output and began to smoke and smell. On second inspection, the problem area was more obvious as we found a charred ceramic bypass capacitor near the power amplifier board output. We removed the PA and I took it home for further troubleshooting,” Bob added.

The problem is still in a repair mode. More will be reported when the information is made available.

Letter To The Editor

On page 5 of the May edition of the "Feedline", a statement is made that "Our current 442.875 repeater is not compliant with control regulation". This is dead wrong, and here is why:

1)- There are three modes of control acceptable to the FCC for a repeater. Namely (a) Local Control, (b) Remote Control, and (c) Automatic Control.

2)- 99.999% of the time, the machine is under the FCC Automatic Control rule. Courtesy of the RC-96 controller. Provisions have been made so that (i) the machine transmitter does not come up on rogue input carriers (use of an 88.5 Hz CTCSS tone on the input), and (ii) should somebody sit on his microphone PTT, and trigger the machine, there is a 3 minute transmitter timer which will shut off the TX. Those two provisions will eliminate 99% of the problems.

3)- Now, should the machine need to be shut down remotely (FCC Remote Control rule - somebody is swearing on there), this can be accomplished through over the air commands which should be kept confidential to Control Operators, who are those individuals officially designated in writing by the Trustee. When doing that, a Control Operator radio instantly becomes an "Auxilliary Station", per FCC rules. It used to be that Auxilliary Stations could not be operated below 222.1 MHz. Although this is irrelevant to this case (input of 447.875 MHz), you can now do that down to 144 MHz, as the rule changed about 2 years ago. There are two (2) Control Operators located within a mile from this machine (N4DFA and K4HC). They will override any other signal on the input of the machine, even on low power. I would estimate at 90% the number of UHF repeaters which are controlled on their input in similar conditions.

4)- And then, there is the last remedy. Should everything above fail, there is still the third option, the FCC Local Control rule. The two Control Operators mentioned above have access to the repeater site within 15 minutes, and they will pull the repeater plug if it needs to be. Within 45 more minutes, there are more Control Operators who can make it there and do the same thing. This is not a machine located on a tower platform at 1500 feet above ground.

Need to pick the right battles.
Arch - KT4AT - GARA Engineering Chairman 2002-2006

Need to Make a Coax Coil? Here's a Tip:

Parts needed:

2-Liter pop bottle (empty)
Coax
Super Glue
Baking soda (you'll see why)

1) Wrap the coax around the pop bottle
2) Adjust coax for neatness
3) Apply superglue between the turns

The last step is the baking soda -- sprinkle a pinch on a wet superglue joint and bingo! Glue is dry.

When you're done, open the pop bottle then crush it to get it out of the coil.

Last step -- stand back and look at the beautiful coil you just made.

73 de Ken Bessler, KG0WX
Wichita, KS *(Via E-Ham)*

Local 220 Repeater Under New Ownership

The N4QVI, 224.96 repeater has been sold to Harold Clapp, KD4TPJ of Julian. Jerry Kanoy, N4QVI, owned the repeater for a number of years. According to Harold, the Icom repeater was completely overhauled and a new controller installed. The machine is located atop the library on the UNC-G campus. There is a tone of 107.2 to access the repeater.

Calendar of Upcoming Events

- **June 28-29:** ARRL Field Day
- **July 12:** Salisbury Firecracker Hamfest
- **July 26:** Western Carolina Hamfest. Waynesville, NC - www.wcars.org/hamfest.html
- **Augist 2-3:** Technician Boot Camp
- **Augist 8:** Tour de Furniture
- **August 30-31:** Shelby Hamfest
- **Sept 6 & 7:** Tour to Tanglewood 2008 Bike Ride
- **Sept. 20:** Doggett Picnic, “Doggettville”
- **Sept. 20 & 21:** Virginia Beach Hamfest
- **Oct. 12:** Maysville, NC Hamfest

Area Activities

FOURTH MONDAY – at 6:30 PM, the **Greensboro Amateur Radio Association** have their regular monthly meeting at the Golden Corral, 4404 Landview Dr, Greensboro, NC 27407, off Wendover Ave, near Sam's Club. Please plan to gather at 6:30 PM for dinner. The meeting is scheduled to start at 7:15 PM

CLUB NETS:

SUNDAYS – weekly at 9 PM, the **GARA News and Information Net.** This net features NewsLine and is on the 145.150, W4GSO repeater. Roy Smith, N4BYU is always looking for net controls. Contact him if you would like to help.

THURSDAYS – The **Guilford County ARES Net** meets on the 145.150 repeater (100 Hz. tone) at 9 PM.

TUESDAYS – at 8 PM, the **2 Meter SSB Net** meets on 144.225 Mhz. USB. Chris Thompson, K4HC is the net control station. (Not operational present time)

WEDNESDAYS – **The Guilford Amateur Society** holds their weekly net on the 145.250, W4GG repeater with an 88.5 Hz. tone. Jim Hightower, W4JLH is the net control.

OTHER ACTIVITIES :

FIRST MONDAY – **The Guilford County A.R.E.S.** monthly meeting is held at 1002 Meadowood St. off W. Wendover Ave, in the EMS building, beginning at 7 PM.

THIRD MONDAY – at 6:30 PM **The Guilford Amateur Society** holds their monthly meeting at the Greensboro Police Western Sub Station at 300 Swing Rd in the community room. Refreshments at 6:30 PM and the business meeting begins at 7 PM.

THURSDAY – at 11:15 AM, Greensboro Hams get together for lunch. Thursday lunch group is meeting at the K&W Cafeteria, 300 Forum VI Mall at Friendly Shopping Center. Talk-in is on the 145. 150, W4GSO repeater with a 100 Hz. tone.

EVERY FRIDAY – at 8 PM (approximately) Greensboro Hams get together for coffee at Guilford College (summer location till Daylight Savings time changes)
• Hams at Hams every Friday afternoon, Cone Blvd. restaurant, at 5:30 - Talk-in on 145.150 repeater.

Greensboro Amateur Radio Association
P.O. Box 7054
Greensboro, NC 27417

Web:
www.w4gso.org

FIRST CLASS MAIL

June 28 - 29, 2008