



The Arclite

September 2011

K5QHD
Garland Amateur Radio Club
Where Amateur Radio
is fun again

K5QHD 146.66- 442.7+
Garland Women's Activity Center
713 W. Austin Street
Garland TX 75040

Meeting Sept 26

Doors open at 7:00 PM
Meeting starts at 7:30 PM

Visitors are ALWAYS Welcome at the GARC!
Bring a friend!!!



Ham Radio
in the 21st Century

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Presidents PEN

Among other topics, Stacy Rogers from the ARRL will present the GARC with an Certificate for it's participation with W1AW/5



---Texas QSO Party---

The Texas QSO party is sponsored each year by the Northwest Amateur Radio Society to encourage contacts between Texas amateur radio operators and amateur radio operators throughout the world. This event is also an excellent opportunity for county hunters to add to their list of Texas counties worked. The 2011 event is scheduled from 1400Z on SATURDAY, September 24 to 0200Z on SUNDAY, September 25 and from 1400Z to 2000Z on SUNDAY, September 26. Stations may work the entire contest period.

One of the planning goals each year is to have operators in each of the 254 counties in Texas. This is the best - and in fact it may be the only - opportunity to make contact with operators in some Texas counties. For more information on operator density in Texas, see the Where Are All The Hams website.

TQP mobile operators, be careful and have a good time. Fixed station operators, get on the air and look for the mobiles! Regardless of how you like to participate, get on the air, make some contacts, and have fun! For all of the information and rules on the Texas QSO Party visit their website at <http://txqp.net>.

Upcoming ARRL Conventions and Events

- October 1 Ham Expo 2011 Belton/Temple TX
- October 21-22 West Gulf Ardmore, Ok
- October 22 Lufkin Hamfest Lufkin TX
- November 11 NCTECH Azel Tx

---San Angelo ARC Anniversary and Special Event Station---

The San Angelo ARC will celebrate the 87th anniversary of their club on October 15th, along with a Special Event Station. The Special Event Station will be on the air from 1400Z to 2000Z using the call sign of W5QZ on 14.230, 7.230, 146.94 (PL 103.5). For a certificate, send a SASL to W5QX, P.O. Box 4002, San Angelo, Texas 76902.

From Walt Mayfield (KE5SOO), the SEC, is an announcement about an ARES webinar:

Next Thursday, September 29th at 7:30pm Central Time, I will be hosting an ARES Webinar. The primary purpose of this Webinar is to officially announce the district changes in NTX. The other major topic is the upcoming Statewide SET which is planned for Nov 5th. Please go to the link below to register for the Webinar. Please note that the time on the Webinar site is in Eastern Time.

<https://www1.gotomeeting.com/register/253037160>

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Computers and Ham Radio in the 1970's
by Steve Phillips K6JT

Some of you will remember the 70's, but the majority are likely too young or started in ham radio later. Since I was first licensed in 1961, I'd had quite a bit of experience by the mid-70's. In those days, the majority of young hams built their transmitters and receivers (yes, separate units were the norm, although transceivers had started to become more popular) from kits. The 60's and 70's were the heydays of Heathkit, Eico, Knight-Kit, etc. You could do the wiring and assembly yourself and save hundreds of dollars off ready-made gear. Single Sideband had also become the norm, largely replacing AM phone, which went through death-throes in the late 60's and early 70's. Of course, the AM gang were always denigrating the "donald duck sidebanders" (the "quacking" that SSB somewhat sounds like without a BFO). Some semblance of that prejudice remains even today, with a resurgence of interest in AM.

How about computers? Today we take for granted the multi-gigahertz clocked personal computers that can do just about anything we need them to do regarding ham radio. There are very good programs to run RTTY, CW, PSK-31, and other digital modes solely with a computer (with sound card) and just about any (SSB) transceiver. Not so in the 70's. Those were the days before Apple, before the IBM PC, and before any type of ready-made computer was available that cost less than hundreds of thousands of dollars, took up dozens of square yards of floor space and required a dedicated air conditioned cooling system.

Intel had come out with the 4004 and 8008 processor chips by the early 70's, but those were very limited in capability and used primarily as embedded controllers for other equipment such as traffic lights. It was not until the Intel 8080 appeared that true "personal computing" became practical. Motorola soon followed with the 6800 (yes, only 2 zeros - the 68000 did not come out until the 80's), and there was also a 6502 chip, eventually produced by Rockwell International (for whom I worked - having started with Collins Radio Company in the late 60's, which was bought by Rockwell in the early 70's). These were all good CPU chips, but that's all they were - processing units. You had to add all sorts of control circuitry, clocking, and memory as well as input/output devices to make a computer.

The first commercial personal computer that came out, in my recollection, was the Altair 8800. I bought one of them, or I should say I bought the parts to make one of them, in the mid-70's. Yes, it was still kit-building then. But any ham who

had put together Heathkits or any other kit could likely build the computer. I still have that old Altair machine, albeit upgraded several times at great expense with new processors, memory, floppy disks, etc. I haven't turned it on (and the power supply capacitors are probably useless now) in 20 years but it rests in my garage attic, waiting for the day when I can create my own "museum".

It was **expensive**, to say the least. I don't recall the basic unit cost, consisting of case, very underpowered power supply (built within the case), front panel, CPU card, and 1 kilobyte static memory card (yes, that is 1024 bytes). I think it was probably close to \$600, and I later spent over \$1000.00 for more memory and another thousand for a dual 5 1/4 inch floppy disk unit. It was initially programmed by means of toggle switches on the front panel, from which you had to manually enter the digital codes (in octal, although I preferred hexadecimal) for all the instructions you wanted to execute. It had LEDs and switches for all 16 bits of the address and 8 bits of data. The 8080 used a 2 MHz clock, and each instruction took at least 4 memory cycles. So it effectively took 500 milliseconds to execute the simplest instruction and even longer for more complex ones. Not fast, but in those days, it was fast enough and about the best you could get for a microprocessor.

I was lucky that my employer started to use 8080's (and 8085's) in embedded equipment, so a commercial assembler was available to me (from Intel, as I recall). I was even assigned to projects that used them ! Thus, I became very good at cranking out 8080 assembly language - hundreds of instructions per day in fact. I used those skills to write my own ROM operating system (similar to a PC BIOS) as well as other programs. I created a mathematical package that included transcendental functions (all in assembly language) and entered it in a contest run by the company making the Altair (MITS). I won a prize, which was a 1 kilobyte PROM card, to add to my system. I was able to burn UV Erasable PROMs at work in off hours from the assembly code I had written. It was a monitor program, simple debugging program, and code to do Input and Output (I/O). All I had to do was enter a "jump" address on the toggle switches into the ROM starting address space to get the computer going. Later, after upgrading to a Zilog Z-80 processor and adding floppy disks, I wrote my own assembler.

Speaking of I/O, the only device I had was a KSR-28 teletype that I'd bought surplus when Rockwell International took over Collins Radio Company. It used the 5-level Baudot code, so part of my ROM program was converting to and from ASCII and Baudot to do all my input and printing. I also created a "boot loader" that used paper tape (5 level, of which I used 4 bit nibbles to make the 8 bit

bytes) so I could make use of my model 14 teletype typing reperforator and model 14 transmitter distributor (TD) paper tape reader, both of which I bought used.

I had been quite active on RTTY on the air before that time. In those days, there were no computer programs to do the modulation and demodulation of the 2 tones used. You needed an external device called an RTTY Terminal Unit. It used analog circuitry and filtering. The best of the reasonably priced units was made by Hal Communications Corporation and was the ST-6. I built one of them in the early 70's from their "kit". As with many kits, as previously mentioned, what you actually got was a chassis and a set of parts. If you were lucky, you got pictorial layouts of the chassis parts and good schematics. The Heathkit-style step by step procedures were often not included. The ST-6, after construction and calibration, worked very well for the 170 Hz shift (2125 / 2295) used on HF and the 850 Hz (2125 / 2975) shift used on VHF. I was living in southern California at the time, and we had an excellent RTTY-only repeater using the 146.10/70 pair. I also operated on HF, working some DX (Australia comes to mind) and domestic stations.

Interfacing the RTTY gear to the computer was no easy task since the mechanical equipment used a high-current loop while the computer needed low voltage digital signals. Fortunately, the MITS engineers had thought ahead and the Altair 8800 was designed using a backplane that accommodated additional circuit cards. It was called the S-100 bus, having 100 lines with large connectors into which the CPU card, memory card(s), and any additional cards could be plugged. The stock machine came with a 4 slot bus, but that could be expanded with additional 4 or 8 slot modules (imagine wiring together those things!). My 4 slots were taken up with the CPU, the 1K static memory, and the 1K PROM card along with an I/O card I purchased from a company called Processor Technology that sprang up to service the growing S-100 market. The PT card I purchased (and assembled) was called a 3P+S. As the name implies, it had 3 parallel ports (I believe they were 8 bits each) and a programmable serial port using a UART device.

I designed an interface using high-current switching transistors and opto-isolator couplers to drive the RTTY current loop of the ST-6 with the computer (and decode the bits on the bus as well). The UART provided for 1.5 stop bits (slightly more than the standard 1.42 used by the Baudot teletypes), but that worked just fine. I eventually got 100 speed gears for the KSR-28 (instead of the standard 45.45 baud, 60 WPM speed used for ham RTTY) so I could do "higher speed"

printing from the computer. The model 14 units were fixed at 60 speed and were not changeable. So I recall buying a cassette tape unit to do my program input and output, interfacing it with the 3P+S unit. I also eventually bought a printer and wrote a driver for it using two of the 3P+S parallel ports. My PROM card capacity was nearly exhausted after all those software (or firmware) device drivers.

It soon became apparent that more memory was needed to do useful work with the computer. MITS came out with a very poorly-designed “dynamic” memory card. It had 4 kilobytes and cost around \$400.00. I learned a lot from building a couple of those cards and trying to make them work. They were, at best, flaky, and would lose the memory content (dynamic memories need constant refresh to preserve their content, unlike static memory, but it was a lot less expensive and had higher capacities per chip than static). I recall doing some re-engineering of the timing of the refresh on that card and finally got them to work more-or-less reliably. So I had a whopping 9 KB of memory to work with. Does not sound like much, but with efficient assembly language programming (that was my favorite anyway), it went a long way. The BASIC language became available for the MITS system, but I never used it much at that time.

Moving forward a few years, and upgrading the system to a Zilog Z-80 based processor card that ran at a blazing 5 MHz instead of 2, I decided I needed to use the computer to help with my traffic handling. I had been active on CW (Morse code) networks since the mid-60’s as part of the National Traffic System (NTS). Those days, a lot of messages were handled on behalf of 3rd parties due to telephone toll charges being very high (no cell phones and no Internet, of course). Nothing commercial, just things like birthday greetings, state fair ham radio booth messages, and, of course, true emergencies like earthquakes, fires, tornados, hurricanes, and floods, to get word to relatives outside (or inside) the affected areas.

I had purchased a small house from another ham who was in the Marines but got transferred to the east coast. He was also a very active traffic handler, and wanted to move CA traffic across the country quickly, once he got established (and I had set up my own station again). So I turned to the computer once more. It was already interfaced with the radio via the ST-6, so it was a matter of developing a program that would send and receive formal radiogram messages, either printing them or storing them for later relay.

My buddy on the east coast liked to get up very early to do his hamming, around 6 AM eastern time. Naturally, since I was 3 hours earlier, that was 3 AM California time and I preferred to be sound asleep. So I wrote a program that would start calling him on a pre-defined frequency (I believe it was on 40 meters) at 3 AM, synchronize with his reply, and accept traffic from him, storing it in the computer's memory for me to process later. At that time of day, there was little chance of creating any interference to other stations. Optionally, it could print a full log of everything as it occurred.

I had it rigged up so that if there were any problem, such as drop-outs or other anomalies resulting in no contact after a certain time, it would send "bells" to the teletype, waking me up so I could go see what was wrong (the ham gear was in a different room, so I did not hear the normal RTTY clacking). It only had to do that a few times in the months that we had the sked (schedule) going. The program could also send him eastern area traffic, and the call-up to him indicated how many messages I had. It also acknowledged each received message. If the message number were not correct, he would send the whole message again. We worked out a specific set of codes that would allow the program to work as intended. Essentially, he remotely controlled my ham station via 45 baud RTTY.

I'm not sure if that was completely legal at the time (per FCC rules), but it was pretty much the same thing as the automated Winlink stations today, which are legal. We never publicized our operations, which continued until he was once again transferred, this time overseas.

It was a really great time to be involved with the emerging personal computer era, and it provided a wonderful way to join my 2 favorite hobbies, both of which I still greatly enjoy. It was, of course, quite time-consuming to do all that development, but I was single at the time, so I had the opportunity.

I have lots more to say about computers and ham radio during that era, but the purpose of this article is to give a glimpse into the early days before personal computers, the Internet, and digital signal processing were developed and refined. Yes, that was more than 35 years ago, pre-dating even packet radio.

73,

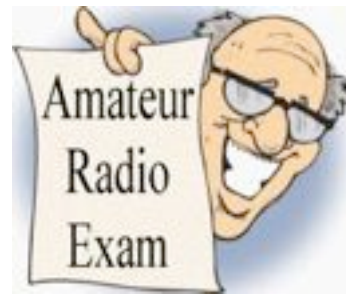
Steve K6JT

(Formerly KN7OOR and WA6TVA)

Upcoming VE Exam Sessions

Upgrade! Exam Session

- 1 EXAM SESSION
[10/02/2011 | Mc Kinney TX 75069-8840](#)
Sponsor: McKinney ARC
Location: Heard Museum
Time: 2:30 PM (Walk-ins allowed)
[Learn More](#)
- 2 EXAM SESSION
[10/03/2011 | Mesquite TX 75149-4977](#)
Sponsor: KE5VPS VE Team-Mesquite
Location: Mesquite Fire Dept Training Center
Time: 7:00 PM (Walk-ins allowed)
[Learn More](#)
- 3 EXAM SESSION
[10/15/2011 | Irving TX 75061-4255](#)
Sponsor: Irving ARC, Inc.
Location: Betcha Bingo #2/Mapsco 31A-Q
Time: 8:30 AM (Walk-ins allowed)
[Learn More](#)
- 4 EXAM SESSION
[10/15/2011 | Wylie TX 75098-7704](#)
Sponsor: Plano Amateur Radio Klub
Location: Wylie Methodist Church
Time: 1:00 PM (Walk-ins allowed)
[Learn More](#)
- 5 EXAM SESSION
[10/27/2011 | Garland TX 75040-4903](#)
Sponsor: WB9ZPH VE Team-Garland
Location: Freeman Heights Baptist Church
Time: 7:30 PM (Walk-ins allowed)
[Learn More](#) <http://sites.google.com/site/wb9zph/>



[WB9ZPH ARRL Volunteer examiner team – Garland Texas area](#) >

What to bring to the testing session

What you will need:

- **\$15** is the current test fee. We prefer the exact amount in cash.
- A government **photo id** (drivers license preferred).
- Your **Social Security Number or FCC Federal Registration Number**. We are required to submit either your Social Security Number (SSN) or your FCC Federal Registration Number (FRN) with your application.
- A pen (black ink) and pencil (we can loan you either or both if you're like me and never carry pencils (*smile*))
- If you already have a license: The original (and one copy) of any current (unexpired) amateur radio operator's license issued to you.
- If you've already passed a test: The original (and one copy) of any document that you will use to prove you've already passed a test element. These documents may include:
 - An unexpired Certificate of Successful Completion of Exam (CSCE) indicating the credit(s) earned
 - Pre March 21, 1987 Technician license (this provides credit for the Element 3 (General) exam)
 - A letter from the FCC confirming that you previously held a specific class of license for which you will be given credit for the Element 3 exams.
- A positive attitude and patience. The VE team will do our best to get you through the paperwork, get you tested, your exam graded, and do our part of the paperwork as quickly as possible, but it does take some time. We do appreciate your patience.

Lost your license?

In the event you have misplaced your license, or it was destroyed accidentally, you can get a letter from the FCC verifying that you do indeed have a license. You could also access your license information on a standard web database, such as the one found at: QRZ.COM. In such a case, simply print the page as displayed on the web site, and bring it to us. We will independently verify that your data is correct, and if everything is OK, then we're all set.

Pre-March 21-1987 Technicians?

Special note for persons who were issued a Technician Class license issued before March 21, 1987: If you still have a valid Technician or Tech Plus license, and were issued a Technician class license before 03/21/87, you are qualified for an **"instant upgrade" to General Class**. No further examination is necessary! Simply **bring us a copy of both your current license and your old license**, with the old license showing an expiration date on or before March 20, 1997 (which means the license would have been issued before 03/21/87). If you no longer have your original license, you can get a letter from the FCC verifying your information. Also, you might find an old Callbook (1986 edition or earlier). If you do, and your name and call are listed, make a copy of that page (be sure to include the Callbook issue date in the copy) and bring it in. All of these are acceptable as proof of being licensed in the applicable time period. As always, anything other than an actual license will be subject to independent verification.

EMPTIES 4 CASH

The GARC has worked with recyclers in the past to try and help both the club and make a “greener” planet. We have found a new vendor who has the resources to help the club in another **GREEN way.**

Please bring your used “inkjet” cartridges to this and future GARC meetings. We will collect and submit them to the empties 4 cash program. This will keep the cartridges out of the land fills and better yet, provide some much needed cash to help with the clubs treasury.

If you can hold the ink cartridge in the palm of your hand, that is the type the Empties 4 Cash program wants. They will not accept the large toner cartridges that laser printers use. If it fits in the palm of your hand bring it!



August Meeting Minutes:

Our president, John Honeycutt W7ZTF, called to order the August GARC Meeting just before 7:30 PM on the 22nd with the Pledge of Allegiance. Introductions were made and we were disappointed to have a small attendance this month. The approval of the minutes was postponed because they were not printed in the Arclite. The Board members made their reports, with the only real business being a passing vote to continue to use MARSH AFFINITY GROUP for our liability policy that will be \$320 and is up for renewal on September 1. There are a quite a few events coming up, but most of the September events will be over before you can see this, so continue to check out John Galvin's public service requests list, available from the club website (www.k5qhd.org). After a short break at 7:45, our own John Honeycutt W7ZTF gave a very interesting review of his experiences in the Nuclear Industry.

The September Board meeting was held on Monday, the 12th at 7:00 PM in the ECC. Bill Engel K5DHY presided since John Honeycutt was out of town. Bill announced that he was willing to have us over to his place for the Christmas Party again this year. It will be a pot luck dinner at 5 PM on December 10th, the week after Dallas White Rock Marathon. John Abbott KF5FWK reported that we did get our refund from the CAT 1000 Repeater Controller that we returned since it would not serve our needs. It will control two repeaters, but only if they are linked together, and we needed separate control of the primary 440 and the back up 2 meter. Ralph Brown K5WRB recommended ordering an S-COM 7330 that will handle both repeaters and is less expensive (but does not have as many bells and whistles). George Norwood KE5KDO announced that his class schedule has been completed and is just waiting to have the two students take (and pass) their upgrade tests.

July 2011 Minutes

From: lowell_allen@hotmail.com
To: board@k5qhd.org
Subject: Minutes
Date: Wed, 17 Aug 2011 16:14:38 -0500

The July GARC Meeting was called to order by John Honeycutt W7ZTF on the 25th a little early at 7:26 PM with the Pledge of Allegiance. Introductions were made by the 29 present and the minutes were approved as printed in the Arclite. The Board members made their reports, and there are only a few events coming up, but continue to check out John Galvin's public service requests list, available from the club website (www.k5qhd.org). After a quick report on our efforts to plan a Radio in the Park and a short break at 7:45, we had an interesting talk on "Satellite Communications and Antennas" given by Bill Kruger AE5BK with numerous personal observations including a lot of the tricks of the trade and a display of his light weight hand built antennas.

The August Board meeting was held on Monday, the 8th at 7:05 PM in the ECC. Ralph Brown K5WRB gave us a "heads up" that he was going to try and have our main 2M repeater connected to an antenna that is higher up the tower than the one we are presently using. He also mentioned he had gotten the fenders for the antenna/generator trailer, but that it has been just too hot to do much work on it (all of the board agreed). John Abbott KF5FWK mentioned we need to renew our equipment insurance and that ARRL has changed carriers. Since the cost will be over \$200, John will check the rates from both companies and present a report at the membership meeting on August 22nd. George Norwood KE5KDO announced that his class schedule has changed to Thursdays only at 7 PM for General unless he gets more students. The only other discussions involved work that was needed at the ECC including what choices we had concerning the air-conditioner. If anyone knows of an inexpensive efficient 120 Vac unit, we would like to hear about it.

Respectfully Submitted, Lowell Allen, Jr. KD5RFD

Recent & Upcoming Birthdays

EH Nail

Swank Roberts

Tom Blackwell

Don't see your name on here?
Have you shared your birthday
with the Club/Arclite Editor? You
may omit the year, all we need
is month and day.



GARC K5QHD

September 2011

Garland Amateur Radio Club
Emergency Communications Center (ECC)
1027 Austin Street Suite B.
Garland, TX. 75040-5608
Where Ham Radio is Fun Again!

**K5QHD is the Bill Folsdtadt Memorial
Station**



Donate your excess goods to the GARC. Don't forget the club is a 501(C)(3) organization and that all your donations can be tax deductible.

Note: No trees were killed in the sending of this message. However, a large number of electrons were terribly inconvenienced.