The Compass!

Official Newsletter of the Great South Bay Amateur Radio Club, INC.

April 2025 | Volume 53 | #4

Inside this edition:

- NOTE: All GSBARC Official Meetings begin at 7:30 PM!
- General License Classes Running Tuesday evenings, 7 - 9 PM in the EOC
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- AB2ZI'S YouTube Picks
- List of upcoming GSBARC meetings and events
- GSBARC Launching Repeater into Lunar Orbit!
- Babylon St. Patrick's Day Parade pics
- What's the Deal with FT8???

Long Island's Friendliest Amateur Radio Club!

Great South Bay Amateur Radio Club, Inc.
Upcoming Meeting and Events Schedule

2025

- **April 24th —** General Meeting
- **April 26th —** Marconi Day
- **May 8th —** Board Meeting
- **May 17th —** Armed Forces Day — American Air Power Museum
- **May 29th —** General Meeting
- **June 26th —** General Meeting
- **June 28th & 29th —** Field Day
- **July 11th —** Maggie Fischer Cross Bay Swim
- **July TBA —** Tesla Science Center Expo
- **July 31st —** General Meeting
- **August 14th —** Board Meeting
- **August 16th & 17th —** International Lighthouse and Lightship Weekend @ Fire Island Lighthouse
- **August 28th —** General Meeting
- **September 7th —** Babylon Village Fair
- **September 25th —** General Meeting
- **October 19th —** Suffolk County Marathon
- **October 30th —** General Meeting
- **November 13th —** Board Meeting
- **November 20th —** General Meeting — Nominations
- **December 18th —** Annual Business Meeting and Elections

PRESIDENT'S MESSAGE

If you missed our February general meeting, you missed the Winter Field Day Power Point that I gave and the top operator awards. Congratulations to the following operators: NO2C for SSB, NA2MM for CW, KD2X for PSK31, and WB2QGZ for the loneliest 10-meter CQ call ever. They all received an engraved pint glass with the club logo and the recognition they were being given. We had three door prizes. Congratulations to the winners: KC2SYF, an ARRL $50 gift certificate; KD2X, an alpha delta dipole kit; and N2UIC, a 1,000-watt dry dummy load. We ran a 50/50 too. Congratulations to K2LDC.

We also reviewed the new website, which we launched on March 1. I'd like to thank Jeff KC2ZQO for his many donated hours to make this happen. I'd also like to thank Stu AF2SC, Walter KA2S, Bill WB2QZ, and Caryn KD2GUT for their Inputs and edits. I hope you all will enjoy it and subscribe to it as well.

We will be always working on it to improve it and keep it up to date. Our new website has links to X (formerly Twitter), Facebook and YouTube. Please post pictures when you are at our events -- club activities only. If you plan to take a video, make sure everyone is OK with being in the video before you do so.

What a great time we all had at the third annual Babylon Village St. Patrick's Day parade. Thank you to all our operators who were part of this event. It was a little chilly, but it did warm up. These public service events keep us in the public eye and keep us ready to serve when called upon. It also demonstrates to public officials who we are – and that we are committed to assisting with public events. We could not do this without your participation.

On March 3, I did a VARA chat. It was a VARA FM, HF and Winlink presentation for the Brookhaven ARES group. I would like to thank Walter KA2S for assisting me.

Winlink and VARA are another useful tool for when we lose cell phones, landlines, and internet. Being able to send ICS forms and files radio to radio is way better than trying to read a list on the air waves when it has a lot of detailed information. I am urging all of our ARES RACES and Auxcom team members to get on board. VARA chat simplex frequency is 144.950. Don't forget about the W2TOB-10 Winlink server. Starting on April 5, I would like to start a weekly Winlink check-in. Open up Winlink then select "new message." After that click on "select template" then the "+" sign. Then select "general," then "Winlink check-in" and double-click it. Another window will open up. Just fill in the info. When you are done, select submit on the bottom. It will attach to the email. Then send it to suffolkcountydec@outlook.com

To all of our ARES, RACES, and EmComm team: Sunday mornings at 8:30 on W2TOB, the 440.850 repeater, we meet before the NYS RACES net.

April is here and what we are excited for, of course, is Marconi Day. Our event has been green-lighted by the Village of Babylon for April 26. Our paperwork is all set for Marconi Day. I took care of that while I was still recovering. We will be operating from the Babylon Village Historical Society Museum for Marconi Day. Babylon Village was the home to one of the Marconi schools for radio operators. We will run three stations using CW, SSB and FT8. Operators are welcome – and needed – for all three modes. CW ops, please bring your own CW key. Remember to bring a chair to relax in when not operating. The village will set up the Marconi replica shed; we would love to have a CW operator on the air from it. We are hoping to get on the air by 9 a.m. Setup will start at 8 local time. We will set up the BuddiHEX and one end-fed antenna. We will operate on 10, 15, 20, and 40 meters until 4 p.m. then wrap it all up.

Please save this date for next month: We have our annual American Air Power Museum event on May 17. We will be setting up at 9:30. We will be using the BuddiHEX and maybe a Wolf River Coil for 40 meters.

Now that the weather is getting warmer, we need to finish some long-overdue projects. Let us know if you would like to assist with any of our projects. Thank you to everyone who has helped with all of our projects up to this date.

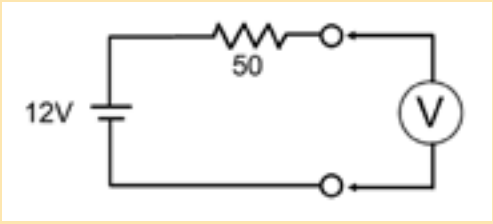
We hope to see at our operating events as well as our public service events. The more active you are the more fun you will have.

— John Melfi, W2HCB

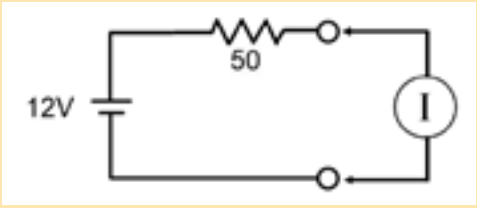
Thevenin's Theorem & Input and Output Impedance

By Kevin AB2ZI

First let's start with an overview of Thevenin's Theorem, which states that any circuit can be reduced to a single equivalent voltage source with a series resistance (for AC circuits this would be a series impedance).

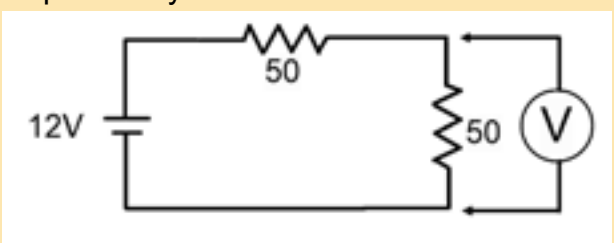


First we measure the open circuit voltage at the output of our device. Since the voltmeter has a very high resistance, there is almost no current flow from the circuit and we measure the source voltage, which in this example is 12 volts. Next we use the multimeter in current mode to measure the short circuit current:



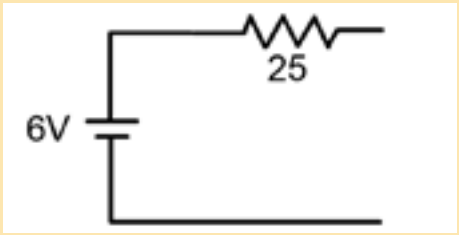
Remember that in current mode the meter is a short circuit and will measure the maximum current. Here we can calculate using Ohm's Law where current (I) = voltage (E) divided by resistance (R), so 12/50 = 240mA.

Let's attach a 50-ohm load to the output and compare Thevenin's with Ohm's Law to see if this really does show equivalency. Now we have this:

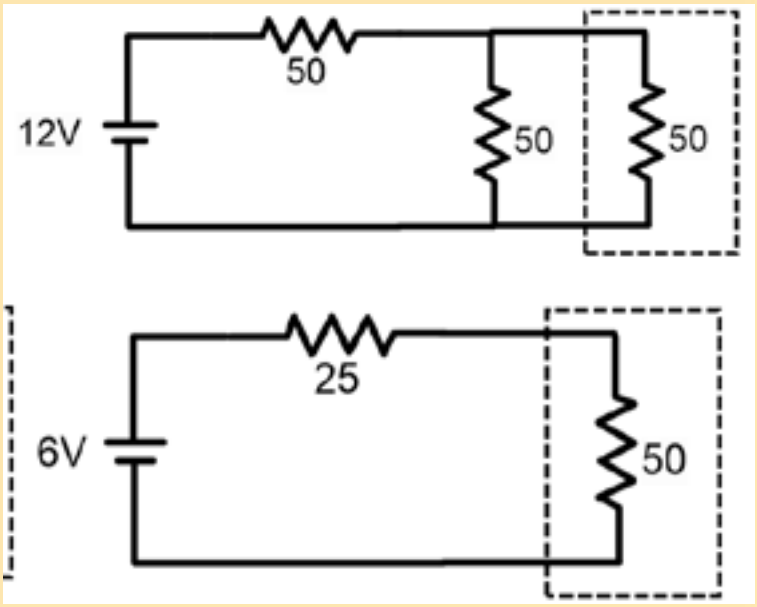


Here we are measuring across a resistor that is part of a voltage divider. Total current in the circuit is 12/100 giving us 120mA. The voltage across the output resistor is current times resistance, 120mA multiplied by 50 gives us 6 volts. 6 volts is our Thevenin equivalent voltage.

Putting our meter in current mode, we end up shorting out that 50-ohm resistor and so current flow is through the first series 50-ohm resistor and the short circuit of the meter. We read 240mA (12 volts divided by 50-ohms is 240mA). The Thevenin resistance is calculated by dividing $E_{Thevenin}$ by $I_{Thevenin}$ which gives us 6V divided by 240mA equals 25 ohms. Our Thevenin equivalent circuit is this:



Let's see if this works with a load. We'll add a 50-ohm load to our original circuit and also to the Thevenin equivalent circuit.



On the first we have a pair of 50-ohm resistors in parallel which are then in series with another 50-ohms resistor giving us 75 ohms in series with 12 volts. Current (E/R) is 12/75 = 160mA total current. All the current flows through the first 50-ohm resistor resulting in a voltage drop (I x R) of 8 volts, leaving 4 volts across the two 50-ohm parallel resistors.

Compare to the Thevenin equivalent circuit where we have 25 ohms in series with our 50-ohm attached load. Here we again have 75 ohms total resistance but now with a 6 volt battery. 6 volts in series with 75 ohms gives us 80mA of current flowing through the 25

ohm resistor and also the 50-ohm load. 80mA through 50-ohms gives us 4 volts! So they are equivalent.

Onward to output/input impedance:

The Thevenin equivalent resistance is the output resistance (impedance for ac circuits). We learn that the maximum power transfer theorem states that the maximum power is transferred when input and output impedance are equal (i.e., matched). Let's see how that works keeping in mind the following:

A high impedance will have low current and a low impedance will result in high current.

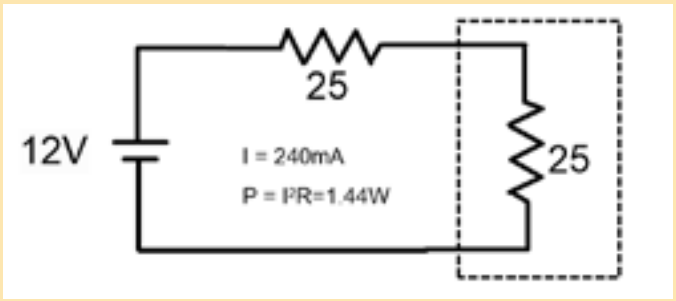
Example one: Low-output impedance to low input impedance. In this case the load (or circuit) is looking for a high current to be supplied. We also have a low-output impedance which can supply high current. No problem here.

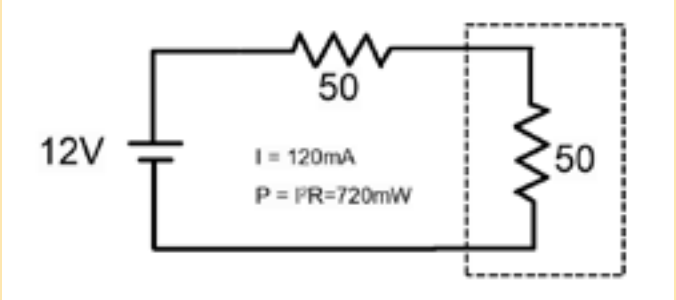
Example two: High-output impedance (low current supplied) to a high input impedance (low current required). Again, no problems.

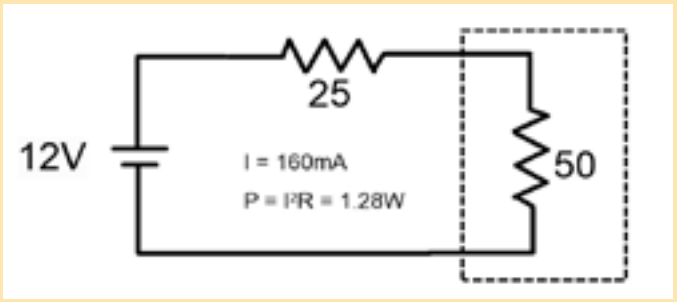
Example three: Low-output to a high input impedance. Here we have a current supply that is feeding a low current load. This is not a problem (for the most part, there are exceptions).

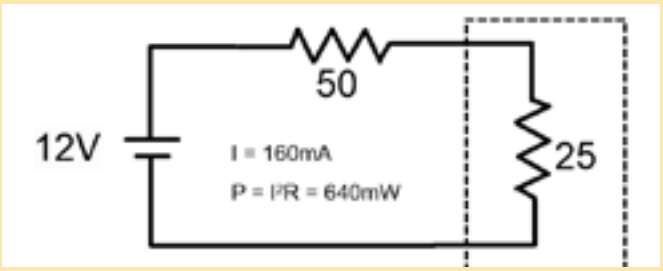
Example four: High-output to low input impedance. Here the low input impedance is looking for a high current but now the high-output impedance feeding it cannot provide it. Here most of the voltage will be developed across the output impedance, not leaving much for the input stage.

Let's look at the power numbers for these situations.



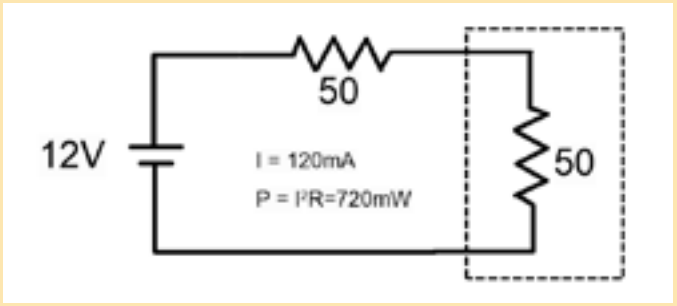




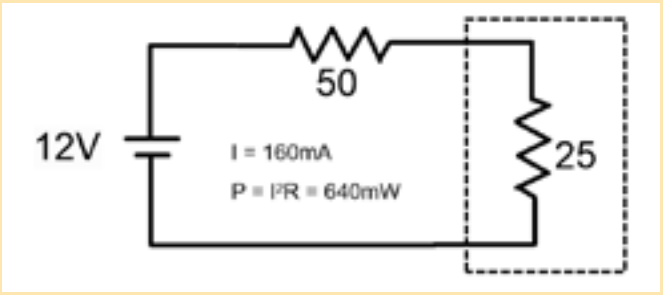


So if our output impedance stays a constant 50-ohms, but our load varies, what will happen? Let's use 25, 50 and 75 ohms for our load (e.g., antenna).

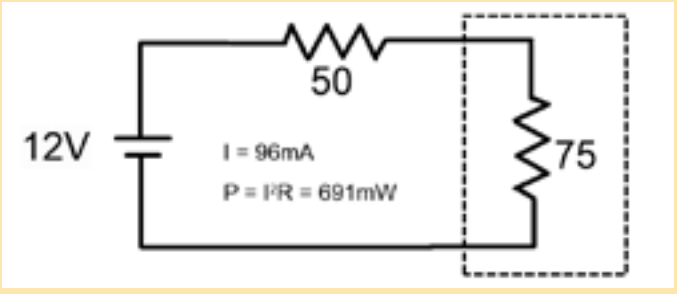
Beginning with a 50-ohm load we have:



If our antenna was not resonant and measured 25 ohms then:



Continuing, if our antenna presented 75 ohms, then:



We can see that the maximum output power is developed when the load is matched to the source.

BREAKING NEWS!!!

BREAKING NEWS: ***Great South Bay Amateur Radio Club*** Launches Repeater into Lunar Orbit

Babylon, NY — In a move that has sent shockwaves through the world of amateur radio, the Great South Bay Amateur Radio Club (GSBARC) has officially launched a repeater into orbit around the Moon. This unprecedented feat has raised eyebrows, sparked debates, and possibly made some NASA engineers question their life choices.

The ambitious project, dubbed MoonRepeater-1, aims to extend the reach of the club's communications far beyond the traditional bounds of Earth's atmosphere, with a focus on providing clear signals for amateur radio operators who prefer to talk about antennas, propagation, and obscure radio frequencies instead of the latest blockbuster movie.

The Launch

The project kicked off with an elaborate fundraising campaign, featuring everything from bake sales to a "lunar-themed" karaoke night at the local Elks Lodge. However, the real breakthrough came when club president John Melfi, W2HCB, made a bold claim during the annual club picnic: "Why settle for just bouncing signals off the ionosphere when you can bounce them off the Moon? We're taking amateur radio to the next level!"

GSBARC swiftly partnered with a low-budget space agency, Launch 'Em Up, known for their unorthodox approach to rocket science. After an intense 18-month planning period, which mostly involved arguing over whether it was possible to make an amateur radio repeater that could withstand space radiation (it can), the team launched the repeater aboard a specially designed rocket, nicknamed The Moonbeam.

"We figured, why not? The moon's practically a giant antenna," said Melfi, still buzzing from the launch. "If it can reflect signals, we can work it into a repeater."

The Repeater

The repeater itself is a marvel of engineering, or at least, of sheer willpower. It's a highly-modified Motorola GM300, stuffed into a custom-made aluminum box to protect it from the cosmic elements, such as dust, radiation, and the occasional laser beam fired by alien invaders (just in case). The repeater is powered by a small solar panel, which Melfi claims is "probably more efficient than most of the club's power supplies at this point."

"It's like the ultimate portable repeater," he said. "I mean, you can't get more portable than the Moon."

The team was initially concerned about the repeater's potential to interfere with the communications of lunar rovers, lunar landers, or any top-secret government operations, but after consulting with a few conspiracy theorists on a late-night Zoom call, they were assured that the only signal they'd be interfering with was that of an aging ham operator in Idaho trying to reach a fellow operator in Queens.

The Reception

Radio enthusiasts around the world have been quick to jump on the MoonRepeater-1 bandwagon, with some even tuning in from their basements in the hopes of making contact with the lunar repeater. The club reports that signals are coming in loud and clear, even if the occasional "moon echo" adds a bit of distortion to the transmissions.

One enthusiastic ham operator, Doug "The Rooster" Anderson from Minnesota, was the first to successfully make a QSO (contact) with the lunar repeater. His reaction? "It was out of this world! I could barely hear him over the static, but I knew he was out there. I've been trying to make contact with the Moon since I was a kid!"

"The Rooster" working MoonRepeater-1 with a hand-held dual-band Arrow Satellite Antenna

Even the local Babylon Chamber of Commerce has been swept up in the excitement, planning a “Lunar Hamfest” to coincide with the next full moon. “It’s good for the economy,” said Chamber President Ellen Williams. “We’ve got lunar-themed T-shirts, and don’t even get me started on the moon pies.”

The Future

With the success of MoonRepeater-1, the Great South Bay Amateur Radio Club has already begun brainstorming future projects, including a Mars-based repeater and possibly an intergalactic satellite that will allow ham operators to chat with extraterrestrial life forms (or at least with people pretending to be extraterrestrials on the other side of the planet).

“We’ve always said amateur radio is about pushing the boundaries of communication,” said Melfi. “The Moon was just the first step. Next, we’re going to the stars. And maybe to a few other planets that aren’t so obsessed with Wi-Fi.”

As for MoonRepeater-1, it will continue to operate for as long as the Moon stays in orbit—about 4.5 billion years or until the next supermoon interferes with the club’s antenna (whichever comes first). The club is also considering setting up an annual “Moon-QSO Day,” where every operator gets a chance to say, “Hey, I’ve talked to the Moon!”

FT8: What's it About?

FT8 is a popular digital mode used in amateur radio communications, developed by Joe Taylor (K1JT) and Steve Franke (K9AN) as part of the WSJT-X software suite. It is designed for weak signal communication and is particularly effective for making contacts under poor propagation conditions.

Key Features of FT8:

- **Efficient Weak-Signal Performance**: FT8 can decode signals as weak as -20 dB below the noise floor, making it ideal for low-power (QRP) and compromised antenna setups.
- **Short Transmission Cycles**: Each transmission lasts just **15 seconds**, enabling quick contacts even under difficult conditions.
- **Structured, Minimalist Exchanges**: Contacts typically consist of automated, preformatted messages that include call signs, signal reports, and grid locators.
- **Error-Correcting Encoding**: FT8 uses forward error correction (FEC) to improve message reliability, even in noisy environments.
- **Time Synchronization Requirement**: Since FT8 operates in precise 15-second transmission windows, stations must be synchronized to within about 1 second using tools like internet time servers (NTP).

Why Use FT8?

- **Reliable DX Contacts**: FT8 is widely used for long-distance (DX) communication on HF bands, even when signals are barely audible.
- **Low Power & Modest Antennas**: It enables effective communication with low power (e.g., 5-10W) and simple antennas.

Continued on page 8...

...FT8 Cont'd from page 7

- **Automated & Efficient**: Operators can make QSOs with minimal manual input, making it useful for casual operating and contests.

Limitations:

- **Limited Conversational Ability**: Due to its structured format, FT8 is not suitable for general chatting or ragchewing.
- **Time Sync Dependency**: An accurate computer clock is necessary for proper decoding.
- **Highly Automated**: Some operators feel FT8 lacks the personal interaction of other modes like CW or SSB.

FT8 has revolutionized digital amateur radio communication by allowing contacts that were previously impossible due to weak signals or poor propagation. It remains one of the most widely used digital modes in ham radio today.

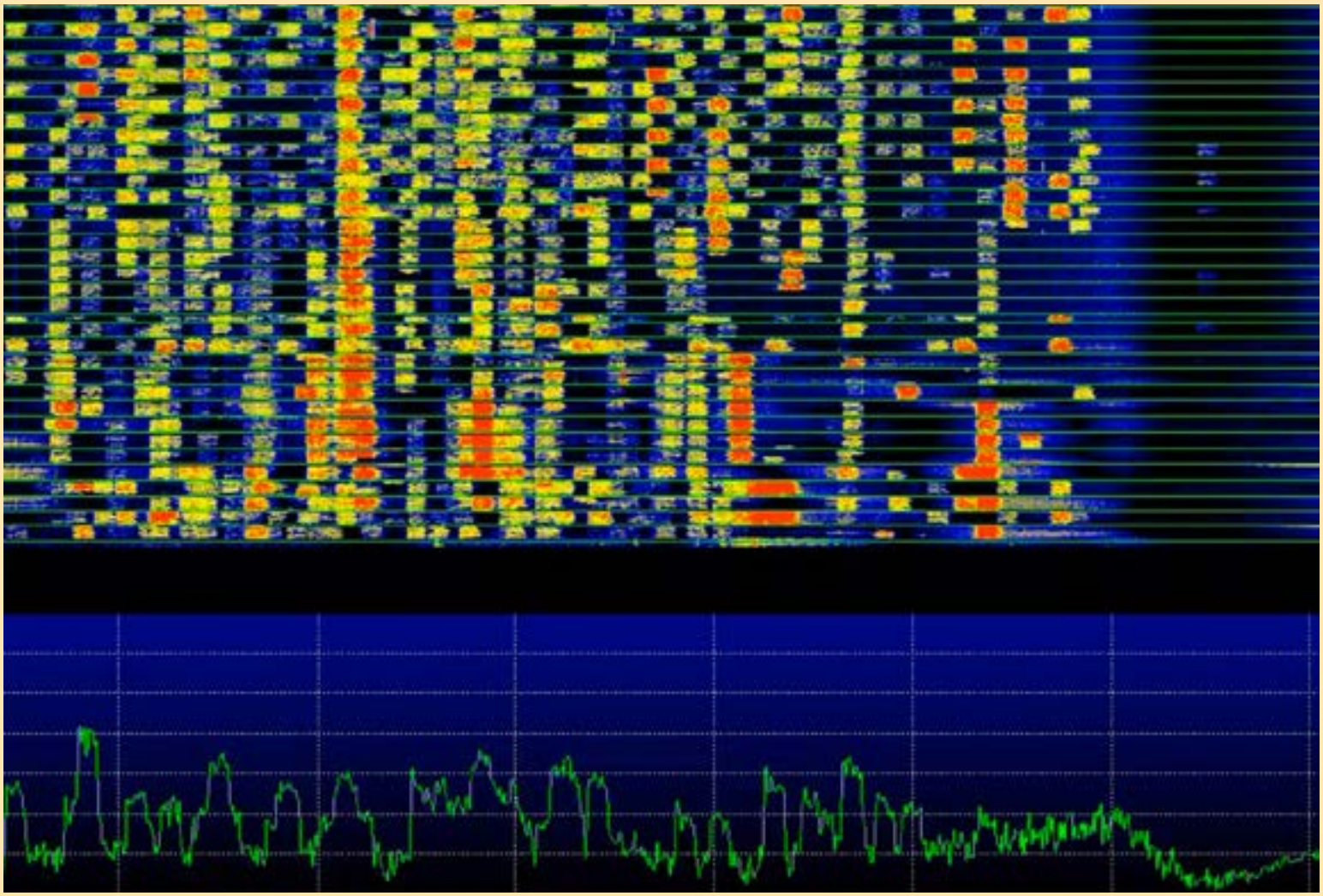
How FT8 Operates

FT8 (Franke-Taylor 8-Frequency Shift Keying) is a digital mode used in amateur radio for weak signal communication. It is implemented in the **WSJT-X** software and requires a computer with a sound card, a transceiver, and an interface for audio and PTT (push-to-talk) control.

1. Transmission and Reception

FT8 operates on **8-tone frequency shift keying (8-FSK)**, meaning that each transmitted symbol consists of one of eight tones spaced at **6.25 Hz** apart. The total bandwidth of an FT8 signal is **50 Hz**.

- Each transmission lasts **15 seconds**, alternating between transmit (TX) and receive (RX) cycles.
- QSOs (contacts) follow a structured, **automated exchange** of information in a fixed format.



- The modulation scheme and **forward error correction (FEC)** allow successful decoding even when signals are extremely weak (as low as **-20 dB** below the noise floor).

2. Synchronization and Timing

FT8 requires **precise time synchronization**, as each transmission starts at the **beginning of a 15-second window**.

- Computers use **Network Time Protocol (NTP)** or GPS-based timing to maintain accuracy.
- Any clock drift greater than **1 second** can result in missed decodes.

3. Decoding and Error Correction

FT8 uses a **77-bit structured message** with **strong error correction** (Low-Density Parity-Check, LDPC).

- This allows for successful decoding even when signals are weak or experiencing QSB (fading).
- The decoding process is done in the **WSJT-X software**, which extracts callsigns, grid locators, and signal reports.

4. Typical FT8 QSO (Contact)

A standard FT8 exchange consists of **six basic transmissions**:

1. **CQ Call** – "CQ K1ABC FN31" (calling station and grid locator)
2. **Response** – "K1ABC W9XYZ EN52" (caller replies with their callsign and locator)
3. **Signal Report Sent** – "W9XYZ K1ABC -10" (SNR report from the calling station)
4. **Signal Report Received** – "K1ABC W9XYZ -08" (SNR report in return)
5. **Acknowledgment** – "W9XYZ K1ABC RR73" (confirmation of the report)
6. **Final Acknowledgment** – "K1ABC W9XYZ 73" (final goodbye message)

This structured format ensures that **contacts are completed quickly**—typically within **one minute**.

5. FT8 Frequencies and Bands

FT8 has designated frequencies on various amateur bands. Some common ones include:

- **160m** – 1.840 MHz
- **80m** – 3.573 MHz
- **40m** – 7.074 MHz
- **20m** – 14.074 MHz
- **15m** – 21.074 MHz
- **10m** – 28.074 MHz

These frequencies are **USB (upper sideband)** regardless of the band.

6. Automation and Logging

- FT8 can be automated using **WSJT-X** and **logging software** like **JTAlert** or **GridTracker**.
- QSOs can be automatically logged into **Logbook of The World (LoTW)** or other electronic logs.

Summary

FT8 is a **highly efficient digital mode** that enables reliable, weak-signal communication. It relies on precise timing, structured exchanges, and automated operation. While it lacks the personal interaction of voice or CW, its ability to make long-distance contacts under poor conditions makes it a powerful tool for amateur radio operators worldwide.

Babylon Village St. Patrick's Parade


FIRE ISLAND JUNIOR
LIFEGUARDS


Wallace CL

AB2ZI's YouTube Pics

Audio amp classes as fast as possible!

This ESP32 Antenna Array Can See WiFi

Thevenin's Theorem, Output Impedance, and Input Impedance

ARES/ RACES Information

Div. 1—Town of Babylon ARES/RACES
Net: 146.685/R, Mondays 8:15 PM
EC/RO: John Melfi, W2HCB, (631) 669-6321

Div. 2—Town of Huntington ARES/ RACES
Net: 147.210 MHz +600/ PL 136.5, Mondays 7:00 PM
EC/RO Steven W. Hines, N2PQJ, ***Huntingtonnyaresraces.org/***

Div. 3—Town of Islip ARES/RACES
Mondays 8:30 PM
Net: K2IRG 147.345 +600/PL 100.0
EC/RO: Philip Jacobs, W2UV, 631-838-2500

Div. 4—Town of Smithtown ARES/ RACES
Net: 145.430 MHz, PL136.5, Mondays 7:30 PM
EC/RO: Rich Johnston, KC2TON, 631-872-4039

Div. 5—Town of Brookhaven ARES/ RACES
EC/RO: Ed Wilson, N2XDD, 631-484-8826

Div. 6—Riverhead ARES/RACES
EC/RO: Steve Casko, W2SFC, 917-701-3919

Div. 7—Southampton ARES/RACES
EC/RO: Removed & Currently Vacant

Div. 8—Southold ARES/RACES
EC: Don Fisher, N2QHV, 631-765-2757
RO: Charles Burnham, K2GLP, 516-779-4983

Div. 9—East Hampton ARES/RACES
EC/RO: Eddie Schnell, WZ2Y, 864-973-9250

Div. 10—Shelter Island ARES/RACES
EC/RO: Vacant
(Neal Raymond, N2QZA, SK)

Suffolk County ARES/RACES Net:

Mon 2100 Local, 145.330/R (136. 5PL)

Alt. Frequency—146.820 (136.5 PL)

New York State RACES Net (HF)

2025 VE Sessions

- ~~January 25th~~
- ~~February 22nd~~
- ~~March 29th~~
- April 26th
- May 31st
- June 21st
- July 26th
- August 30th
- September 27th
- October 25th
- November 29th
- December 27th

All sessions are at the Town of Babylon EOC at 10 a.m., located in the basement in the rear of town hall. Please bring photo ID, a copy and your original amateur radio license (if you have one) and any CSCEs you may have. Nonprogrammable calculators are allowed. The exam fee is $15 payable by cash or a check made out to "ARRL VEC."

IMPORTANT!

If you do NOT already have an FCC FRN (Federal Registration Number) you MUST Visit the FCC Universal Licensing page to register for an FRN to use on the paperwork.

Club Name Badges

Club name badges are available from ***The Sign Man*** (***thesignman.com***) of Baton Rouge, LA.

The badges which are 1-3/4 in. x 3 in. If you visit The Sign Man's webpage you can order the badges by using a drop down selection on the orders page and clicking on:

"Great South Bay ARC, NY"

GSBARC Repeaters

146.685 W2GSB -shift 110.9 Hz Encode - 127.3 or CSQ decode

146.685 -shift 127.3 Encode/ Decode (south — receiver site linked to 146.685)

438.475 - shift 136.5 Hz Encode/ Decode

223.860 W2GSB -shift 110.9 PL Enc/ Dec w/ECHOLINK

223.860 -shift 156.7 PL Enc/Dec Local use

440.850 W2GSB + shift 110.9 PL ***Encode, 127.3 PL Decode (NEW)***

446.775 KB2UR -shift 110.9 PL Enc/Dec Fusion Steerable

927.3125 W2YMM -shift D606 Enc/ Dec

440.250 W2TOB/B + shift DSTAR REF020A Babylon

147.255 W2TOB/C + shift DSTAR Steerable

445.725 W2TOB -shift 110.9 PL Enc/Dec *Note: No Longer DSTAR*

Echolink W2GSB-R
AllStar ACESS NODE 465710 affiliated repeater

KB2UQK 449.23750 - SHIFT 114.8 ENCODE / DECODE

Portable Event Repeater (Trailer):
KB2UR 446.3875 - 110.9 Enc/Dec
W2GSB TRP

Club Apparel

Want a shirt, jacket, hat, sweatshirt or T-shirt with a Great South Bay club logo?

We use ***VIKING*** *(previously Mr. Shirt)* located at 80 East Montauk Hwy. in Lindenhurst. We now have a group order page.

Click Here to Place an Order

Now you can get color matched backgrounds on your logo too. Check them out...