President's Message *– Joe Harris, N1QD*

After Field Day, my ham radio activity levels typically peter out over the summer, as I get distracted by the better weather and wind up spending the weekends hiking with my XYL. This year, I have found myself more active than normal. A month or so ago, I finally got radios installed in the mobile, so my commutes have not been feeling as long as they used to. Repeaters have been keeping me busy, both analog FM and DMR. Also, I've found far more simplex activity in Eastern MA than I thought possible, and I'm thrilled to hear all the chatter! If the repeaters are quiet, don't discount simplex. Listen to the 2 meter simplex channels between 146.5 and 146.6. Try throwing your call out on 146.52 or one of the other frequencies recommended by our area frequency coordinators (New England Spectrum Management Council) at www.nesmc.org. You may be surprised by what you hear!

Joe Harris, N1QD

In this Issue of *The SPARC*

- Fun with the Arduino
- KC1CIC in outer space
- Boxboro!
- N1LAH builds a portable repeater
- Events, meetings, directions

Next BARC General Meeting
Thursday, September 21, 2017 at 7:30 pm

The next BARC General Meeting will be on Thursday, September 21, 2017, at 7:30 p.m. at Brookline Police Headquarters in Brookline. Directions to this location can be found elsewhere in this issue. Note that there are no General Meetings in July and August.

Repeaters: 145.230 (-) CTCSS 88.5   Simplex: 147.420   449.175 (-) DMR CC1

BARC's Online Discussion Group *– Joe Harris, N1QD*

BARC has an online forum at Yahoo groups. The Yahoo group serves as a sounding board for members to post their suggestions and comments, and is intended to foster discussion. The group can also be used to share photographs from club events! Come visit us at: http://groups.yahoo.com/bostonARC.

Book Review: More Arduino Projects for Ham Radio *– Joe Chapman, NV1W*

For most of my life as a software developer, Moore's Law has applied. The law states that processing speeds and memory densities double every 18 months, so what was an unthinkable amount of computing power a decade ago is now inside your toaster. If the Microsoft Word of today were any less sluggish than it was back during the Clinton administration I might be impressed. More interesting to me are the developments at the low end. You can stick a three-dollar 8-bit microcontroller in pretty much anything (I've got one in my Altoids tin–sized Rockmite QRP rig and another in a homebrew tea timer) and the $40 Raspberry Pi has enough oomph to run fldigi.

The Arduino is one of the venerable microcontroller-based prototyping platforms. It's cheap and easy to write code for and to interface. It's no computing powerhouse, but unlike your fancy laptop, if you have to click a relay, flash an LED, or talk to a lightning detector chip, you aren't out of luck.

This book is a second set of ham radio–related projects for the Arduino by Glen Popiel, KW5GP. Like the first book, there's an extensive discussion of the available Arduino and Arduino-compatible boards, as well as a chapter on "shields" (expansion modules) and other parts that it's nice to have on hand. I think that even if you don't plan to make any of the projects, the preliminary matter is worth the price of the book.

The heart of the book consists of fifteen projects, beginning with an Auto On-Off Mobile Power Control and ending with a 40-Meter QRP JT65 Transceiver. Few people will find a use for all of them. Given my limited desk real estate, I can't see any of the projects earning a permanent place in my shack, but they were fun to tinker with.

The Station Power Monitor is a typical example. Based on an Arduino Nano, it uses a Hall Effect current sensor to measure the current coming off your power supply, a simple voltage divider to monitor supply voltage, and a very accurate real-time chip to supply clock time. Everything gets displayed on a color TFT display. There's also the usual 7805-based 5V power supply.

I had everything lying around except the Hall Effect current sensor, which I got for a couple of bucks on eBay. Apart from four caps and two resistors, the rest of the work involved connecting chips by poking jumper wires into a solderless breadboard. The Arduino "sketch" can be downloaded from the web and everything worked like a charm first time. (Rant: if calling a computer program a "sketch" empowers people to write them because it sounds friendly, perhaps we should try calling brain surgery "fun with Mr Scalpel".)

It's not going to displace the current meter that's already on the front panel of my power supply, or the cute miniature digital voltmeter I'll get around to mounting one of these days for sure. On the other hand, it served as a nice roadmap for hooking up a temperature/relative humidity/barometric pressure chip, and once I figure out how to make a mounting panel for the TFT display that variant might find a permanent place at my operating position.

Another interesting project is a portable network time protocol server based on a GPS. This project blew me away. The GPS system depends on a very accurate clock, so in addition to being able to learn where you are, you also know what time

it is with a high degree of accuracy ("stratum zero" in Network Time Protocol circles). In this project you take a GPS and an Ethernet interface and you turn it into an authoritative source of network time, all in a package that fits in your hand, and again with a handful of components. You're definitely pushing the limits of the Arduino's memory with the sketch for this one.

There are projects for two 40-meter QRP transceivers, CW and JT65, based on a cheap transceiver kit called "Frogs Calling" that you can get from China for less than ten bucks. I've ordered a few off eBay, stay tuned for more commentary.

Glen writes well, and this is a fun book to play around with on a rainy Saturday afternoon, perhaps while waiting for Microsoft Word to start up.

More Arduino Projects for Ham Radio, by Glen Popiel, KW5GP. ISBN 978-1-62595-070-5. Published by the ARRL, http://www.arrl.org. *$39.95.*

Slow-Scan Images from the ISS *– Greg Bennett, KC1CIC*

To celebrate the 20th Anniversary of Amateur Radio on the International Space Station (ARISS) a Slow Scan Television (SSTV) event was planned for July 20th. The ISS would broadcast different images to hams on the ground for the time period. I decided I wanted to give this a try.

I already knew I could hear the ISS. It has a packet station on board that transmits frequently. I've never been able to make a connection but it had a good signal. This event was going to be transmitted on 145.800 using SSTV in PD 120 mode. Other than the frequency I had no idea what that meant. Off to explore Google and find out.

SSTV as it turns out is not really TV. It is the transmission of still images. PD 120 is just one of the many modes available when using SSTV. Back in the day it took a lot of expensive equipment to make SSTV work. Now of course with the right software that is either free or purchased, anyone can use SSTV.

However, the software must be able to control your radio. Just like watching Joe NV1W trying to track satellites at Field Day, the frequency shifts (Doppler Effect) as the satellite (or ISS) moves toward and away from you. You can tune the radio manually but not as effectively as the software can.

You also need to know where the satellite will be in your area. If you have never been, go to https://www.amsat.org/ and select Satellite Info then Pass Prediction. You input your location information, select your satellite, and it will tell you when the satellite will in your area.

I have Ham Radio Deluxe (HRD) installed on my computer and well integrated with my radio but I've never used the SSTV feature set. I did not have a special antenna, just the Diamond X50a 2m/70cm that I've been using for years. HRD has a punch-out to https://www.amsat.org and it augments that with some very nice prediction/signal strength graphs which you can see at the bottom of my computer screen. The second one from the left of the screen was my best opportunity. So I took a nap…

145.230 (-) CTCSS 88.5　　　　**Simplex: 147.420**　　　　**449.175 (-) DMR CC1**

Returning to the computer I had the AMSAT page open as well as the ISS tracking page and of course the SSTV window open. I didn't hold out much hope for the first pass as it had a predicted low signal. As I watched the ISS approach on the prediction page my radio started making a squawking noise and I literally jumped out of my chair in excitement, an image was starting to be displayed in the SSTV window!! It takes about 30 to 60 seconds to download an image. As you can see from the image on the left it is incomplete with a lot of noise. Don't forget, the ISS is really moving fast! On the second pass which was much closer I got a different and much cleaner picture.

If I had been using a satellite antenna the image would be very clean. However, I was thrilled with the results using just a standard antenna. If you want to look at the images other hams from around the word posted go to http://www.spaceflightsoftware.com/ARISS_SSTV/index.php.

73 everyone!

Boxboro! *– Joe Harris, N1QD*

As we reach the symbolic end of summer, area hams can look forward to a new annual tradition: Boxboro! The ARRL New England Division Convention is now an annual event, and it takes place the weekend after Labor Day, from Friday the 8th to Sunday the 10th.

The Convention offers classes and forums, as well as an exhibit hall, flea market, and two banquets. See all the details at www.boxboro.org.

Cross-Band Repeat for Public Service *– Ralph Devlin, N1LAH*

Anyone who does public service support has heard the following:

"STATION CALLING THIS IS NET CONTROL. YOU ARE BREAKING UP, PLEASE INCREASE POWER OR MOVE TO A HOT SPOT!"

After several exchanges, it is clear that the problem is seldom HT output power but HT location. So the ham finds a hot spot that is some distance from where they are really needed to provide communication.

Many dual band mobile rigs available today have a feature called cross band repeat which allows for the mobile rig in the car to be parked away from the assigned location with a clear shot to the repeater being used for the event. Using a handheld at the actual assigned location or shadowing the assigned person, the ham can communicate through the mobile

145.230 (-) CTCSS 88.5   **Simplex: 147.420**   **449.175 (-) DMR CC1**

rig in the car to the event repeater. Usually the handheld can hear the repeater directly even though it cannot reach it on transmit so it is unnecessary to have the mobile transmit back to the HT. Since most events use a 2 meter repeater, the usual setup would be for the HT to communicate with the mobile on UHF. This might best be called simplex-duplex repeat.

The specific procedures for setting the radios would be model specific; I do suspect that the general configurations would be similar.

I have tested this on my Kenwood TM-71A mobile with a Kenwood TH-F6A and a Baofeng UV-5R. Both worked fine. W1HAI and I went to a known "bad" location and tested both simplex and repeater 2 meter output.

On the TM-71A I set Band B on 446.325 MHz simplex and Band A on 147.420 simplex and then on a couple of 2 meter repeaters. On each of the HTs I set display A to 446.325 MHz and display B to the appropriate 2 meter frequency. On both the mobile and handhelds these frequencies can be set either with the VFOs or by tuning to stored memories. Since the TH-F6A is dual receive, that was it. The UV-5R is dual watch, not dual receive, so I had to set it to dual watch (Menu 7) and set to make band A always the transmit frequency (Menu 34).

Tests are fine; the real test will come at an actual public service event.

A few observations:

- Since routine operator ID on UHF from the handheld is simultaneously transmitted on the 2 meter side there is no need for a separate repeater ID. If the mobile were configured to transmit the received 2 meter signal back to the HT on UHF, that UHF transmission would need to be identified.
- The control operator of the mobile, although not actually in the car, is close enough to shut the mobile down if anything goes wrong. I am not a Part 97 expert, but based on some reading my understanding is that this situation would be in compliance.
- Since the HT is close to the mobile and the mobile has a clear shot at the repeater both can be run on relatively low power. There needs to be some attention to the risk of discharging the car battery, especially if it is a long event or the mobile radio is running on high power. In which case a separate source of power other than the car battery should be considered.
- To reduce the likelihood of accidental transmissions by another ham the UHF frequency might utilize PL or DCS.
- Net control asking to switch to a different repeater could cause a scramble!

The web site http://www.ssiarc.ca/cross-band-repeat.php has a lot of information about cross band repeat as well as an extensive list of radios that have the cross band repeat feature.

Thanks to W1HAI for his advice and participation in playing radio for the field test.

Some of the cross band repeat radios also have duplex-duplex repeat and remote control capabilities, but that's for another day.

New Members *– Joe Chapman, NV1W*

BARC recently welcomed another new member, **Mark James, KC1GWX.** Mark is a recently licensed General who lives in Arlington. Be sure to say hi if you hear him on 145.23 or on the Monday evening net!

BARC Meeting Calendar for 2017

Unless otherwise noted, all meetings will take place at the Brookline Police Headquarters.

General Meetings
September 21   2017   Thu   7:30 pm
October 19   2017   Thu   7:30 pm

November 16   2017   Thu   7:30 pm

Business Meetings
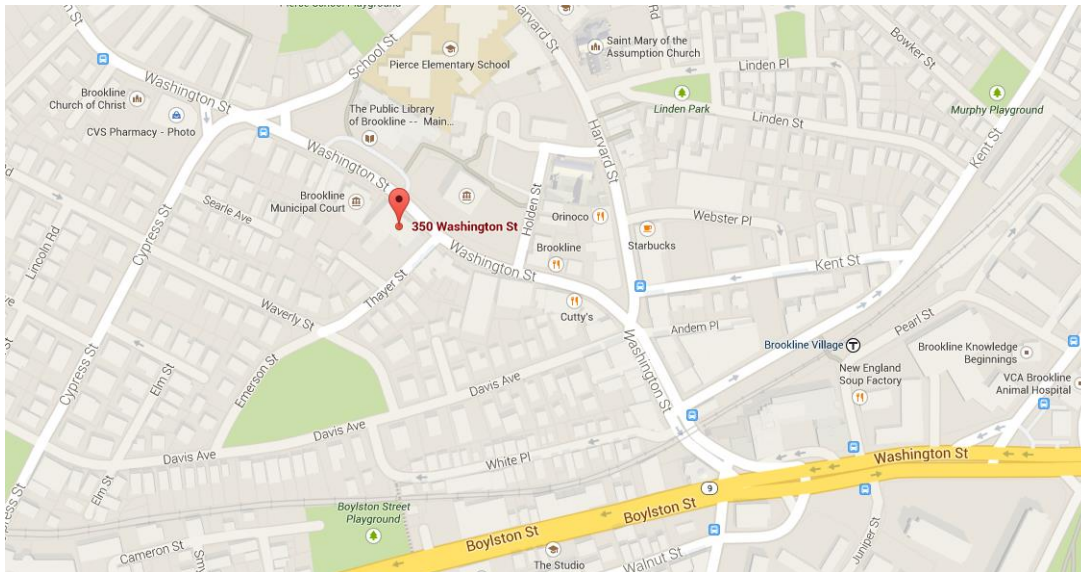September 7   2017   Thu   7:30 pm
December 7   2017   Thu   7:30 pm

VE Sessions
October 9   2017   Mon   7:30 pm

Area Map for Brookline Police Headquarters, 350 Washington St., Brookline

BARC Net Preamble

The control operator for the BARC Net is Joe, W1JJF. He rarely misses a net, but when he does any ham can take up the position and run the net. To assist you in opening and closing the net The BARC Net Preamble is printed below. Do not be afraid to step up and take the challenge.

Is there any further business for the repeater before we begin the Boston Amateur Radio Club Net? This is «YOUR CALL». Calling the Boston Amateur Radio Club Net. This is «YOUR CALL», my name is «YOUR NAME» and I am located in «YOUR TOWN». This net meets each Monday evening at 9 pm Eastern Time on the 145.230 Boston repeater, PL 88.5. This net is an informal round table discussion concerning matters of interest to the members of the Boston Amateur Radio Club and the Boston Amateur Radio community in general. When checking into the net, please say, "this is" and drop your carrier to check on doubling. Then give your call sign, name and location. All amateurs are welcome to join the net. Any check-in's for the Boston Amateur Radio Club Net please call now.

[Compile the list of the check-in's and proceed with the net.]

Is there any further business for the net before I close? Hearing nothing, this is «YOUR CALL» closing tonight's session of the Boston Amateur Radio Club Net. I would like to thank everyone who participated in the net and those who stood by while I ran the net. The Boston Amateur Radio Club Net will return next Monday evening at 9 pm Eastern Time. This is «YOUR CALL» returning the repeater to general amateur use. 73.

I See the Future

12–13 August	WAE DX Contest, CW
19–20 August	North American QSO Party, SSB
19–20 August	ARRL 10 GHz and Up—Round 1
20 August	Flea at MIT, Cambridge
20 August	ARRL Rookie Roundup, RTTY
21 August	Solar Eclipse QSO Party
26–27 August	W/VE Islands QSO Party
7 September	**BARC Business Meeting, Brookline Police Headquarters, Brookline, 7:30 pm**
8–10 September	ARRL New England Division Convention, Boxboro, MA
9 September	Deadline for articles for the September SPARC
21 September	**BARC General Meeting, Brookline Police Headquarters, Brookline, 7:30 pm**
24 September	Jimmy Fund Walk **(Rp)**
8 October	BAA Half Marathon **(Rp)** (volunteer registration in August)

▲ *Note change from usual date and/or location*
(Rp) = BARC Repeater likely to be used

As you might expect, there are many more events (public service, hamfests, flea markets, etc.) taking place—some only peripheral to ham radio. For information on these, covering much of the Northeast, the "Ham - Electronic Flea Market" and the "PSLIST" lists tell the story. Of course, if you know of an event that would be of interest to the readers, please let the Editor know.

For an up-to-date calendar of events, including web links, visit http://www.barc.org/calendar.

See Yourself in Print! (well, PDF) *– Joe Chapman, NV1W*

We are always looking for articles for the newsletter. I have reserved this space for your articles, reviews, tips, how-tos, hints, kinks, photos, schematics, or other ham related information. Photos of you operating or your shack are especially welcome. Send your submissions to the Editor, Joe, NV1W, at nv1w@arrl.net. Articles for the September issue must be received by September 9.

Thanks to Ralph, N1LAH, and Greg, KC1CIC, for their contributions to this month's issue.

KB1QHX on a roll on six meters at Field Day (KC1CIC, photo)

Quarterly Business Meetings *– Bob Salow, WA1IDA*

As the Bylaws require, BARC has Business meetings quarterly. Unless circumstances warrant, BARC Business meetings will be held on the first Thursdays of December, March, June, and September. The next such meeting will be on **September 7, 2017** at Brookline Police Headquarters in Brookline. All members are urged to attend and participate in club affairs. This is where club functions are discussed and decided, and your help is needed to guide us.

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A short opening period of each General meeting will continue to be used to bring any immediate business matters to everyone's attention.

To provide continuity of club business between meetings we also have a virtual business meeting via an email list. Any member interested in the affairs of the club can ask to be on this virtual meeting list—just give your name, call and your email address to President Joe Harris, N1QD.

Businesses Can Advertise Here

The SPARC accepts commercial advertisements. BARC encourages monthly promotion of your products and services which would be of interest to hundreds of our members and others interested in the Amateur Radio Service.
The rates for display advertising are:

1 col × 2 in. (business card)	$15 per issue
1 col × 2 in. (business card)	$75 per 6 consecutive months
1 col × 2 in. (business card)	$125 per 12 consecutive months
1 col × 4 in. (½ column)	$30 per issue
1 col × 9.5 in. (full column)	$60 per issue

Originals of ads must be presented to the Editor in MS Word or .jpg format to print 1:1. Other composition will be at extra cost. We will be glad to quote other ad sizes and durations. Members are urged to seek prospective advertisers who are appropriate to our readers. For additional information, contact Joe Chapman, NV1W, at 617.267.6349 or nv1w@arrl.net.

BARC Volunteer Exam Sessions

The Boston Amateur Radio Club schedule has been revised to suit the needs and interests of the applicants and examiners. **The next exam session will be on October 9, 2017.** Generally, sessions are held at Brookline Police Headquarters, 350 Washington St. in the Community Room (across from the information desk).

We give all exams (Technician, General, and Extra). *Testing is by reservation only.* Please bring the following with you:

• Your current license and a photocopy for the ARRL, if you are upgrading
• Any CSCEs you are claiming, and a photocopy of them
• Valid picture ID or two valid non-picture IDs
• A pen and a calculator (if you want to)
• $**15.00** (good for all the tests you take at that session, except for retests)

Note: Written tests can be taken sequentially at the same session for the same $15 fee. The needed FCC forms will be provided.

To reserve a seat or for further information, contact: Jim Clogher, N1ICN, n1icn@arrl.net, or Linda Blair, NA1I, na1i@arrl.net.

Your Personal Ad Could Have Been Here

Are you a depressed BARC member because you have a treasure you must turn to cash? Cheer up, Bunky! The SPARC will run your (non-business) ad for free. Of course, a 10% donation if you sell it will be cheerfully accepted. Just send your ad to Joe Chapman, NV1W, nv1w@arrl.net.

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Newsletter Editor: Joe Chapman, NV1W
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The Boston Amateur Radio Club is a non-commercial association of persons interested in the Amateur Radio Service. The Club is organized for the promotion of interest in Amateur Radio communication and education, for the establishment of emergency communications in the event of disasters or other emergencies, for the advancement of the radio art and the public welfare, for the representation of the radio amateur in legislative and regulatory matters, and for the maintenance of collegiality and a high standard of conduct.

The Club is open to all persons interested in Amateur Radio without regard to race, color, religion, creed, national origin, gender, disability, or sexual preference. Our General and Business meeting locations are handicap accessible. Other meeting and activity locations may be handicap accessible by arrangement.

The Club is an ARRL-affiliated club, and is a member of the Council of Eastern Massachusetts Amateur Radio Clubs (CEMARC) and the New England Spectrum Management Council (NESMC). The Club is also an associate member of the Courage HandiHams system.

Greater Boston Net Directory

Daily 7 pm	**MARI (Mass/Rhode Island CW Net) (NTS)**	**3.565**
Daily 8 pm	**Eastern Mass 2M Traffic Net (NTS)**	**145.230 (PL 88.5)**
Daily 8 pm	**Slow Speed CW Net**	**28.160**
First Mon 8:30 pm	**EMA Section ARES Net**	**146.610 and all MMRA links**
Mon 8 pm	**New England DMR Net**	**DMR New England Talk Group (TG 3181)**
Mon 9 pm	*BARC Club Net*	*145.230 (PL 88.5)*
Sun Mon Wed Fri 10 pm	**Heavy Hitters Traffic Net (NTS)**	**MMRA-linked repeaters:**
		146.610, 146.670, 146.715, 146.820, and all 222 and 440 repeaters
Tue 8 pm	**MMRA Club Net**	**146.610 and all MMRA links**
Wed 8 pm	**Wellesley Amateur Radio Society Net**	**147.030; 444.600 (PL 88.5)**
Wed 9 pm	**Waltham Wranglers Swap Net**	**146.640 (PL 136.5)**
Sat 9 am	**Northeast SATERN Net**	**7.265**
Sun 9:30 am	**Yankee SSB Net**	**50.275**
Sun 8 pm	**Algonquin Amateur Radio Club Net**	**446.675 (PL 88.5)**
Sun 8:30 pm	**NSRA Net (with Newsline)**	**145.470 (PL 136.5)**
Sun 9 pm	**CAARAnet**	**145.130 (PL 107.2)**

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