DIDN'T MAKE IT TO FIELD DAY?

>> PHOTO COVERAGE ON PAGES 4 & 5

ENGINEERING COMMITTEE HARD AT WORK

>> PAGES 3, 6 & 7

ANNUAL BAR-B-Q PICNIC AT THE DOGGETT'S

September 22, 2007, starting at 6 PM.
All local amateurs are invited.
FUN, FOOD & FELLOWSHIP

E-mail John Doggett and let him know how many will be attending: ki4bms@arrl.net

The Greensboro Amateur Radio Association

Feed Line

Providing Amateur Radio news for the Triad

Volume 16, No 7 | **July, 2007**

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

Field Day Fun

Matchstick Antenna Was Last Minute Idea

by Greg Spencer, KG4UQV

On Saturday morning June 23, there was a slow period at work, so I checked the ARRL web site for any late news about field day, which would start later that day.

I saw an article about the International Space Station participating in field day so I copied down the frequencies used and the time and position that it would be above the horizon. When I got home I looked in my ARRL Handbook and found an antenna design for a medium gain 2 meter yagi designed by L.B.Cebik, W4RNL, which used a piece of PVC pipe for the boom. This antenna was of a reasonable size and with six elements.

I thought it should do the trick so I headed out to the Field Day site with my handbook, On the way I stopped by Lowes and picked up some materials. I could not find anything to make the elements out of so I kept looking and finally found some galvanized steel wire of just over 1/8" diameter. It was strong enough and cheap enough and there was plenty of length to make an antenna and a few mistakes. I also picked up some screws and a bracket that I could reshape into a connector mounting bracket.

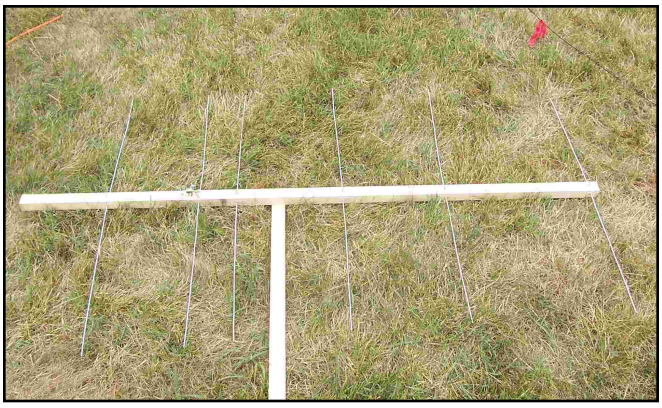
I did not get any PVC pipe for a boom because the article stated that this antenna could be built on any non metallic boom and I knew that I had some 1" x 1.5" wood about 5' long already at the field day site.

After arriving at the park I helped to finish setting things up and getting the radios going. So, it was getting close to dark before I really got started building this thing. After straightening out the wire and cutting the elements to length, I drilled holes through the boom for the elements to pass through and drilled holes in the top for screws to hold the elements in place.

A little customizing with a grinder had a bracket suitable to hold an SO-239 connector to the boom. Dub Bridges KG4UFB brought out his trusty antenna analyzer and helped or more correctly tuned it for me. After we tuned it Dub said we should call it a Matchstick Antenna because of the wooden boom.

We then erected a 20-foot tower with the antenna at the top and proceeded to check it out. With just minutes to spare Dub got his FT 897 set up and tuned in with the proper offsets and tried to make contact with the space station. After several tries with no response we determined that they must have been too busy to get on the air at that time.

We did however turn it to the north and substitute a Yeasu FT-530 ht and put Dub's 897 back on duty on HF. With the FT-530 we tried the 145.15 W4GSO repeater and dropped the power down to 500 MW and had no problems getting into the repeater. We would have tried more distant stations but we ran out of time. I plan to do some more testing with this antenna.



KG4UQV antenna for Field Day

Photos by Greg Spencer, KG4UQV

GARA Meeting Minutes

Regular Meeting Minutes
June 25, 2007

The meeting was called to order at 7:25 PM, by Chris Thompson, K4HC,vice president. John Doggett, KI4BMS, was out of town.

Roy Smith, N4BYU, talked about the Natural Science Center hosting GARA meetings and it was decided to keep this on hold while we search for a cheaper place that will meet our needs. The N.S.C. had asked for an annual donation to offset their cost for keeping the center open later. We need people to use the radio station at the natural science center.

There was no new business.

Alan Bradley, KD4IUN, said that there are no soccer tournaments in July.

Carlton "O"Rork, N4DFA, spoke about engineering. The repeater has been repaired with the installation of a new pair of final's and a resistor and capacitor that were damaged when the final transistor let go. The new duplexer has arrived and Arch, KT4AT, has been tweaking it for minimum insertion loss.

The repaired repeater and new duplexer should go online on Friday 6/29/07 and then our great coverage will be back. The backup repeater that we had been using will be checked out and realigned so that it will be ready the next time that it is needed.

Ernie Wall, NC4EW, gave the treasurer's report stating that we had higher than normal payments this month due to the duplexer purchase and a phone line repair charge.

Al Allred, K4ZKQ, gave the financial report stating that all normal items were well in line with the forecast

Roy Smith, N4BYU, said that his computer that he uses for GARA member e-mails is almost back up and running. He requested that anyone not receiving e-mail from him to contact him.

Bob Mays, KE4MOW, said that we all need to appreciate all those who volunteer their time for the club and remember to say thank you.

The Meeting closed at 8:30 PM
Respectfully submitted by
Greg Spencer KG4UQV

The Greensboro Amateur Radio Association

President: John Doggett, KI4BMS
Vice-President: Chris Thompson, K4HC
Treasurer: Ernie Wall, NC4EW
Secretary: Greg Spencer, KG4UQV
Financial: Al Allred, K4ZKQ
Engineering Chairman: Carlton O"Rork, N4DFA
Operations:Roy Smith, N4BYU
Members at Large: Clark Doggett, KG4HOM
Tom Forrest, N4GVK
Appointed Positions:
News letter editor and Webmaster:
Tom Forrest, N4GVK

Thursday Lunch Bunch Gets Tour Of RF Micro Devices

by Don Harris, W4BUZ

After our fine tour of the new WGHP Fox8 Transmitter site, Clint Davis, W4IVY, and Tom Forrest, N4GVK, were discussing the GARA tour of RF Micro Devices back in 2005. The idea of our group going on such a tour was presented to the group and the tour was on Thursday, June 21, immediately after our luncheon.

We arrived at the RF Micro Devices Corp. Headquarters Building on Thorndike Rd.

Derek Brown, WF4I, was waiting for us in the reception area here he was introduced to the group. After we signed in, Derek showed us some of the beautiful building and led us to the RFMD amateur radio station room on the second floor.

There are 30 radio amateurs who work for RFMD that may use the facilities. The radio room is well equipped with choice gear including: Yaesu FT-920 HF Transceiver; Yaesu FT-847 HF/VHF/UHF/SAT Transceiver; among other things. Derek described each transceiver and offered us the opportunity to work someone on the rigs.

Next, he took those who wanted to go on the roof to see the antenna systems. The HF beam antenna was a Mosley Pro-67C 40-10 meters whopper. This is something we would all like to have one of to work the world. Derek likes to work QRP (low power contacts) and says that this antenna works very well.

There was a nice 3 element 6 meter beam, too. Last, but not least, there was a super nice 2MCP22 2 Meter and a 436CP42 430 Mhz. set of beams controlled by an EL-AZ rotor system which allows tracking of satellites which typically use 2 meter downlink and 430 Mhz. uplink operation. If one wants to do some serious hamming, this is it! What more can I say.

The call letters of this fine station is KG4KLM, for which Derek Brown, WF4I, is the Trustee. Derek gave us beautiful KG4KLM QSL Cards which has a glossy full color aerial photo of the RF Micro Complex on the front and station details on the back. After this first wonderful tour with a most interesting show and tell session, Derek took us to the RF Micro Devices Fab. 3 building for the rest of the tour. It was a real pleasure to have the opportunity for each of us to meet and talk with Derek. We appreciate his time and efforts very much.

We were introduced to Jim Christianson in the secure entrance area of the Fab. #3 manufacturing facility. Taking of photos in this area was not allowed. Each lab has double glass doors which one can peer through and see the long corridor where

Please turn to page 5 –>

Engineering Report

by Engineering Chairman Carlton, O'Rork, N4DFA

Engineering Committee Has Busy Month

Considerable work, repair and replacement of equipment has been done recently. I am sure all of you have noticed the tremendous improvement, great reception and increased coverage area as well as the quality sound of our VHF repeater. This is due to two primary things. My order and purchase of the new Telewave Duplexer, which the board had approved and the great deal of time, hard work and expertise of Arch, J.B. Archinard, KT4AT. I will condense this recap somewhat to indicate specific dates and times that things were put in place and the results achieved.

As covered in the earlier report, I had delivered the Master 2 with the bad final amp transistor to Arch for replacement with a new matched pair. During this time I received the new Telewave Duplexer and held on to it for a few days while Arch was working on a D-Star project. Then he quickly repaired the Master 2 and on June 22nd I carried the new duplexer over to his home and spent the day with him while he tuned it for minimum insertion loss with acceptable rejection of at least 92dB. However, we were able to get the desired results on the transmit side, (minimal help on my part), but the adjustable capacitors on the receive cans did not have enough adjustment range and there was a 2.7 dB insertion loss instead of less than 2dB as advertised by Telewave. This may have partly been due to the fact that it covers a frequency range of 118 to 148 MHz and therefore did not function properly in the amateur range. I picked up the repaired Master 2 repeater and left the duplexer for Arch to add additional caps to the receive side to reach the desired insertion loss of about 1.5 or less.

I had to modify the wooden box that we keep our duplexer in to accommodate the much taller Telewave. This involved making a strong bottom to raise the duplexer up off the floor as well as to allow clearance inside for the top to be attached and not touch the top of the tuning rods. I will make a picture of this for the next report. On June 25th, Charles Lyons and myself went to the site and physically installed the repaired Master 2 and I left the duplexer box on site. I did not switch back to the repaired machine as Arch would soon have the new duplexer ready. He will address his duplexer work in Part 2. On June 29th, Charles, Roger, Allen and I met Arch at the site and installed the new duplexer as well as put the repaired Master 2 back in line. Roger and Allen had a little tour of the setup and placement of our repeaters. Arch checked out every item of equipment with his accurate diagnostic gear and all was adjusted as necessary and working excellent with receive coverage equivalent to the maximum that we had several years ago. With his instrumentation Arch found that something was in fact wrong in the receiver stage of the backup repeater and later found a bad transistor in the mixer stage. The combination of the degrading Phelps Dodge duplexer and the failed mixer stage fully explains why our backup machine was not receiving well for that period of time in use.

Arch carried it home to repair. He replaced the transistor in the mixer stage. As we now had a properly operating duplexer that was clean with no generated noise or intermod, he decided to put in a new preamp to replace the GE that has an improved sensitivity of 2X or 3dB. On July 7th Arch and I reinstalled this machine that had been the backup and put it back in line. Currently it is the one in use. It is in a testing period at the moment, but so far it has worked out exceptionally well. Basically it improves our receive coverage to the point that HT's which before were barely getting in, are now getting in full quieting or with substantially less white noise. Due to our ARES primary position, Soccer, etc., it is to our advantage to have the best possible receiver available. This matter will be discussed by the Board and we my leave this preamp in place and also put the same in the other Master 2 that had the bad final. This would mean that when we switched out from one machine to another, they would be more on an equal basis and we would not see a noticeable difference in our coverage!

Ham Happenings
NEWS briefs

Jerry Perryman, WA4BKR, SK...

Gerald Walter "Jerry" Perryman, 78, WB4BKR, passed away at his residence Monday, July 2, 2007. Services were held July 6.

Jerry was born January 14, 1929, in Chicago, Ill., to the late Edward Joseph and Florence Ball Perryman. He was a graduate of Greensboro Senior High School and served in the United States Navy for five years during the Korean War. In the early days of NASCAR, he was the chief engineer of the Universal Racing Network. He retired from Analog Devices as an electronics engineer. He was an avid member of the Thursday "Lunch Bunch."

NT1J Off To Ireland Again ...

The last time Charles, NT1J, was at his home in Ireland (in May/June) he was pleased to QSO with GARA members Carlton, N4DFA, Ernie, NC4EW, John, KI4BMS, Lisa, K4LAT, and Dave, KN4ZO. He will be back in Ireland from 22 July to 4 September and will once again listen for GARA members on Saturdays at 12:00 UTC (8 AM Greensboro time) on 14.280 MHz. His Irish call is EI7JV. Why not give him a

NEXT MEETING

The next meeting of the Greensboro Amateur Radio Assoc. will be July 23, at the Golden Corral Steak House off Wendover Ave, near Sam's Club.

Field Day '07 "Snap Shots"

John Link, W4HWT, makes a contact, stajnding with his restored 1930 Ford.

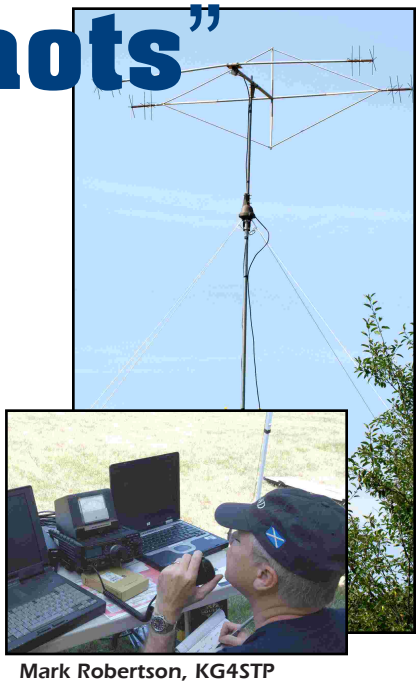
PLEASANT GARDEN - Hagan-Stone Park near Pleasant Garden was the place to be for ARES Field Day 2007. This year Field Day was coordinated by Dave Collins, KE4IAF.

"There were about 40 or so participants. Never really got a good count but thats a good guess. One fellow saw it in the paper on Sunday morning and came out and worked some CW that morning," Dave commented.

Dave Collins, KE4IAF & Matt Towe, KG4ZGZ

"That was the 50th anniversary of his first Field Day. I got a kick out of that. We ended up with 822 contacts. 382 CW and 440 phone."

Dave said. "Tried my best to beat out the SSB but fell short again. We ran 3A and had a dedicated GOTA stations on the air about all of the time."



Mark Robertson, KG4STP

The activities also received publicity of New 14 Carolina and a nice story by Nancy Mclaughlin, of the News & Record.

Here are a few candid photos from the activities.

Photos by
Tom Forrest, N4GVK

Nancy McLaughlin, of the News & Record interviews Kelli Joyce, KI4LRS & Ernie Wall, NC4EW.

Larry King, WA4VEN; Clint Davis, W4IVY and John Link, W4HWT

Lisa, K4LAT and Dave Touvell, KN4ZO

Thanks to the Red Cross volunteers for the Saturday evening meal.

Rob Erikson, KG4OPX and Roy Smith, N4BYU

Dave Collins, KE4IAF and Larry King, WA4VEN

Susan, KG4NRI & Matt Towe, KG4ZGZ, left photo; Mark Robertson, KG4STP & Terrell Brown, KI4GIC, center, Kelli Joyce, KI4LRS & Ernie Wall, NC4EW, right photo.

Setting up Dub's screwdriver antenna, left, & visitors to a station, & meeting old friends right, below left , overall site

Mark, KG4STP & Dub Bridges, KG4UFB.

Tour from page 2 ...

processing machines are placed on each side. Now, when I say long. . . I mean L-0-N-G.

Since the manufacturing processes often involve acids or toxic materials, the workers must wear special protective gloves, for example. In fact, the process chemicals may be so acid, that a time limit of use is set for the special gloves in the specific application.

Jim Christianson introduced himself to the group and described the RF Micro Devices complex. There are four manufacturing plants, two at the Thorndike Rd. location and one on Gallimore Dairy Rd. A first facility was built on the Thorndike Rd. property which was Fab. #1. The Gallimore Diary Rd. plant was the second built and became Fab. #2. Fab. #3, where we were located, was the last built here but has had expansions he described to us as A, B, and C. RF Micro Devices employs 2500 people, approximately.

We extended a very special thanks to Jim Christianson on behalf of our group for his fine tour, and to RF Micro Devices through him for allowing us the privilege to do so.

Thursday Lunch Bunch outside the RF Micro Devices main building in Greensboro.

Photo by Clarles Lyons, NT1J

The New Telewave TPRD-1456 VHF Duplexer

By Arch, KT4AT

Out of the box

Straight out of the shipping box, this Telewave TPRD-1456 VHF duplexer exceeded minimum specified rejections on both sides (TX -116 dB, RX -106 dB, spec -100 dB minimum). It also passed SWR on all ports (less than 1.20 : 1). However, ***it failed to meet specified maximum bandpass loss*** (2.0 dB max), and by quite a bit (TX 2.3 dB, RX 2.7 dB losses). Measurements were conducted with an HP-8753C network analyzer, at an RX frequency of 144.55 MHz, and a TX frequency of 145.15 MHz, per factory tuning.

Transmit (High) Side

Reducing bandpass loss involves increasing coupling between the coupling loop and the bandpass rod. There is also a maximum coupling value beyond which the reject notch will not adjust 600 kHz away. On transmit (high side), this is not a problem with this duplexer. Experiments showed that a loss as low as 1.1 dB is achievable, and, in this case, the notch capacitors were almost all out (minimum value).

Receive (Low) Side

There is a totally different situation on the receive side. With the notch capacitor all in (maximum capacitance), and appropriate coupling, there is no way to achieve notch tuning 600 kHz away. Either you get tuning at 600 kHz separation, but then a minimum of 2.6 dB loss was achieved, or you can get the loss down to 1.3 dB, but separation would not tune below 1.2 to 1.5 MHz).

An immediate improvement was achieved by adding capacitance in parallel with the original notch capacitor. Photo 1a shows the coupling loop in its original form, Photo 1b shows the modification (adding a Sprague Goodman piston cap in parallel). This provides around 1.45 dB loss, at maximum notch capacitance, still allowing the tuning of the notch 600 kHz away.

A better way of doing this would be to redesign the coupling loop (make it longer). This would improve the Q of the notch (increasing L increases Q, whereas increasing C decreases it). This is a two week project, because it will impact the tuning range of the main bandpass, and the tuning rods are already almost fully retracted at 144 to 148 MHz (this duplexer covers 118 to 148 MHz). Also cavity-to-cavity jumpers may have to be changed in length.

Other Issues

The other issues which were also addressed up front have to do with intermod. ***Every duplexer which crossed my path within the past 15 years, regardless of brand, but which had the cavities electrically connected together through the mounting frame, exhibited intermodulation distortion.*** This is because the outside of the cavities is submitted to incident strong RF fields, creating rogue, uncontrolled currents on that frame, and create intermod at those points which have different metals in contact. And somehow, when you have created an intermod

Photo 1a-Original Notch Cap

Photo 1b-Modified Notch Cap

response on RX, it finds its way back into the duplexed circuit. Two steps were taken on that specific duplexer:

a)- Use of rivets: Rivets are a no-no anywhere in a duplexed system. Telewave used 24 of them on that model, holding braces together. All rivets were replaced by stainless steel 8-32 screws. Photo 2a shows the original brackets, and Photo 2b shows the modified versions with stainless steel screws.

Photo 2a - Original braces (with rivets)

Photo 2b - Modified braces (with screws)

b)- Isolation of the cavities was achieved with Avery Polyester adhesive sheets, along with 2 inch shrinkable tubing applied on the braces.

c)- To achieve the above, the non-reusable clamps were removed, discarded, and replaced by 7 inch stainless steel hose clamps. Thicker polyester padding was also applied under the clamp worm gear, where protrusions were present which could break the insulation. Photo 3 shows the entire arrangement, and Photo 4 the entire reassembled duplexer.

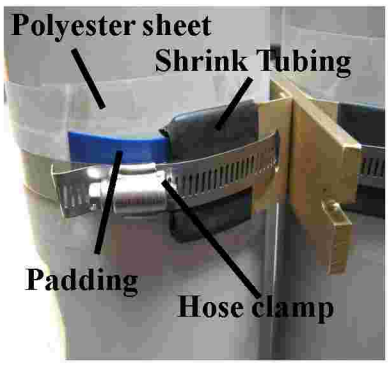


Photo 3 - Cavity attachment

Photo 4 - Entire Duplexer

Results

Figure 1 shows the duplexer response after retuning. TX was tuned to achieve a 1.5 dB loss, and associated reject at -104 dB. TX went from 2.2 dB loss to 1.5 dB loss, and reject from 116 dB to -106 dB. RX was the sweet spot, tuned at minimum bandpass loss of 1.45 dB, and a reject of -104 dB. RX went from 2.7 dB loss to a 1.45 dB loss, and reject remained basically unchanged at -105 dB.

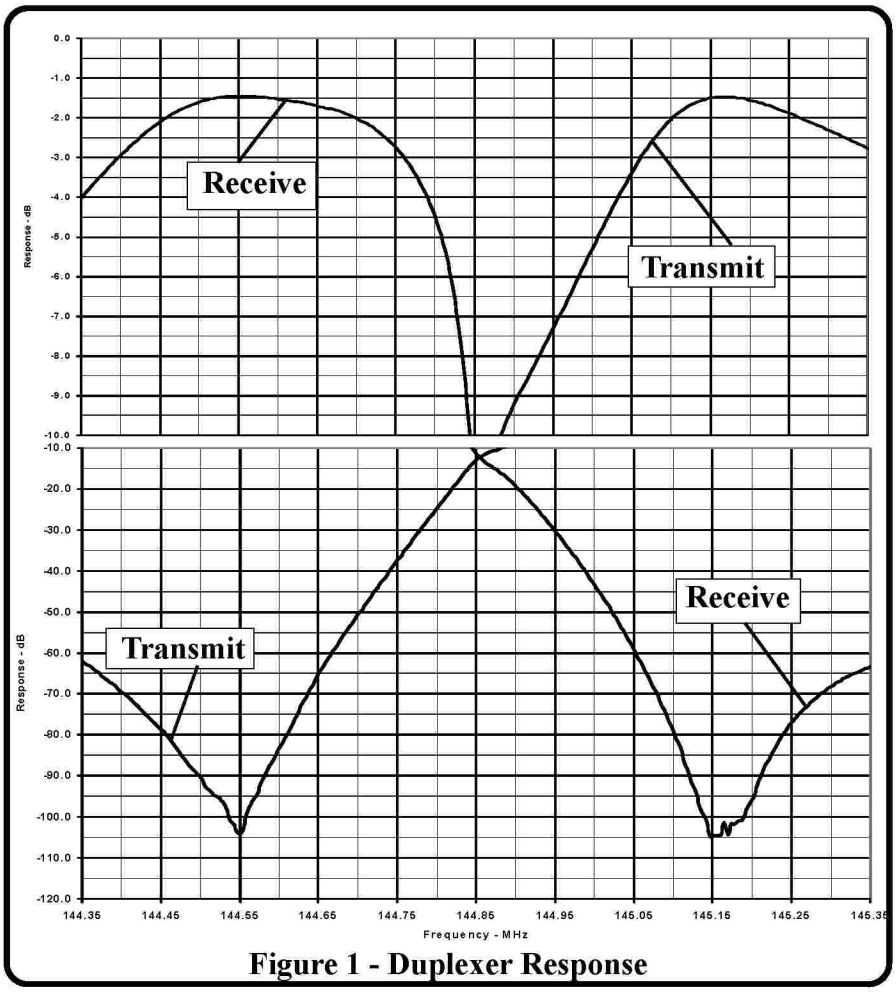


Figure 1 - Duplexer Response

Area Activities

FOURTH MONDAY – at 6:30 PM, the **Greensboro Amateur Radio Association** have their regular monthly meeting at the Golden Corral on Landview Dr., off W. Wendover Ave. 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.

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.

TUESDAYS – at 8:30 PM **The Triad SkyWarn Net** meets on the 147.225, K4ITL repeater, no tone required.

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.

SATURDAYS – at the K&W Cafeteria on Big Tree Way, hams get together for **Saturday Breakfast** at 7:30 AM. Talk-in is on the 145.150, W4GSO repeater, with 100 Hz. tone.

THURSDAY & FRIDAY – at 11 AM, Greensboro Hams get together for lunch. Thursday lunch group is meeting at the K&W Cafeteria off Big Tree Way and a Friday lunch bunch is at the K&W Cafeteria off South Holden Road. 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)

Greensboro Amateur Radio Association
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Web:
www.w4gso.org

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