CQ de WA2LQO

Sixty Eight Years: 1944 -2012

The official voice of the Grumman Amateur Radio Club

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COMMUNICATIONS SYSTEMS (Continued from August 2012)

By Bob Wexelbaum, W2ILP

In July and August I discussed RTTY, BPSK-31, MFSK and Hellschreiber. I will now continue to define other keyboard modes that have been used by amateur radio operators.

PACTOR:

At first PACTOR was used for real time keyboard operation, just like the previously discussed modes. This was no longer the case when hams began to use PACTOR for automated mailboxes and bulletin board systems (BBSs). WinLink 2000 became a network gateway to the Internet which could handle e-mail and other data. However, not all PACTOR BBSs are WinLink stations. Once you contact a PACTOR BBS you will be given the right to select an Enter Command. When you do so, you do not need to send an "over" code command. The BBS will automatically flip the link. PACTOR enables you to not only chat but to download small programs, because it was designed to communicate binary data. PACTOR uses a two tone method similar to RTTY but it requires more hardware than other modes, and it is called a multi-mode TNC. Such a TNC might also be used for PACKET or AMTOR. PACTOR is a "burst" mode, notable in that it sounds like cricket chirps, where each burst is a data block. Each data block is acknowledged when it is received and the receiving station transmits back an ***ack*** signal. The ***ack*** signal says "I received the last data block (group of characters); Send the next group." It will send a ***nak*** (non-acknowledgement) if there are errors in the last group of characters. In that case the last group of characters will be sent again. Audible wise, the long chirps are the data and shorter chirps are the ack and nak signals. This is back-and-forth conversation that differs from previous modes. When a PACTOR controller receives a botched character block it saves in temporary memory whatever data appears to be error free. If the repeated block is still missing data it will ask for another repeat. Each time it will fill in whatever data seemed to be missing, comparing to what was memorized. Eventually the controller gathers enough fragments to construct the entire block. PACTOR's memory (ARQ) feature reduces the amount of repeats required to gather fragments to reconstruct the entire block. This ability greatly reduces the time required to make repeat transmissions of damaged data, thus increasing the throughput. PACTOR can automatically vary its throughput according to band conditions, QRM, QSB, etc. A PACTOR data segment is actually 129 bits long when operating at 200 bits/s when band conditions are good; 80 bits long when operating at 100 bits/s when band conditions are poor. The individual character code lengths vary from 2 to 15 bits, so that the most frequently used characters are the shortest. The vary-code used is *Huffman* coding. The average character length is 4 to 5 bits for English text, instead of the 8 bits that is required or ASCII. When you initially call CQ on PACTOR you do not use ack or nak signals. You initially use *forward error correction* (FEC). This initial signal sounds like fast RTTY; not like cricket chirps. The data is initially transmitted twice and it may not be error free, but it may be good enough to pull out the call-sign of the sending station, which is all that is initially needed. Once contact is established conversation automatically proceeds in turns governed by ack and nak signals. The station that is sending data is called the *information sending station* (ISS). The station receiving data is called the *information receiving station* (IRS); not to be confused with the federal tax collecting agency! The TNC can include LEDs that indicate whether you are in the ISS or IRS mode. When the ISS is finished sending he sends an *over* command and the roles are reversed; If there is no changeover to IRS mode, the stations will go on continuously sending mindless chirps to each other. There is, however, a timed

"forced over" which will be sent automatically when no new data is being sent for some period of time.

AMTOR:

AMTOR is also a burst mode, similar to PACTOR, but it is less sophisticated. AMTOR requires sending data blocks continuously, repeating them as much as it takes to deliver error-free data. Unlike PACTOR, there is no memory used to save parts of blocks that are correct, and thus there is slower throughput during poor band conditions.

PACTOR II:

At the 1995 Dayton Hamvention, PACTOR II was introduced by the Special Communications System (SCS) of Hanau, Germany. It is a super version of PACTOR, that is capable of running at a data transfer rate up to six times faster than PACTOR. It can produce error free copy when the signal-to-noise ratio is -18 dB, (when the signal is virtually inaudible.) PACTOR II occupies only about 500 Hz of spectrum. This requires a special modulation system called *pi/4-DQPSK*. Digital Signal Processing (DSP) enables digital filtering rather than hardware filters. PACTOR II requires a modern high speed microprocessor to handle all of the incoming and outgoing information. PACTOR II is compatible with the original PACTOR. HF gateways often use PACTOR II for digital BBSs, Internet and e-mail transferring. The WinLink 2000 HF/Internet System uses PACTOR II. PACTOR II was originally also used for commercial and military applications, using a PTC-II multimode processor, which cost nearly $1000. In 1999, however, SCS introduced the PTC-IIe priced at about $700 and still too expensive for most individual hams. PASCTOR II employs a type of data compression run length encoding, called Pseudo-Markov Compression (PCM). Compared to 8 bit ASCII plain text PCM yields a compression factor of 1.9 which leads to an effective speed of 600 bits per second in average HF propagation conditions. Markov compression is like double Huffman compression. PCM deals with probability distribution of next characters. In order to avoid using a very large look-up table PCM is limited to 16 most frequent proceeding characters. All other characters trigger normal Huffman compression. A PACTOR II data packet is either 96 bits long sent at 100 baud, or 192 bits long sent at 200 baud. Each packet consists of a Header byte, Data field, and Status byte. The Header byte is used for synchronization, Memory ARQ and listen mode and it consists of an 8 bit pattern for 55 Hex. The Data field contains either 64 bits at 100 baud or 160 bits at 200 baud. It is normally either Huffman compressed ASCII or basic 8 bit ASCII. The Status byte provides a packet check-count, indication of the data format, a break-in request, and a QRT bit, for a total of 8 bits.

(to be continued)

PRESIDENT'S NOTE by ED GELLENDER, WB2EAV

Instead of the August general meeting we held the club annual picnic at Marjorie Post Park in Massapequa. The weather was not on our side, but we got lucky in that it stopped raining for an hour or two while we cooked and ate dinner (many thanks again to our premier cooking crew – another job well done). No surprise that the turnout was not what it usually is, but those who were there did have a nice time. Being by the park gazebo was also an asset as it provided shelter when it was raining.

NLI Section Manager, Mike Lisenco N2YBB, was going to join us, but between the downpours and the resulting traffic jams, I told him to stay put in Brooklyn rather than risk an aggravating trip for little or nothing. We agreed in principle that he would instead come to one of our regular meetings; Now, I have to actually set it up.

Speaking of Mike, he is now running for ARRL Hudson Division Director. I have found him to be a true asset to ham radio in general and to the local clubs specifically. I am glad that he is running, and am sure that he will do well by us if he wins. We will keep you informed as this develops.

Ed, WB2EAV

GRUMMAN AMATEUR RADIO CLUB
MINUTES OF GENERAL MEETING 8/15/2012
By Karen, W2ABK

This meeting was the annual picnic meeting.

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TREASURER'S REPORT – Ed, WB2EAV

Finances continue to be in good shape.

REPEATER REPORT – Gordon, KB2UB

Both repeaters are working, although sometimes reported to be noisy. One week 145.33 had a hum.

NET REPORT – Karen, W2ABK

Thursday night net at 8:15 PM on 146.745 MHz had 3 check-ins.
Thursday night net at 8;30 PM on 145.330 MHz had 4 check-ins.
Sunday morning net at 7:30 AM on 7.289 MHz was hard to hear.

VE REPORT – Bob, W2ILP

The August VE session was cancelled due to W2ILP's illness.

OLD BUSINESS

We need programs for our meetings.

PROGRAM

We had our annual picnic at Marjorie Post Park on Wednesday, instead of the usual meeting. The picnic was attended by 16 people, who braved the rainy weather. We were in a gazebo, where it was dry and the hamburgers and hot dogs were plentiful and good. Jack WA2PYK did an excellent job with the food.

GARC NETS: 40 Meters: 7.289 MHz at 7:30 AM EST Sundays

Net Controller: Eugene, W4JMX

2 Meters (repeaters) Thursdays: 146.745 MHz (-600 kHz) at 8:15 PM
145.330 MHz (-600 kHz) at 8:30 PM. Tone for both repeaters: 136.5 Hz.

GARC Net Controller Karen, W2ABK

ARES/RACES NETS: Mondays.

MEETINGS

General Meetings of the GARC are held on the third Wednesday of each month, starting at 5:30 PM, at the Ellsworth Allen Park in Farmingdale. Driving directions and map can be obtained from http://www.mapquest.com. It is suggested that the GARC web site be checked to be certain of meeting location, which may change after this newsletter is distributed. Board meetings are held a week before the General Meeting at the Bethpage Skating Rink.

WEBSITE

The GARC web site can be found at http://www.qsl.net/wa2lqo . Webmaster is Pat Masterson, KE2LJ. Pictures of GARC activities, archives of newsletters, roster of members, and other information about the GARC may be found there.

INTERNET LINK OF THE MONTH FOR INTERNERDS

By now you all know that Neil Armstrong passed away on August 25th, at the age of 82. He died of complications from heart bypass surgery. Armstrong was not a ham but he took that famous first step on the moon on July 20, 1969, when stepping out of the Grumman built LEM…. and that makes him especially a hero to all of us Grummies. I need not write more about Neil Armstrong here, because you can Google up his biography on the Internet, as well as many news articles about him. I will not try to give you a specific Internet address this month either… but just refer you to your own search engines.

At the time of the first lunar landing I was working for Loral as a field engineer. In my usual pessimistic way, believing strongly in Murphy's Law, I bet an engineer at Loral twenty dollars that the lunar landing would not succeed on schedule. Obviously I lost the bet…but somehow it was a bet that I was glad to lose! --w2ilp--

PUZZLE

This month I will again ask a question, taken from the new Amateur Extra Class Exam.
What class of licensee is authorized to be the control operator of a space station?

A. All except Technician Class
B. Only General, Advanced or Amateur Extra Class
C. All classes
D. Only Amateur Extra Class

Last month I asked this question taken, from the new Amateur Extra Class Exam.
What is the National Radio Quiet Zone?

A. An area in Puerto Rico surrounding the Aricebo Radio Telescope
B. An area in New Mexico surrounding the White Sands Test Area
C. An area surrounding the National Radio Astronomy Observatory
D. An area in Florida surrounding Cape Canaveral

The correct answer is C.

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Newsletter

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GARC Webmaster

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GARC VE Exams

We normally proctor exams for all classes of ham licenses on the second Tuesday of each month, starting at 5:00 PM. The exams are given at Briarcliffe College, 1055 Stewart Avenue, Bethpage, NY in room: Long Beach #5. Ham Exams are: Element 2 – Technician, Element 3 - General, Element 4 – Amateur Extra Class. All applicants must pre-register by contacting W2ILP. Time and location of exams are subject to change. If there are no applicants VE sessions will be cancelled. The fee for 2012 is $14 for all exams taken at one sitting. New first time applicants should be aware that their Social Security Number will be required on the application form unless they register with the FCC for an FRN. Applicants for an upgrade should bring their present license, and a photocopy of it. All applicants should bring picture ID such as a driver's license. Study material may be bought from the ARRL-VEC or W5YI-VEC http://www.arrl.org or http://www.w5yi.org. All VECs use the same Q & A pools.

Commercial FCC Radio Operator Exams

We are certified by the National Radio Examiners to administer exams for all classes of FCC commercial radio operator and maintainer exams. All Commercial Operator License Examiner Managers (COLEMS) use the same commercial license pools. Administrating fees vary. For information or to register contact W2ILP.

Editorial

I wanted to check on the date that I had conducted the first GARC VE Session as a Contact VE. W5YI used to mail me a "Praise Paper" certificate for each examination session that was successfully completed. This is no longer done. W5YI Inc. now communicates everything possible via the Internet and e-mail, in order to save postage. Anyway the first "Praise Paper" that I was able to find was for the VE session of 12/08/1992. That was almost 20 years ago! Running VE sessions is a responsibility that must be taken seriously. I have become ill recently, and I don't know if or when I may recover. I do not want to cancel sessions when I am too ill to conduct them. I think that now is the time for me to retire from CVE/CE service. The GARC will have to appoint someone else to carry on this voluntary public service, if it is believed to be an important GARC activity. As for me, I believe what Clint Eastwood said, (as Dirty Harry) "A man's gotta know his limitations."

Grumman Amateur Radio Club
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Book Reports

I am the kind of nerd that reads many books, especially when I am sick in bed. I won't tell you about the books I have recently read that deal directly with politics and the coming presidential election. I won't express any partisan opinions here either but I will talk about books that deal with economics. I admit that economics and politics are closely related but I will leave the connection of those dots up to you.

In recent times several books have been written about how to steer the local and global economies more efficiently than they are being managed, because many experts say that no matter who gets elected the US will face more recessions and maybe even great inflation and depression in the near future if better methods are not taken to control spending and to prevent the economy from going "over a cliff" that might shut down our government entirely!

Friedman's concept that "The World Is Flat" is being challenged by modern macro economists. It is interesting that more than one economist wants to apply Shannon's Information Theory to economics rather than methods now being taught to students of the subject. Not only Information Theory…but Communications Theory is suggested by a book by Nate Silver, called "The Signal and the Noise – Why So Many Predications Fail – But Some Don't."

The most frightening non-fiction book that I have ever read is "The End of Cheap China" by Shaun Rein. Rein says that there are now many more Billionaires in China than in the US! If true this is a revolting development! I have always thought of mainland China as being a Communist nation, where most people are much poorer than Americans. Rein says that China has copied Capitalism from us, just as the Chinese have copied many of our products. He says that China will soon be advertising its own higher quality brands, not only to the world but to its own internal giant market. The standard of living of most working Chinese is slowly raising. The Chinese are beginning to embrace modern technology (TV sets, computers, etc.) on a very large scale. This had happened in Japan, South Korea and Germany when productivity became more efficient, after the end of WWII and it will happen in China. Meanwhile we owe China for loans they have given us and we have become dependent on buying lots of cheap products from China. Rein believes that the money exchange rate will change and that China's global economic power will greatly exceed ours in the near future. If this is so China can beat us economically and become the greatest world power, without beating us with military warfare.