

Feed Line

GARA - We're putting the "Spark" back in Amateur Radio®



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Editor: Tom Forrest, N4GVK

Web Site: www.w4gso.org

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E-mail: info@w4gso.org

Ready For A Hike? Take Along A QRP Back Pack Mobile Station

by Chris Thompson, K4HC

I recently purchased a Yaesu FT-817 - I have lusted after one since they first came out. Used prices are pretty reasonable on a used one now - under \$400, even through the major ham dealers. For those of you that don't know, the FT-817 is a 5 watt HF, 6m, 2m and 70cm self contained radio. This thing is a little bigger than a large HT, but with far more capability.

This has been my first foray into the QRP world (5 watts or less output). Except for my early Novice days, when the power limit on HF was 75 watts input, I've always used a 100 watt output radio. Even with modest antennas, mostly wire antennas, I've had pretty good success working what I've heard.

With the acquisition of the 817, I wanted to stretch things a little, and take advantage

of the portability of this radio. My mind began working on ways to make this happen. I joined both the FT817 and HFpack Yahoo groups, and started looking through the suggestions and ideas that others had.

Shortly after I got the radio, I went to the Raleigh hamfest with some ideas in mind. I picked up some components for a Hustler mobile whip, an antenna mounting bracket, a Heil Traveller headset, and the find of the 'fest was a surplus Army AN/PRC-25 backpack frame (for \$5).

Since there is no mobile bracket available for the 817, I tossed several ideas around in my head trying to figure out how to securely mount the radio. I finally built a wooden mounting plate (that would bolt to the backpack frame) and used flat bungee material to securely

hold the radio and the LDG Z-11 automatic tuner to the frame. Since I already had a Pocket PC, some investigation led me to find the CTR-Remote software package that controls the 817 (and other radios too) from the Pocket PC.

After putting all this together, my first Pedestrian Mobile contact was with VE3II in



Close-up of the components and the layout. The Yeasu 817 is on the top and the tuner at the bottom.

Ontario, Canada on 20m SSB. Not to bad for 5 watts (or did it have the radio set on 2.5 watts?) with the lousy band conditions we've had on HF recently. Hurry up sunspots!

Had a couple of minor hitches in getting this setup going, but for the most part everything went together smoothly. As we used to say in the Coast Guard, Semper Gumby! (always flexible). My ideas changed along the way - as one piece would come together, another challenge would present itself.

I've been having lots of fun with this, and hope some of you get some ideas of your own.

The HFpack group is on the web at: <http://www.hfpack.com> - lots of great information on portable operation of all flavors.



Chris Thompson, K4HC and his "man pack", left photo shows Chris operating the radio from a pocket PC and the right photo shows the complete configuration. (Photos by Tom Forrest, N4GVK)

GARA Meeting Minutes



Regular Meeting May 22, 2006

The regular meeting of the Greensboro Amateur Radio Association was held Monday evening May 22, at 7:15 PM at the Golden Corral Steak House off Wendover Avenue. One visitor was present, Brent Wells.

The meeting was called to order by President John Doggett, KI4BMS. The minutes of the previous meeting were approved as printed in the "Feed Line." It was noted Earl Yeamans, N4ERL and Earl Fox, W4DWR became silent keys in May.

There was no old business reported. Committee reports were presented.

Treasurer Ernie Wall, NC4EW, reported all was in order for the treasury and Al Allred, K4ZKQ, gave his financial forecast, saying everything is coming together as planned. Ernie also had a thank you note from Betty Wilson, widow of Pete Wilson, K4CAV.

Secretary/web master/news letter editor Tom Forrest, N4GVK, said all was fine.

Engineering Committee report was presented by Arch, KT4AT. Arch said AC plugs were replaced on power cords in the shack. He also noted the city would be installing a new back-up generator at the site and there would be some down-time on both repeaters while the wiring was taking place.

Operations Chairman and Repeater Trustee Roy Smith, N4BYU, had no report.

John Doggett, KI4BMS, reported about various upcoming events. Allen Bradley, KD4IUN, requesting volunteers for the annual soccer tournament as well as volunteer operators for the Natural Science Center Ham station. President John

Doggett, KI4BMS, commented on a couple of items: the fox hunt will be rescheduled and the Mt. Mitchell trip is scheduled for the second Saturday in October.

The program for the evening was presented by Chris Thompson, K4HC on his portable "back pack" QRP HF radio set-up. Chris configured the radio and tuner to be carried portable and operate QRP battery power. The antennas were Hustler mono-banders. The members thanked Chris for a great demonstration.

There being no further business, the meeting was closed at 7:58 pm.

Respectfully submitted by Tom Forrest, N4GVK, Secretary

Board Meeting May 8, 2006

Greensboro Amateur Radio Association
Minutes of Board of Directors Meeting
May 8, 2006

John Doggett convened the Board in a closed session at 7:00 PM.

The Board opened its regular session at 7:45 PM. The following Board members were present: Ernie Wall, NC4EW; Clark Doggett, KG4HOM; "Al" Allred, K4ZKQ; Roy Smith, N4BYU; Rudy Langley, KG4HCT; and visitor Chris Thompson, K4HC.

The president announced that this year's barbeque would be on 9/16/06, the third Saturday in September. He then asked for reports from those present:

- Treasurer Ernie Wall reported a checkbook balance with one major bill for insurance to be paid. Following his report, there was considerable discussion regarding the feasibility of a combination of checking and money market accounts to generate more income for the club. In reply to a

direct question regarding options available with his firm, Rudy said that the club's balance would not meet their minimum balance criteria. Ernie will "shop around" for options to present at the next meeting.

- Chris, on behalf of Peggy Yeamans, thanked the Board for the flowers sent to Earle, N4ERL, during his sickness. Ernie asked if the usual memorial for deceased members should be sent to Hospice. He was instructed to do so.

- John reminded the Club about the Founder's Day and the ARES activation scheduled for Saturday, 5/20/06.

The others present had no reports.

Roy moved for adjournment, it was seconded.

The meeting adjourned at 8:35

Respectfully submitted, W. D. "Al" Allred, K4ZKQ, Acting Secretary

Next Meeting

The next meeting of the Greensboro Amateur Radio Association will be June 26, 2006 at the Golden Corral Steak House off Wendover Ave. The program will be presented by Arch, KT4AT, "Digital Has Landed." This will be about the future of digital communications in Ham radio and digital repeaters.

"The Feed Line" is ©2006 by the Greensboro Amateur Radio Association and published monthly. Our address is P.O. Box 7054, Greensboro, NC 27417. The purpose of the newsletter is to provide the club and prospective members information about the club and amateur radio in general. Material and information should reach the editor by the first Friday of the month for the next edition of the newsletter. Opinions expressed in "The Feed Line" do not necessarily represent the views of the officers, directors, editor or members of the Greensboro Amateur Radio Association. Material may be reproduced, provided proper credit is given to GARA.

145.15 and 442.875 Repeater Audio

By Arch, KT4AT

Engineering Chairman

This article is a review of the various components which make up the 145.15 and 442.875 repeater outgoing audio. For both machines, there are 4 sources of modulation: (1) the receiver port, (2) the controller voice synthesizer, (3) the controller CW generator, and (4) the outgoing CTCSS tone. In addition, on VHF, there are also (5) the autopatch, (6) the weather radio port, and (7) the Digital Voice Recorder (DVR).

The receiver port: Audio signals originate at the Mastr2 receiver demodulator. The Mastr2 provides a usable audio response from 20 Hz to around 5 kHz. It is the job of a custom audio board (known as the M2Audio), that I designed five years ago, to provide the required audio processing. I use this same board in all Mastr2's which cross my bench.

First, an adjustment upward is performed from 3 kHz to 5 kHz to compensate for the Mastr2 response, which is quite sluggish there. The high side of the audio spectrum is important, because it provides voice "presence".

Second, de-emphasis is performed. A complete explanation of pre-emphasis and de-emphasis exceeds the scope of this article. Let's say that the signal your HT or mobile sends accentuates, at 6 dB per

octave, the highs of the audio spectrum, and the reverse operation takes places in the repeater receive channel. The net result of this is an improved signal to noise ratio.

At this point, the incoming CTCSS tone is extracted for decoding. Then, this CTCSS tone needs to be removed, and regenerated (possibly at a different frequency like on VHF - 100 Hz in, 67 Hz out). A five pole, 150 Hz corner high-pass filter does this, with a steep 30 dB per octave response. One limiting factor is the slope of this filter. It is possible to exceed 30 dB per octave, but then, group delay distortion becomes excessive, and generates "ringing" at or around the filter corner frequency. And, over a radio channel, this would be very bad because it would enhance every pop and

crackle. Although we do not have this capability now, removing this CTCSS tone allows the use of Automatic Gain Control (AGC).

Taking in account the pre-emphasized incoming signal, and receiver compensation, the receiver port has a "flat" response from 170 Hz to around 4.5 kHz. This is shown on Figure 1. This bandwidth was selected very carefully, and is the result of experimentation done by K4ITL with his PCRN repeater network. On one hand, the lower the response, the better the voice sounds ("full body" sound). Fifteen years ago, toneless PCRN repeaters had a low corner at 80 Hz. On the other hand, today, with CTCSS tones, you start overlapping voice and tone. Which, eventually, prevents tone recognition. Also, only tones at or below 100 Hz are used.

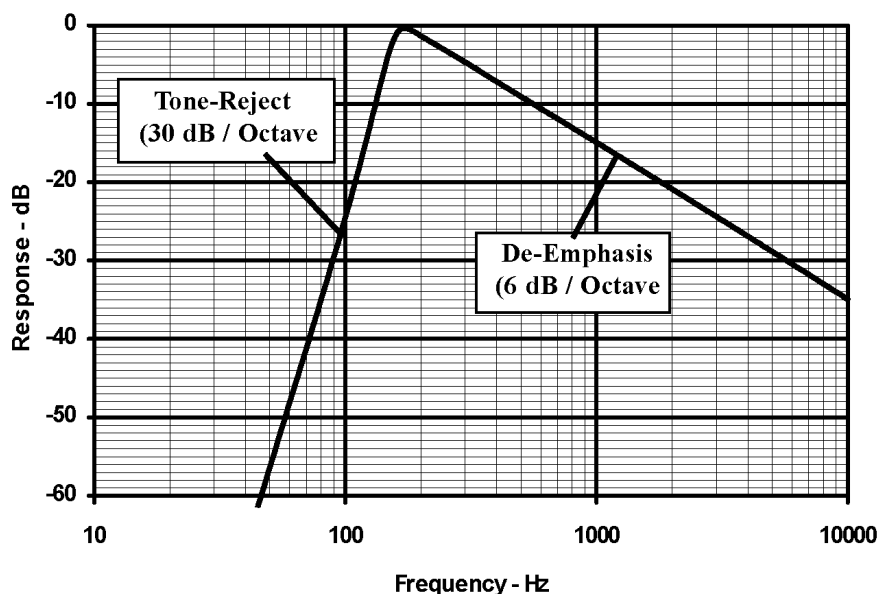
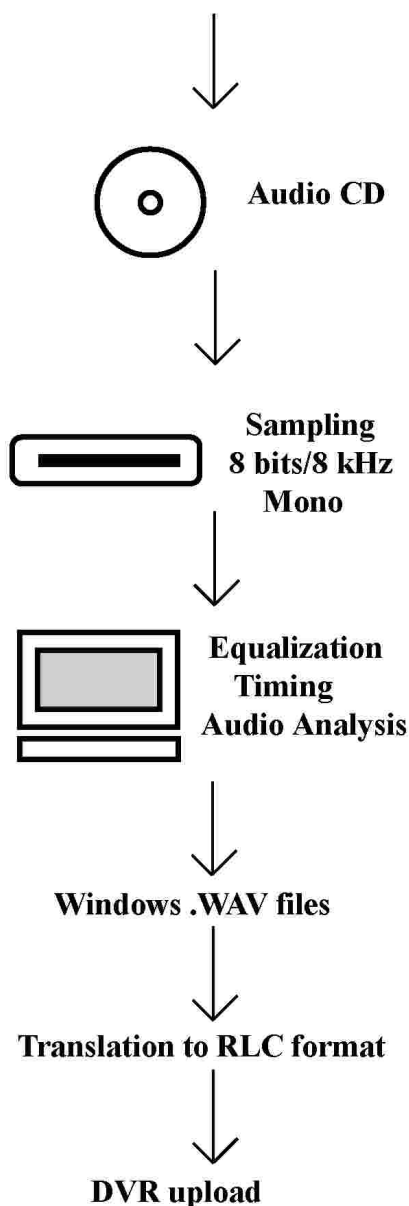


Figure 1 - Receiver port Response

Please turn to page 4 —>



Photo 1 - WG4R, Bill, the Man behind the Repeater Voice



Let's mention also that about 10 to 15% of the radios in use out there have "tone harmonics" which bleed into the voice band. What you hear is not the 100 Hz tone, but its harmonics at 200, 300, 400 Hz, etc...

Finally, the audio is delayed by 120 ms with a delay board, and gated by receiver squelch. The delay avoids hearing the "scratch" when the squelch closes.

Voice synthesizers: The voice synthesizers used on both machines are of the Texas Instruments, "Speak and Spell" category. There is worse, but today there is also better. On UHF, the synthesizer is used for all messages. On VHF, it is used only for command feedbacks, and the DVR is used for all frequently used messages.

CW Generators: CW generators are used at 440 Hz (VHF), and 880 Hz (UHF) to generate the CW identification message, and also the courtesy tone. Doing this allows to announce the mode the machine is

into through the courtesy tone (i.e. ARES mode: courtesy tone "A" in CW). On UHF, at 880 Hz, this works very well. On VHF, at 440 Hz, the CW ID level sounds a little high, but if turned down, the courtesy tone is barely heard, especially in noisy environments (mobile). The controller on the VHF side actually has two tone generators. Later on, an attempt will be made to use both of them on the courtesy tone, and only one on ID, which will actually double the courtesy tone level versus ID level.

Autopatch: This is applicable only to VHF. Right now, the autopatch level is a little high. It is actually adjusted for Newline on Sunday night. And we changed the Newline source recently.

Weather Radio: Also applicable to VHF only. It is intentional for the weather radio to be mixed with a User. This was done to avoid cutting off a User, and still to allow the weather message to be heard.

Digital Voice Recorder: Also applicable to VHF only. The DVR is used for voice mail, messages (such as an ID in voice), and announcements ("Information Net tonight...").

The messages and announcements currently in use have been produced by WG4R, Bill, shown in action on Photo 1. This photograph should not be construed as meaning that Bill sits there all the time, announcing things in real time over the repeater. He oc-

Please turn to page 5 →

casionally has other things to do, so he made an audio CD of his announcements available. Sounds like a million bucks Bill, thanks...

This CD is then re-sampled at 8 kHz, 8 bits, monaural, which is what the DVR wants. I wrote a piece of software four years ago to provide equalization, timing adjustments, and audio analysis, which can be performed both in the time domain, and the frequency domain. Figure 2 shows the analysis in the time domain of one of Bill's messages, and Figure 3 the same message, in the frequency domain. Those announcements are stored as .WAV files under Windows. This allows easy management, and playback of those files. Then, they get translated back at upload time into the DVR format, which is not .WAV.



There is no mail W 4 G S O
Figure 2 - Message in Time-domain

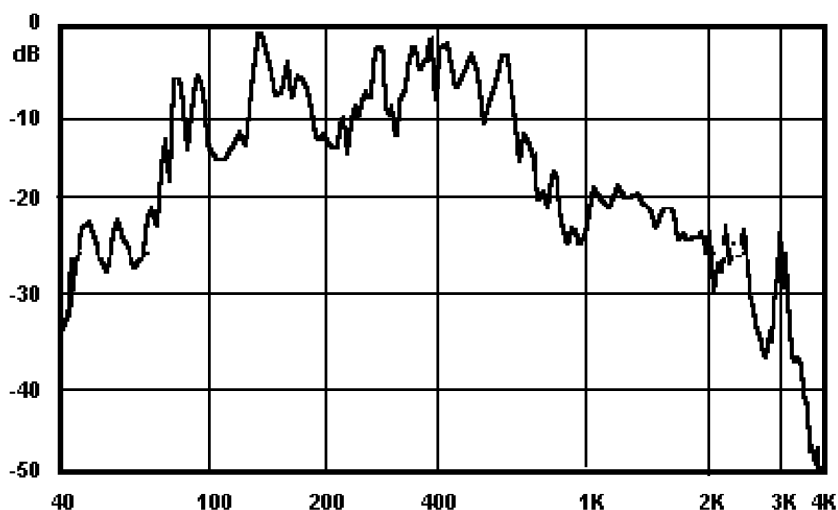


Figure 3 - Same message, in Frequency-domain

It should be noted that the DVR uses 16 Mbytes of recirculating, PC D-RAM. It therefore needs power backup. But, should (a) commercial power disappear, (b) the City generator not start, (c) the above lasting more than the primary machine UPS backup time (around 4 hours), and (d) lasting another 3 hours on top of that (backup time of the DVR battery)... then Bill will go away from the DVR...

The outgoing CTCSS tone: All the sources above are mixed in the controller. The last one, the outgoing tone, is not and rather has its own modulating path into the exciter. The outgoing tone is gener-

ated in the M2Audio board. It is 67 Hz on VHF, and 88.5 Hz on UHF (those frequencies are crystal controlled, and are accurate at better than ± 0.025 Hz). It is also heavily filtered (6 pole low-pass filter) to eliminate all harmonics that would end up in the voice band.

The deviation is NOT set at 750 Hz, which is customary for such a thing. Set at 750 Hz, the tone is audible on a good shack speaker, which is very aggravating. Rather, it is set to open 99.9% of the radio tone squelches out there. All my radios open (about 6 of them, various makes and brands, VHF and UHF), and so do all N4GVK's. If yours doesn't open, let me know

and we will push it a little higher.

Finally, the Exciter Audio: The last stage encountered is the audio circuitry in the FM exciter. The audio is pre-emphasized again, and is amplified to a level suitable to drive a varicap diode in the modulator.

On UHF, which uses a multiplying exciter, standard Mastr2 exciter audio is used. On VHF, which uses a Mastr2 PLL exciter, a custom audio board had to be designed to be able to use low-cost, standard crystals. This custom board provides a higher level amplification, and also adjustment capability of deviation symmetry.

Repeater Site Policy

By Arch, KT4AT

Engineering Chairman

FROM: Arch, 102331,1606

TO: K4ZKQ, INTERNET:K4ZKQ@bellsouth.net
KG4HCT, INTERNET:kg4hct@aol.com
KG4HOM, INTERNET:KG4HOM@arrl.net
KI4BMS, INTERNET:dogg7460@bellsouth.net
N4BYU, GARA Trustee, INTERNET:n4byu@arrl.net
N4DFA, INTERNET:f.orork@worldnet.att.net
N4GVK, INTERNET:n4gvk@bellsouth.net
NC4EW, INTERNET:ewall@attglobal.net

CC: "Frye, Larry"

DATE: 5/28/06 9:12 PM

Re: Copy of: Copy of: Site Policy

As a reminder. I originally sent the attached Email on May 5, 2004, which represents the GARA access policy to the repeater site that I implemented back then, and is still in force. The City of Greensboro, our Landlord, can change those at any time. You will notice particularly paragraphs 2, 3, 7, and 8 of this policy.

Thanks -Arch - KT4AT - Engineering Chairman

----- Forwarded Message -----

It has been a while since the repeater site policy was formulated. New members have arrived on the Board of Directors, so I would like to reformulate the policies in place regarding the repeater site, which belongs to the City of Greensboro. Those policies are necessary because this site includes confidential law enforcement and other governmental agency radio equipment. Although the City has been very flexible with us, access to this site is restricted and controlled. The policies below were formulated some time ago, and represent the controls GARA puts on site access and confidentiality on behalf of the City.

1)- Periods of access: The site is accessible anytime the Cemetery Park is open. This is roughly every day from sunrise to sunset. Note that we do NOT normally have access at night.

2)- Individuals permitted on site: To limit the number of people who have knowledge of the site and its contents, only the members of the GARA Engineering Committee and the members of the GARA Board of Directors are permitted on site. *Very* exceptionally, a guest may be admitted, subject to prior request to the Engineering Committee.

3)- Site access: To limit the number of people who actually have physical access to the site, only the members of the Engineering Committee are provided with (a) a key to the building, (b) combination code to the gate, and (c) combination code to the security system. The site is to be left lights off, air conditioner on, security system armed, and door and gate locked.

4)- Work policy: To enhance safety, visits to the site by a single individual are discouraged. This is not cast in concrete because there are situations when more than one individual may not be possible, nor required (i.e. emergency visit to swap machines, or drop off or pickup of an item). However, any serious work on the GARA machines requires the presence of at least two people (from the list above in #2), and must be planned in advance. Work on the tower by GARA members is prohibited, and must be done by a bonded and insured contractor. Such work is also subject to prior City approval and coordination.

5)- Lightning Safety: The site uses a lightning protection technique called "High Side Float". The machines are isolated from the floor, and will reach several kilovolts should the tower be hit. This in turn can trigger arcing between a machine cabinet and an individual standing close. It is NOT safe to stay at the site during thunderstorms, either inside or outside the building.

6)- Visit documentation: After each visit, a report showing who, when, what was done, etc... shall be written and kept on file for potential review by the City (Email to Engineering Committee is acceptable).

7)- Confidentiality: Shall not be disclosed to third parties: the nature of equipment present on site, whether such equipment is turned on or not, frequencies of use, government agency owners, FCC call-signs, etc... Site coordinates will not be disclosed except to the South Eastern Repeater Association for coordination purposes.

8)- Photographs: Are permitted those photographs showing ONLY the GARA equipment. Publication or distribution in any form to any third party is subject to GARA approval given by the Web Site Master and/or the Feedline Editor. Are NOT allowed photographs showing other equipment present on site, or parts thereof, or showing infrastructure (feedlines, power equipment, telephone system distribution, security system, general organization of the building, etc...).

9)- Reporting problems: Problems with City equipment (i.e. power outages, air conditioner failure, etc...) should be reported at the City telephone number which is inside the building door. In no circumstance GARA will perform any operation on non-GARA equipment, except (a) in a dire emergency (i.e. machine on fire), (b) per City Radio Shop instruction, or (c) on the emergency natural gas generator, which will be kept properly oiled, and its running times will be noted. Problems noticed with the cell phone equipment (i.e. door open) should be reported to the cell company, not to the City.

10)- Insurance: Per City request, GARA shall maintain aggregate general liability insurance in the amount of \$2,000,000 at all times.

That's it

Arch - KT4AT - GARA Engineering Chairman

GARA supplies communcation for scoring during the 2-day tournament.

27th Annual Wrangler/McDonald's Youth Soccer Classic

by Allen Bradley, KD4IUN

The 27th annual Wrangler/McDonald's Youth Soccer Classic was the smallest in over ten years. There were 190 teams in 34 divisions who played 320 games. Thanks to all of the radio operators who volunteered to help. Since only Smith Complex and Bryan Park we used, there were actually more volunteers than needed.



Bob Mays, KE4MOW and Al Allred, K4ZKQ, man the radio station at Smith Complex during the tournament. (Photos by Tom Forrest, N4GVK)



Soccer action during the tournament

Ham Happenings **NEWS** briefs

Club Member Publishes Second Book

GARA member, **Bill Mauldin, WG4R**, just completed publishing his second book, "State Troopers Of America." The book is over 400 pages and contains 1500 photographs, and highlights the history of state law enforcement agencies of all 50 states with detailed photos of badges, shoulder patches, marked patrol cars and uniforms.

Bill, a retired Delta pilot, also had 30 years experience in law enforcement, starting with the Guilford County Sheriff's Department and later, with Florida Highway Patrol, where he retired as Major on the Florida Turnpike. He wrote his first book on badge collecting, Badge Guide, in 1997 which had four editions and was sold world wide.

Past President of GARA Les Volle, KA4IXL, SK

Les Volle, KA4IXL, 77, President of GARA sometime in the 1980's passed away Friday May 26, 2006.

Services were held at Tabernacle United Methodist Church. He was a career Marine, first Magistrate judge in Guilford County and was a Deputy Sheriff. Our thoughts and prayers are with his family during their loss.

John F. Lookabill, N4FFQ, SK

High Point amateur **John Frank Lookabill, 80, N4FFQ**, became a silent key June 6, 2006 at the GrayBrier Nursing Center in Archdale. John, was employed by Freck's Radio when it was located in Greensboro and also worked at Electronix of NC.

Our sympathy is extended to his family.

— For Sale —

Kenwood TM-271A, 2 mtr. radio, new in box never used. Complete with \$70 programming cable from Kenwood. Sell total package for \$165. Software is free from Kenwood's web site. Call Tom Forrest, N4GVK, 336-294-6771 or e-mail; n4gvk@bellsouth.net

This compact, MIL-STD-compliant transceiver delivering a maximum of 60 W output, providing powerful mobile performance and advanced features as multiple scan functions and memory names, as well as NOAA Weather Band & emergency alert reception. Illuminated keys and a large LCD with adjustable green backlighting for easy operation day or night.

Hustler Antennas for sale. Various mobile single band whips with low and high power coils along with mounts. Call, Tom Forrest, 336-294-6771 or e-mail n4gvk@bellsouth.net

Area Activities

FOURTH MONDAY – at 6:30 PM, the **Greensboro Amateur Radio Association** has 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.

MONDAYS & FRIDAYS – at 11 AM, Greensboro Hams get together for lunch. On Monday they meet at various locations. Check on the 145.15 repeater for current location and on Friday lunch 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 Starbucks on Battleground (summer location till Daylight Savings time changes)

Greensboro Amateur Radio Association

P.O. Box 7054

Greensboro, NC 27417



Web:
www.w4gso.org

GARA OFFICERS

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Rudy Langley, KG4HCT

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Treasurer

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Arch, KT4AT

Operations

Roy Smith, N4BYU

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