

The

Modulator

Newsletter of the Newport County Radio Club, April 2018

Cranking Up the Club

Amateur Radio began around the time that Marconi began making long distance communications a reality, but the date that stands tall is 1912. That's when the Navy prevailed on Congress and amateurs were relegated to frequencies "200 meters and down."

This was the time of enormous spark gap transmitters, lightning machines by any criteria. It was thought that waves shorter than 200 meters—short waves—were useless and non-essential communications should not interfere with longer wave length operations.

Oliver Heaviside predicted what we now call the ionosphere in 1902, but it wasn't until amateurs began transmitting short waves that its existence became clear. The Kennelly-Heaviside Layer was confirmed in 1923.

This issue of the *Modulator* is dedicated to ham radio operating. Something for HF, for VHF, and builders too. Sun Spot Minimum on page 3 describes how we can continue to exploit ionospheric reflection (actually refraction) even as the engine of ionization, the Sun, is in decline as we head into the end of sun spot cycle 24.

Tidbit: The idea that "Down" implies frequencies higher than 200 meters explains why 160 meters is called *Top Band*. It's less "down" than the other amateur bands.

ARRL International Grid Square Chase

Radio Sport

Ongoing through 2018 is the ARRL International Grid Square Chase. The idea is that during this calendar year, you keep track of the grid squares of contacted stations and upload your log entries to ARRL's Logbook of the World (LoTW). The Chase is open to all bands and modes except 60 meters, so TECHs can play too with their VHF and code privileges.

But I'm Not a Contester

Many hams are not contesters, but the Chase has several things going for non-contesters. First, it runs for a whole year.

That means that it doesn't have the frantic do-or-die atmosphere of weekend contests. But even better, you can define an operating goal for yourself, or a group of friends, as a way of gaining skills as an operator.

Can you work all twenty-two New England grid squares? That may seem like a lot, but consider: If you find yourself near a grid intersection, you could work four grid squares on VHF simplex with your handheld! And you have nearly nine months to do it.

What is a Grid Square?

A grid square is a part of the Maidenhead Locator System, named for the English town where the system was adopted in 1980. The world is divided into 324 fields and these fields are subdivided into grid squares. All of New England lies in field FN and all of Rhode Island lies in grid square FN41.

Here is a link to more information about the Chase:

<http://www.arrl.org/international-grid-chase-2018>

And here is a link to get started with logbook of the World. Be sure to include your FN41 location:

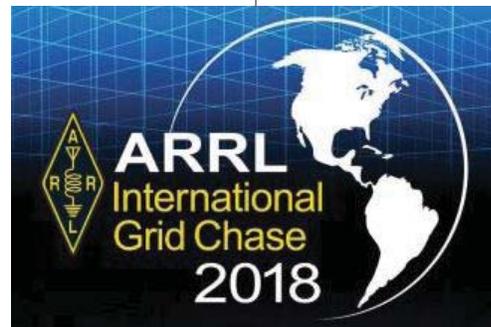
<https://lotw.arrl.org/lotw-help/getting-started/>

Here is a link to a dandy web site that will allow you to explore the grid square of any location:

<https://www.karhukoti.com/grid/?grid=FN>

If you succeed in this New England challenge, be sure to contact me so your accomplishment can be properly celebrated:

editor@w1sye.org



Morse Code Project Anyone?

It has been some years since earning an Amateur Radio license required proficiency in sending and receiving Morse Code, and yet there is more radio music on the air today than back when it was mandatory.

Although I've been a CW op for many years, my copy speed tops out at fifteen words per minute. I suspect it's a head wiring thing, because I've seen others who with minimal study have jumped right up to 20 wpm and faster. Yet I find it fun and I enjoy a leisurely rag chew.

Yesterday Willy, W1LY, called and asked if I had seen the keyer reviewed in the April QST. "Why yes, Willy, I did." "Wouldn't that make a dandy club building project?" Says he. As we talked, the wheels began turning.

How 'bout if we had two Morse letters sponsor each club meeting, like they do on Sesame Street? Most CW learners who lose their way do so because they don't have a regular study program. This would provide a minimal framework to keep them on track. And hey—maybe member roll call could be done in CW, optionally of course, and at slow speed.

Stepping out beyond VHF

At present, the entry level Amateur license provides voice access to the VHF and bands above, but that same broad access provides little incentive to upgrade and gain access to the High Frequency bands where wondrous

adventures lie. Our phone call enthusiasm about a code-oriented project stemmed from the prospect of encouraging our TECHs to explore hamming beyond their 2-meter hand helds.

Project Options

The device that Willy was talking about is a full-featured single-action paddle keyer. That means that this device has a blade that when touched one way, makes dots until released. Touched the other way, it makes dashes. Further, it has memories. That means that it can send a string of pre-programmed code on command:

CQ CQ CQ de W1LY ar.



K1EL Systems Model PS2B

I've seen this keyer and it is top-notch, but it is designed for the experienced CW op who has mastered the timing of CW characters.

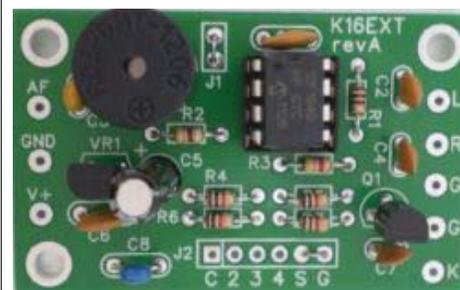
What about CW learners?



K1EL Systems Practice Oscillator

Here's an ideal kit for the beginner. It makes a true sine wave tone in response to your key or keyer. Start with a traditional straight key to learn the sound and timing of a "Good Fist." That true sine wave tone is huge; most practice oscillators generate square waves and sound terrible.

Once you get the rhythm of CW, you can try a keyer. Like the PS2B kit, a separate outboard paddle makes dots one way, dashes the other. No need to start over, K1EL Systems makes a device that goes between your outboard paddle and the same practice oscillator.



K1EL Systems K16-EXT Keyer Kit

Something for Everyone

K1EL makes excellent kits and uses quarter-watt resistors, so construction is easy. As you can see, there are kit combinations that would suit ops from beginner to experienced brass pounders.

www.hamcrafters.com

If there is sufficient interest, we will prepare a set of choices for you that will determine a build night and further adventures in Morse Code. Don't be shy, if you want to explore this further, step up and contact:

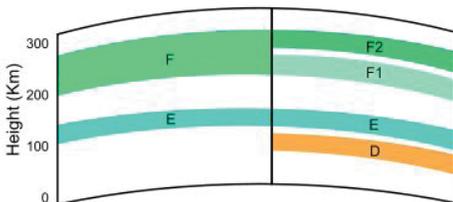
editor@w1sye.org

Sunspot Minimum—Play the Gray Line

The ionized layers of the atmosphere are the life blood of long distance High Frequency communication. These layers are created largely by solar radiations and so the intensity of daytime ionization follows the 11-year sunspot cycle. We are now entering a sunspot minimum and as daytime ionization weakens, the higher HF bands, 20 meters and above, are less able to support long haul contacts—what to do?

Layers of the Ionosphere

The ionosphere is broadly divided into three layers, D, E, and F. The E and F layers reflect HF signals, but the D Layer absorbs them. Although sunlight creates all three layers, the denser atmosphere of the D Layer causes that layer to ionize more slowly in daylight and to collapse quickly in darkness. Taken together, these effects cause the sponge-like D Layer to be a daytime phenomenon.



Layers of the Ionosphere

Problem Solved?

Is there a problem here? Work the HF bands at night and be happy! And that's just what 160 and 80 meter ground wave ops do. But the other problem is that although the E and F Layers persist during darkness, they gradually weaken, losing some of their

mirror-like properties. And this at sunspot minimum!

The Gray Line

What if we could have the higher ionosphere well-ionized and at the same time, the lower D Layer minimally ionized? Wouldn't that allow 20 meters and above to make some real distance?

As the line that separates day and night, the Terminator, moves around Earth, a small zone of these ideal conditions moves just before and just after it. For example, if sunrise is coming to New England, the D Layer has not yet formed, but the E and F layers are coming along. This zone, centered near the Terminator, is called the *Gray Line*.

Where is the Gray Line?

The Gray Line is a Great Circle on Earth's surface, but on a flat map it appears curved. Its shape and position changes gradually, but constantly, as Earth moves in its orbit.



Gray Line at Summer Solstice, June 21st

As you can see, the early summer sunrise Gray Line in New England slants northwest and southeast, but the sunset Gray Line slants northeast and southwest. In these illustrations the Terminator

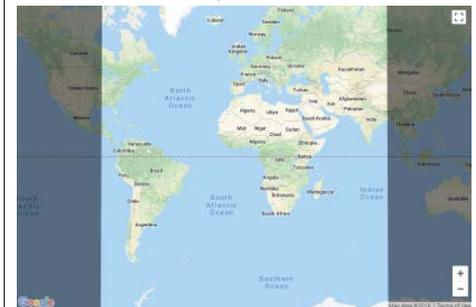
is moving from right to left.



Gray Line at Winter Solstice, December 21st

Here the directions of the early winter Gray Line in New England are reversed compared to the early summer Gray Line.

Can you guess where the Gray Line is at the Equinoxes?



Gray Line at the Equinoxes, March 21st and June 21st

Although the Gray Line appears curved, remember that this is a map artifact; it is a Great Circle and is as straight as the Equinox lines. Signals travelling along the Gray Line are travelling in their usual straight manner.

Does that mean that you could make a JA (Japan) contact along the Gray Line—you bet! But you have to time it right. Use this web site to plan a Gray Line contact for any day of the year:

<https://academo.org/demos/day-night-terminator/>