BARS Billerica Amateur Radio Society

NEWS FOR AND BY BARS MEMBERS

JUNE 2021

BARS physical meetings are on hiatus until further notice.

The decision to resume in-person club meetings and breakfasts at Stellio's will be made entirely by the Board based on the outlook of this medical emergency. The safety and well-being of our membership is important to us.

Meanwhile, virtual club and breakfast meetings using Zoom have proved an enjoyable substitute. Please ignore the sections, below which give directions and schedule for in-person meetings.

VE License Exams are also virtual – see the VE section near the end of the newsletter for details.

--BARS Management.

From the President's Desk
from the President of BARS, Doug Bruce

Greetings, All.

Some thoughts while waiting for Solar Cycle 25 to kick in…

One of the best areas of interest in our hobby is the net, an organized gathering of fellow ham radio operators. Nets originally were designed to pass formal traffic messages among operators. These messages ranged in formality from the ultra-formal technical message regarding equipment and the like to the ultra-informal messages, like wishing a fellow operator a Happy Birthday!

Nowadays, the net has taken on a much more friendly and informal structure. There are nets of all shapes and sizes.

For example, the Green Mountain Net is an informal net among operators from all parts of New England from Maine to Connecticut. This net has been around since the 1950's, and most of the operators know each other personally, as they have a yearly picnic/cookout gathering at Elaine KA1TWV's house in Wardsboro VT in September. Hopefully I will be able to attend this year's gathering to enjoy the fellowship and comradery offered there.

Another example of a net is the 3905 DXCC Net, which has an entirely different clientele than the Green Mountain Net. This net's purpose is to help fellow ham radio operators make contacts, send QSL cards, and to work states towards the WAS (Worked All States) award from the ARRL. I was able to get several of my 44 states on this net. I also was called by several operators needing contacts and before I knew it, I had 8-10 QSL cards in my mail slot requesting my QSL card from Massachusetts! I will continue to use this net to get the last six states I need (Alaska, Hawaii, Montana, Idaho, Nevada, and Utah) hopefully sooner than later.

These two nets are examples of HF nets. There are also many, many local club sponsored VHF 2 meter nets and 70 cm 440 MHz nets available to a wide range of operators. These nets are very informal in nature and like the Green Mountain Net, a lot of the local operators know each other personally.

Ham radio is all about contacts and connections, and the net is a great vehicle to get to know your fellow ham operators better.

Here's to hearing everyone reading this on our next B.A.R.S. net on the WB1GOF repeater in Westford, MA on Wednesday nights at 8:00PM, and hopefully real soon on a new and improved W1DC Billerica repeater on 147.12 MHz, with a positive offset, and a PL tone of 103.5 Hz!!!!

Until next month,
73,
Doug, N1WRN

Next BARS Zoom meeting: June 2 at 7:00 PM

"Antenna Designs"
Presenter: Terry Snyder, WB3BKN

Our featured speaker this month is Terry Snyder, WB3BKN, an expert on a lot of different wire antennas for any application in ham radio that you can think of. Terry will do a presentation centered on a number of different antenna designs, from the vertical, to the loop, to the quad, to the j pole, to the dipole, and beyond. He will discuss the pros and cons of each design, along with the basic design theories of these antennas. Please join us for a very informative and interesting presentation! Hope to see everyone there!

We will announce the link to join the Zoom meeting before the meeting, but it will be posted to the BARS email list and should not be shared outside our Club. Are you on the email list? If not, please send an email to bars-subscribe@w1hh.org and then simply reply to the robot response from the server and you will be subscribed.

Observing our Zoom meeting requires only a web browser and headphones/speakers. You do not need a webcam or microphone unless you want to speak or be seen.

Before our meeting date, please go to https://zoom.us/test and see if it will function for you. If you have problems, we can try to assist – feel free to ask questions on the BARS email list.

I am looking forward to "seeing" many of you on Wednesday 6/2 here at 1900.

Doug, N1WRN
President, Billerica Amateur Radio Society

A Message From the Editor
from Marla Wallace, WA1GSF

Last month, I waxed enthusiastic about two new products from Raspberry Pi, the P400 computer-in-a-keyboard and the Pico microcontroller. This month, I have an article about turning a Pico into an automatic keyer with a couple of unique features.

For an experienced builder, this is a weekend project, especially if you construct it all on a solder-less breadboard. Best of all, you can get all the parts from Amazon (though there are some cheaper sources; Amazon, though convenient, seems to sell components is larger quantities than this project needs, by far.) But I still spent under $50 to make the keyer and now my junk box is well-stocked. Still, the cost of what actually gets used is about $25, depending on how you want to package it.

The source code and compiled binary for the keyer is available on request from wa1gsf@comcast.net and the schematic is included in the article. It's written in C and is about 250 lines of code – a very small program compared to what the Pico is able to hold.

The tools to program a Pico are all free downloads. I have a Windows laptop, so those tools came partially from Arduino and partially from Raspberry Pi. I also installed the equivalent tools for Linux (Raspbian, the Raspberry Pi version of Debian) on my P400.

Technical Article: Modifying the QRP Labs QCX Transceiver for Binaural (I/Q) Audio Output

By Andy Wallace, KA1GTT

Years ago I had read the article by Rick Campbell, KK7B entitled A BINAURAL I-Q RECEIVER in the March 1999 QST. He describes a circuit whereby the quadrature output (similar to what a software defined receiver produces) is fed directly to the listener in left and right channels through headphones.
Campbell (arrl.org)
[note you might need to have an ARRL login to see that]

I have been curious about hearing that for myself. Some Elecraft (and probably other) rigs do this. One thing I dislike about build articles is that the designer may have scrounged "junkbox parts" which might have been common in 1999 but difficult to locate today. So I was doubtful I could reproduce Rick's receiver.

Then I realized I already had a radio which had I/Q channels. In the last several weeks I had built and modified the QRP-Labs QCX transceiver. The QCX is a wonderful single-band QRP (about 5W) CW transceiver.
QCX 5W CW transceiver kit (qrp-labs.com)

Note that the model I purchased in 2017 (but hadn't built till 2021…don't ask) has been replaced with two others, the QCX+ and QCX-Mini which are sold unassembled each at $55 or assembled for $100, cases extra. I should review the transceiver as well – it's dandy.

I saw a post by VK3ELH in a forum talking about getting the I/Q signals out to audio. It was simple: pick up the I and Q channels from IC5 pins 1 and 7 respectively, and ground at pin 4 Output should go through 10 uF capacitors unless you use an external amp with them on the input already. Because the I/Q output is before the phasing, sidetone, and audio amp circuits of the QCX, you'll hear both sidebands, with no muting or sidetone on transmit, and no volume control. Check the QCX+ and QCX-Mini schematics for where the circuit is – and proceed at your own risk of course.

I tried as he said – direct thru caps to a pair of headphones, and the output was quiet, but there. This was promising. I didn't have a stereo headphone amp handy so I purchased this kit from Amazon:

Amazon.com: KKmoon 47 HIFI NE5532 Headphone Amplifier DIY PCB AMP Kit With Transparent Case Single Power Supply DC12~18V: Home Improvement

I connected this by wiring a stereo jack right to the side of the QCX as there was just enough room under the PCB. The amp has caps on the input so I did not add them to the QCX. Interestingly, this configuration did not like having both the QCX and amp powered by the same supply. Using a 13.8VDC supply on both cause the audio amp to mute.

I consulted with my sister Marla, and she thought that the problem had to do with the ground of the amplifier module being biased to ½ the supply voltage so that the op amps saw the supply as plus and minus ½ the supply. Tying the amplifier ground to the OCX ground subverted that. A quick check with a voltmeter showed that that was indeed the case – the amplifier "ground" was at about 7 V with respect to the QCX ground when the two boards were run from the same supply but not connected together.

The fix was simple – rather than make a DC connection to amplifier ground, use a large-value capacitor for the ground connection.

I removed the AF IN jack and drilled out the ground pin of the board.

It is a two sided board so no worries about traces. I then stripped some wire and used that to insulate the pin of the jack inside the hole.
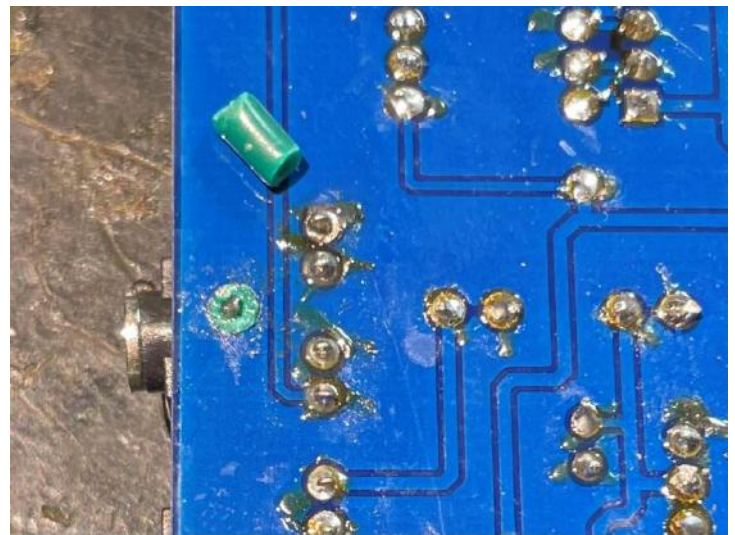
I connected ta 100 uF / 16 V electrolytic capacitor between the two 3.5mm jack ground pins. (The output jack is still connected to the amplifier ground, so that made a good place to tie to.) The + lead went to the unmodified AF OUT ground pin, and the - to the pin of the AF IN jack inside the isolated hole.
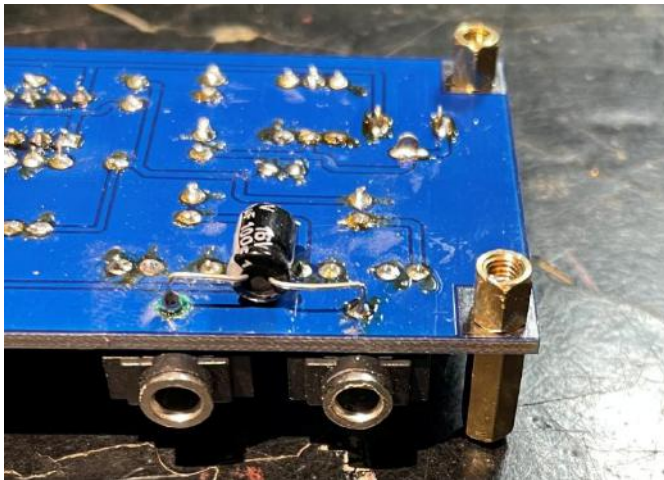
Works great now. Even fit between the board and the plexi housing.
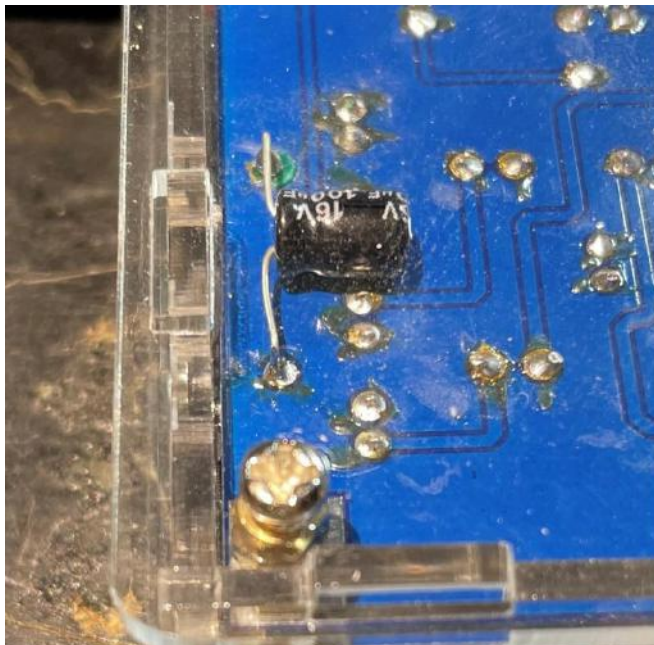
The good news is with the amp turned up fairly high, I can now hear what KK7B described in his article. As you tune the band, there is a stereo soundstage in front of you, with CW signals slipping from one ear to the other. Your brain, like your brain deciphering multiple conversations at a busy cocktail party, can differentiate many signals appearing at once.

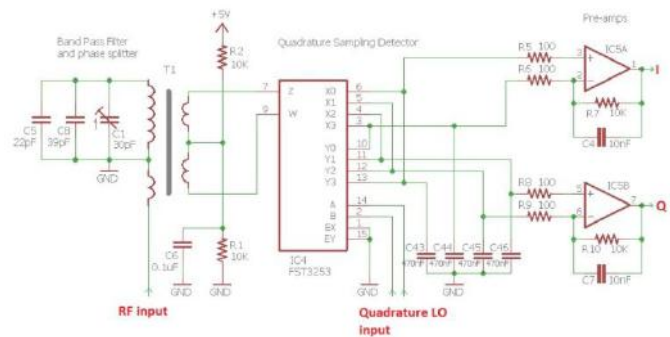I have the QCX set for CW Reverse. This means that on 40m I am listening using the lower sideband. As I turn the tuning knob clockwise, CW signals appear from 0 and tune up in audio frequency. To me, this is always how it felt natural.

If you follow the schematic, it's easy to see where to pick off the I and Q signals. Here's the relevent portion of the QCX schematic:

For the I/Q output, I have chosen it so that the I goes in the L channel and the Q goes in the R channel, wired thusly:

IC5-01 = I = tip (left channel)
IC5-07 = Q = ring (right channel)
IC5-04 = GND = sleeve

and therefore the CW signals walk from my right to left as I tune up. Note that listening to the I/Q channels you can still decode CW on the LCD by turning the rig volume control up – but it is decoding the signal in the 700 Hz CW (or CW-R) passband.

As an added benefit because this output bypasses the 4SQRP HiPerMite CW filter circuit (Four State QRP Group (4sqrp.com)) built into the QCX, you can tune SSB signals. They walk across your soundstage as well and 40m LSB sounds like someone is standing to your left.

All in all it is a surprising and novel way to listen to band activity. The practicality is not so hot with this transceiver, since you lose sidetone and muting. I have left the jack in place for demo purposes and occasional fun but the QCX receiver does a much better job at peaking single CW signals with its audio filter.

This was an interesting learning experiment!

Andy
KA1GTT

Feature Article: CW Skill Development At BARS
By Henry Christle, WA1VAB

Why my emphasis on CW Morse code?
• The CW reward is staying power, the more you enjoy it the better your skills become and the more you enjoy it, a limitless circle.
• Morse Code listening is one media which improves with age, when the eyes water, CW music tirelessly continues.

Who will benefit from CW Skill Development?
• Just about everyone with a HF Radio.

How will you benefit?
- Fun, CW is fun if you are not having fun, then you need to be in a class.
- Morse code is a language, it works in poor conditions, low power, precise, and amazingly fast to accurately edit.
- CW Morse code is unmodulated language, lacking all emotion in transmission.
- Modern CW code expands amateur radio operations like DX, contesting, rag chewing and traffic handling, QRP, solar power with real time digitized computer processing with spectrum scopes, and computer logging and others.
- When you copy in you head, you will be amazed by:
  a. How much faster you can copy.
  b. How much more accurate you copy watching a CW reader errors, unless CW is computer generated.

Skill development goals
- Course goal is to counsel students head copy skills.
  a. If you originally learned robotic ear to pencil method as I did, you can re-program for head copy.
- Introduce computer aided CW logging and contesting tools.
- Skill development will not end with learning head copy.
- Head copy can only be achieved with your effort, you must have the desire to succeed. Hopefully with council from someone like myself, or with the CWOps zoom training, see

A brief history of evolution of CW training.
- Morse code became especially important during WW1, when 50 million encrypted messages were sent during the war. Hundreds of thousands of CW operators were trained with a single purpose, receive coded messages (Radiograms), type or write them on paper, 100 percent accuracy, and do not recognize the content (these are secret messages). Undercover wireless operators, mostly citizens relayed CW messages, which went by transatlantic cable (which was laid in the 1860's) to States.
- This was accomplished by encryption, usually 5-digit numbers, in 25 block groupings per message. The operators drilled like computers, hear the Morse characters, and write them immediately, ear to hand, ear to hand. Just a knee jerk reaction.
- A month ago, I made a CW friend, outstandingly easy to copy, I could tell straight away he was an X Navy operator. When trying to help him understand his new ATU, he kept referring to his notes, we spoke on phone, and realized he was one of the above operators, he typed it w/o thinking, and had to go back and read it, this is a deliberate goal of original CW education.
- Another personal true story is my CW mentor, who was radio operator on the USS Arkansas, Atlantic Fleet Flag Ship, I QSO'ed on CW every Sunday morning, suffering from brain cancer he was speechless the last 3 months of his life, we had CW QSO every day then, even on the last day of his life.
- Of course, we need to know A is di-dah, and B is Dah-di-di-di, once learned it is ideal time to train the brain to file the letter in brain until a word is formed.

Let me introduce everyone to CWOps; https://cwops.org/ a ham organization 100% devoted to promoting CW, and CW skill development. You will be impressed with the scope of CWOps activity promoting CW. I am a member of CWOps, mainly because I enjoy participating in their Wednesday CW contests. PLEASE visit their web pages.

CWOps hosts Wednesdays, for 3 one-hour periods, CTW test runs. Low ends of 40-meter band is a good listening spot.
TIMES
Every Wednesday at
     1300 – 1400z (favoring Asia/Pacific);
     1900 – 2000z (favoring Europe/Africa); and
     0300 – 0400z –Thursday (Wednesday evening in US/Canada).

IN CONCLUSION
BARS will provide Zoom time to conduct a CW skill program. Classes will be 5-6 students and might run 45 minutes twice weekly. Classes will be offered to four student skill levels:
1. Beginner, no experience.
2. Basic, who know Morse code but cannot quickly recognize characters.
3. Intermediate, for people with instant character recognition, emphasis on word recognition.
4. Advanced designed for people who can hear words, emphasis on longer phrases.

CWOps, in my view, has successfully pioneered the methodology to inspire CW learning, they are Ham CW operators helping Hams. BARS class will borrow from the CWOps playbook.

Please visit https://cwops.org/ and read up on CWOps, excellent programs and consider signing up for one of their CW courses. Their counselors are very intense, skilled, experienced with classes, and humbly I submit probably better than myself.
If you have interest in the BARS Autumn evening class(es), please email me and we will have a dialog on how best to help your CW skills, Henry Christle email hgcsenior@gmail.com

Feature Article: What Goes Around Comes Around – The Rest of the Story
By Jim Idelson, K1IR

[Some text got lost in last month's article by Jim Idelson, K1IR "What Goes Around Comes Around". Your editor was having a bad day. The relevant section of the article, with the missing text, is included. Apologies to Jim.]

We broke the job down into four phases.
- Disconnect the control cables and feedlines from the antennas and strip them off the top ten feet of the tower to ease our access to the hardware.

- Remove the elevation rotor with the cross-boom and antennas from the mast and lower this complete assembly to the ground.
- Remove the 15-foot mast and lower it to the ground.
- Remove the top 10-foot section of tower with the attached azimuth rotor and lower it to the ground.

The project proceeded as expected. We worked slowly and carefully. I spent the first 4-5 hours on the tower. At the point when we were working on the final step - removing the top section, I started to experience some cramping in my hands. We believe this was probably the result of dehydration after a long period on the tower and not consuming enough fluids. I came down and Paul suited up in his climbing gear and finished off the job on the tower. The whole project took about 8 hours, including a lunch break.

Phase 1: Strip Cables and Small Antennas
In this phase, the key tools are wire cutters and a utility knife. I carefully disconnected the cables from the rotor and all antennas. There were two other small antennas that needed to be removed in this phase, as well - a wifi patch antenna and a small satellite TV dish. There were lots of cable ties to cut and a lot of electrical tape to remove.

Phase 2: Remove and Lower the Satellite Array
We used the proven technique of 'tramming' to get the array safely to the ground. First, I lowered the array on the mast by a few feet and then tied a strong, tight line to the mast above the elevation rotor. …

… to lower the section to the ground. We had estimated the location of the center of gravity almost perfectly; the section stabilized in a horizontal position, making it easy to manage on its way to the ground.

Phase 3: Remove and Lower the Mast
Miles was using a 15-foot mast to support the array above the tower. About 8 feet of the mast was inside the tower, secured at the bottom in the azimuth rotor mast clamp. We had previously loosened the mast clamp, so the mast was simply resting in the top of the rotor at this point. The mast protrudes through a Rohn thrust bearing mounted on the top plate of the tower. With a little lubrication and a lot of force, the corroded bolts securing the mast inside the thrust bearing were loosened. It was now possible to lift the mast out of the tower. The tool required to do this is a gin pole. A gin pole is simply a pulley supported at the top of a pole that is secured to the tower, and which extends well above the top of the tower. In our case, the gin pole gives us a pulley about 8 feet above the tower top plate. The secret to successfully maneuvering a mast out of the tower with a rope and gin pole is to tie off the rope at the right spot on the mast.The attachment point needs to be low enough to be able to pull the mast out of the tower. It also needs to be high enough to keep the center of gravity below the attachment point; this prevents the mast from suddenly flipping over when it comes out of the tower. We had to adjust it once in order to find the right attachment point. Once we had that done correctly, the mast was easily removed and lowered to the ground.

Phase 4: Remove and Lower the Top 10-Foot Tower Section
Rohn towers are constructed in 10-foot sections. The three legs at the lower end of each section are designed to slip over the tops of the legs of the section below. Two bolts secure each of the three leg joints. Our plan was to remove all the bolts securing the top section in place, lift it off and lower it with the gin pole. I lowered the gin pole and attached it to the top of the third section. I secured the rope just above the point we estimated to be the center of gravity of the top section. I was in the process of removing the joint bolts when I started to feel the cramps. At this point, I came down and we took a (late) lunch break while discussing how to complete the job. Paul went up and managed - with much effort - to remove all six joint bolts. Using the gin pole rope, we worked with Paul to try to lift the top section off, but it wouldn't budge. Fortunately, we had considered this common

problem in tower dismantling. We had a special jacking tool with us to apply force to separate the two sections. The jack was designed for use in Rohn 25g applications, not 45g. But, with a bit of wrangling, Paul was able to get it to do the job. The section finally popped off, and we were able to lower the section to the ground. We had estimated the location of the center of gravity almost perfectly; the section stabilized in a horizontal position, making it easy to manage on its way to the ground.

With the job complete, Miles was kind enough to volunteer his trailer to transport the gear from Chelmsford to Sudbury. We took care of that just two days later.

So, with many thanks to all involved, I hope to put this equipment back into service again soon. There's lots to be learned and experienced in the world of satellite operations. Look for an article or two on putting the station together and making some initial contacts. And, when the time comes, I hope to make sure this gear ends up in the hands of someone else who wants to engage with this exciting aspect of amateur radio.

73 Jim K1IR

Technical Article: Build a Microcontroller-Based Keyer for $20 Parts Cost
By Marla Wallace, WA1GSF

If you've been paying attention, you know I'm a home-brew enthusiast. And my background includes years of designing digital hardware and software. So when I discovered a new (well, it came out last year) "building block" that combined a fast processor, a large amount of program store and data memory and 26 programmable I/O pins into a package about the size of two quarters side-by-side and costing only eight times as much, I had to find a use for it. I did. Now I'm going to inflict the project on you. (You were warned!) This project is actually a learning vehicle for me. I want to eventually ise this microcontroller in a

music keyboard. But I chose an automatic keyer because it was a little simpler and still needed to do most of the same type of I/O.

What It Does
Automatic keyers have been around for decades. I remember seeing a project for one using a couple of CMOS integrated circuits back in the 1970s. So a $4 Raspberry Pi Pico is a bit of overkill. To justify using this part, I elaborated the keyer design a bit:

- Generate a 440 Hz side tone (which you can turn off)
- Three styles of keyer:
    - "Bug"
    - Automatic keyer
    - Iambic keyer
- Speed control from 5 to 50 WPM

The Hardware
Since I was using this as a learning experience (I don't use CW much at all and have never used anything besides a straight key), I decided to assemble everything on a solder less breadboard.
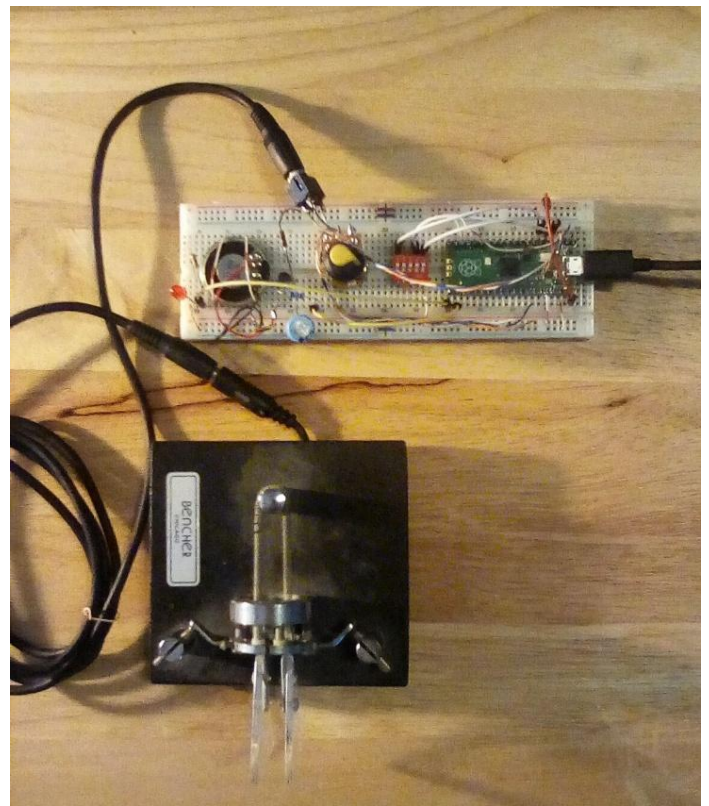
As you can see, everything fits on a full-length breadboard. I suspect one could package this in an Altoids™ tin!

Working from right to left (because I'm perverse), The cable coming from out-of-frame is a USB cable connected to a generic wall-wart. This supplies +5v to the keyer. I've also run it from a "portable power pack" rechargeable battery sich as what people use to charge their phone in an emergency. Next, the green rectangular object is the PICO. The red square object is a multi-pole DIP switch which sets the keyer mode and determines if a

side tone is to be generated. Next, the round black and yellow knob is the speed adjustment. To the right and below that is the emitter follower that drives the speaker (far right). There's also a LED that shows the TX keying output. (Since I'm not hooking it to a rig, I didn't bother with the switching transistor (Q2) shown in the schematic.

Speaking of the schematic, here it is:

The Software

As the saying goes, the devil's in the details. In this case, the details are all in the software. There's about 200 lines of well-commented code needed to make this project function. Unfortunately, this is too big to publish in the newsletter, but if you email me (wa1gsf@comcast.net), I will be happy to send both the source code and the binary files on request.

Welcome to the First BARS CW Corner
By Tom Walsh, K1TW

Last newsletter, I laid out in writing my love over many years for CW. Based on the many responses I received, there is plenty of enthusiasm in BARs to promote the enjoyment of CW. I am clearly not alone!

CW, one of the simplest and original methods of amateur radio communication is thriving today thanks to the engagement of countless hams - young and old. CW is also your ticket to enjoying all your hard-earned FCC frequency privileges.

CW is indispensable if you want to fully enjoy working DX, Contests, low power operating (aka QRP), and experimenting with simple equipment and rigs by building kits. One of my CW joys is to tune in an ongoing rag chew and just listen in my head. CW is almost like a musical symphony once you get the hang of it!

Getting Started

How to begin actually? The original survey of BARS members is helpful. Members are a diverse group, and this applies to those who responded to my email asking about your CW interest.

Here is what I learned.
(1)   Number of CW OPS members: at least 4;

(2)   How many already operate CW: at least 8;

(3)   How many would like to know more or possibly learn CW: at least 7.

A couple of newsletter columns will not make everyone a CW wizard overnight. The journey will be the fun part.
(1)   For experienced people, we may propose fun or challenging operating activities as a club;

(2)   For beginners, we should be guides and mentors;

(3)   For everyone, this should be a place to provide information about CW and local and worldwide activities.

Mentors

I have been mentoring someone in recent months start from knowing little about amateur radio. I am enjoying this as much as anything I have ever done in my decades in the hobby. I recall the many who helped me start out as a teenager and have a fuller understanding of how much joy being a mentor is.

I particularly remember Frank Baker, W1ALP who was (I believe) the longest serving Eastern Massachusetts ARRL Section Communication Manager (or SCM) back in the day. Frank was the SM from the early 40's until I think mid 70's. I bet a few other BARS members remember W1ALP.

I have enjoyed mentoring my friend every step of the way from getting licensed, unravelling the mysteries of propagation, building his first antenna, discovering the joys of QRP (low power), building his QCX+ QRP kit, and discovering the joys of cw. Oh, and joining BARS in the process too.

This all came to fruition on a lovely day in May when we set up his QCX+, homebrew antenna, and paddle. I watched with pure joy as he made his first true cw QSO from a picnic bench at the Old North Bridge in Concord. Two very friendly Park Rangers gave us the permission to operate.

I was nearly excited as he was, and I was having great fun!

What is next?

I would love to see BARS develop as the best darn club of CW and amateur radio Mentors in the section. I am all in. Are you?

Contact me at k1tw@arrl.org if you want in as a mentor too.

Meanwhile

Here is a cool website if you love cw. The CW Club Reverse Beacon Network Spotter. If you want to find and contact other cw club members, this is a fantastic tool. I may discuss it in a future column but for now check it out: https://rbn.telegraphy.de/

Dit-dit, and 73,
Tom K1TW

PS: Many thanks to Doug, N1WRN BARS Club President for suggesting the Column Title

Strays

Your editor had a bad day, indeed!

Our guest speaker for the May 5th meeting was Terry M. Stader, KA8SCP. His name was misspelled in the meeting announcement of the May issue.

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56 Years of Operating Systems

This isn't really ham related, but if you have a computer in your shack, you might be interested in knowing how its operating system came to be.

1965: The ancestor of nearly all modern operating systems was designed by a joint project of Bell Labs, General Electric and MIT. This operating system is the direct ancestor on UNIX and Linux. Concepts from this operating system can be found (implemented badly, IMPO!) in Windows. At the time it ran on a million-dollar mainframe system that needed more floor space than many houses have.

Recently, I was able to get it running in emulation on a Raspberry Pi P400 computer the size of a laptop and costing under $250. And it runs faster emulated by an ARM processor than it did running on that enormous mainframe.

Learn more about the Multics Operating System at https://en.wikipedia.org/wiki/Multics.

An unusual oscillator circuit

One of the problems with designing a radio system is maintaining oscillator stability. In a CW rig, this is especially annoying. An unstable VFO in the transmitter or an unstable local oscillator in the receiver results in an audio tone that "wobbles" as the transmitter is keyed or drifts as the receiver warms up – very apparent to anyone who isn't totally tone deaf. Besides a well-regulated power source and mechanical design that minimizes temperature changes and mechanical vibration, one almost always needs to have the oscillator coupled to a buffer amplifier. The buffer amplifier minimizes the effect of changing in loading on the oscillator.

But back in the 1930s, an engineer / ham came up with something called a tri-tet oscillator which allowed the function of the oscillator and buffer stages to be combined into a single vacuum tube. Unfortunately, this circuit doesn't translate into modern semiconductor devices, so you've probably never seen an example. But it's still worthy of note. Read all about it at Tri-tet oscillator - Wikipedia.

--de Marla Wallace, WA1GSF

Making ZOOM available to Elmers

In this time of social distancing we have been using Zoom for our monthly club meetings. I have been thinking that Elmers could also be using Zoom to coach new hams instead of actually going to visit with them. Elmers could perhaps help with programming a new radio with the new ham sharing their computer screen and the Elmer helping to walk them thru the process. An Elmer could have Zoom on their cell phone and show a new ham how their shack was setup. Use your imagination and see how you might use this tool. If you would like to use Zoom for this, contact Bruce, W1LUS@hotmail.com, with a date and a time and a meeting will be setup for you. You may also contact Bruce if you would like training on using Zoom to Elmer someone.

--de Bruce Anderson, W1LUS

Upgrading Your License? Here's a Resource

If you are thinking of upgrading your license using one of the Online exam sites. I recommend that you take some free practice exams on HamStudy.org. I recommend it because the software used to generate practice exams on HamStudy.org is the same software that is used to create exams for online tests. By doing that when you take an online upgrade exam the test question format will be familiar. With HamStudy.org practice tests you should use the keyboard to select the answer, A,B,C, or D and not your mouse as that is way online exams are run.

--de Bruce Anderson, W1LUS

Friday and Sunday Night CW Slow Speed Contest

Every Friday and Sunday night, there is a weekly slow-speed CW contest run by the local K1USN guys. This is a good way to polish up your CW skills. See http://www.k1usn.com/sst.html for details. [Currently, the schedule is 4-5 PM EDT Friday and 8-9 PM EDT Sunday. – ed.]
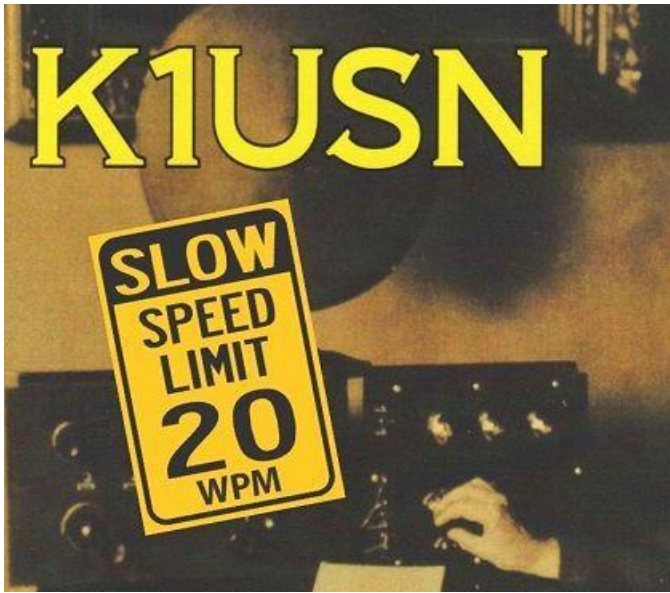
-- de Tom Walsh, K1TW

Secretary's Reports

from Scott Ginsburg, K1OA, Secretary

BARS General Meeting May 05, 2021
President Doug Bruce, N1WRN called the Zoom virtual meeting to order at 7:10 PM.

Terry Stader, KA8SCP gave a talk on the D-STAR digital mode.

There were 30 attendees. N1WRN closed the meeting at 8:45 PM.

BARS Board of Directors Meeting, May 20, 2021
Board Members present: N1WRN, W1LUS, KA1GTT, WA1VAB, K1TWF, K1OA

Guests Present: Mike Rioux, W1USN

The Board discussed with W1USN the future of the W1DC repeater and various options for transfer of ownership. Mike also indicated there are planned hardware updates in the works.

The Board discussed the possibility of restarting in person general meetings in July. No decision was reached yet.

Progress on the planning of the WBZ 100 year anniversary operating event was reviewed. No club members have volunteered to help out yet.

BARS Membership

Bruce, W1LUS, our BARS Treasurer reports that as of 5/1/2021, we had 88 members. To date 16 members from 2020 that have not renewed their membership for 2021.

2021 BARS Member Dues

A $15 annual BARS membership now runs from January 1st and expires on December 31st. Any renewal or new membership made after September 1 will be valid until December 31st of the next year. Memberships allow us to

- Pay our bills;
- maintain our great web page;
- fund field day;
- and bring the membership a great variety of informative meetings and speakers.

Treasurers Report for June 2021

from Bruce Anderson, W1LUS, Treasurer

For May, our expenses were Zoom $15.93, postage $.55 and a PayPal fee of $3.25. We had three new/renewals for an income of $45, one ARRL student renewal for $25 and a donation of $3.

Dues for 2021 are due and remain at $15 for 2021.

Dues can be paid several ways:
- Via bank to bank transfer with Zelle, Venmo, PayPal, etc. by sending $15 to bars.dues@outlook.com.
- With credit card by using the Join/Renewal membership form on the W1HH.org website.
- With cash or check by mailing $15 to Billerica ARS, PO BOX 832, Nutting Lake, MA 01856

BARS Needs You!!!

We are looking for a few good hams to act as net control on the regularly scheduled Wednesday night nets! All it takes is one night a month; if you are interested contact Chris, KC1IUK. Also, the club needs volunteers for light tasks of ~ 1 hour a month. Are you able to pitch in? Contact Doug Bruce, N1WRN.

Wednesday Night Net

Join us on the Billerica Repeater for the weekly BARS net each Wednesday at 8:00 PM (**except on the first Wednesday of the month which is club meeting night**). *Note: We are now using the Westford Repeater, due to system difficulties with the Billerica Repeater. Thanks to the Westford Police Amateur Radio Team (PART) for their generous act of making their repeater available to us.*

Repeater info:
WB1GOF
146.995 MHz
-600 kHz (normal) offset
Encode CTCSS 74.4 Hz

Club Meetings

When we resume in-person meetings, they will be held on the first Wednesday of the month at 7:00PM at Chelmsford Bible Church, 128 Gorham St., Chelmsford MA

Park in back and enter by rear door

Chelmsford Bible Church Hall, 128 Gorham St, Rear Door, Chelmsford MA 01824-3220

VE Sessions

Since December, 2020, we have been doing exams on-line. Our next online exam session will be on June 10th. If you are interested in participating in these sessions as a candidate or as a VE, please contact Bruce at W1LUS@hotmail.com to register for this online exam session.

Eventually, we hope to resume holding VE sessions as before, every month on the 2nd Thursday at 7:00 PM at Chelmsford Bible Church, 128 Gorham St., Chelmsford MA. Park in back and enter by rear door. Chelmsford Bible Church Hall, 128 Gorham St, Rear Door, Chelmsford MA 01824-3220 (map)

May 2021 VE Session

On May 13 we had our sixth online VE Exam session. We had four people signed up. One passed their Technician exam. A second passed Technician and General. The other two failed to show up. Our next session will be on June 10, 2021.

Thanks to Scott, K1OA, Andreas, KC1NTL, and Tom K1TW for their help in running the session.

I would suggest that anyone considering taking an online exam use the exam prep site HamStudy.org for practice as that is the same site that is used to generate the online exams.

I am looking for more VEs to help run the online exams. With more VEs we can run more than one session a month. Since most exams are for Technician, General VEs can participate. And there is a possibility for non VEs to participate. Contact me at w1lus@hotmail.com for more information.

Bruce Anderson, W1LUS

Club Breakfast every Saturday

On Saturday mornings around 8:15AM, we also meet weekly for a casual, social breakfast at Stelio's restaurant. Stelio's Family Restaurant, Billerica, MA   Note: currently in hiatus due to COVID restrictions.

Future Meetings

The 7/7 meeting will be held via Zoom. [With any luck, your editor will be checking into a hotel in Hawaii about then.]

Subscribe to the BARS Mailing List

To subscribe to the BARS email list, send a blank email to bars-subscribe@w1hh.org and watch for an automated reply. Note that bars-subscribe is all one word.

Reply to that message from the list server and you are then subscribed.

To post to the list, address your email to bars@w1hh.org

June Get-on-the-Air Suggestions

BARS is a "get-on-the-air" (GOTA) club. We encourage members to participate in the varied events on HF and VHF. Here are some popular suggestions for this month:

Date	Event
Jun 5-6	10-10 International Open Season PSK Contest http://www.ten-ten.org/index.php/activity/2013-07-22-20-26-48/qso-party-schedule/2-uncategorised/51-open-season-rules-rules
Jun 12-13	Straight Key Century Club (SKCC) Weekend Sprintathon https://www.skccgroup.com/operating_activities/weekend_sprintathon/
Jun 12-14	**ARRL June VHF Contest ** http://www.arrl.org/june-vhf**
Jun 19	**ARRL Kid's Day ** http://www.arrl.org/kids-day**
Jun 19-20	All Asian DX Contest, CW https://www.jarl.org/English/4_Library/A-4-3_Contests/2021AA_rule.htm
Jun 19-20	Stew Perry Topband Challenge http://www.kkn.net/stew/
Jun 26-27	**ARRL Field Day ** http://www.arrl.org/field-day**

** Top Recommendations for this month

Details on each contest above and more events can be found every week on the WA7BNM contest calendar at :
 https://www.contestcalendar.com/weeklycont.php?mode=custom&week=current

BARS Leadership Team

President: Doug Bruce, N1WRN
Vice President: Kayla Creamer, W2IRY
Treasurer: Bruce Anderson, W1LUS
Secretary: Scott Ginsburg, K1OA
Net Coordinator: Chris Lobdell, KC1IUK
Newsletter Editor: Marla Wallace, WA1GSF
New Member Outreach: John Fisher, KC1FTJ
BoD: Mike Raisbeck, K1TWF
BoD: Henry Christle, WA1VAB
Ex Officio: Andy Wallace, KA1GTT