Upcoming Club Events

Next General Meeting:
Thurs. June 29th, 8 PM at the EOC

GSBARC's FREE License Classes Tuesday nights 7–9:30 PM.

Technician License Class Currently Running

General Classes Starting Tuesday night, June 27th

Next Technician Class starts Tuesday, September 5th, and will run for 11 weeks and be followed by an 11-week General class & 16-week Extra class.

Open Houses on Wednesday nights from 7:30 to 9:30 p.m. and also Saturdays from noon to 3 p.m

Visit us on Facebook at www.facebook.com/gsbarc

Annual Emergency Preparedness Exercise
"FIELD DAY"
24HR. SIMULATED EMERGENCY
Sat., June 24 & Sun. June 25 at Town Hall
SET-UP Sat. 7AM • AIR OPERATION, Sat. 2PM & Sun. 2PM
Sponsored by
The Town of Babylon Amateur Radio Emergency Services & The Great South Bay Radio Club

NPOTA Gathering at Dayton Hamvention

Inside this issue of The Compass...

- *The Squirrel Cage*
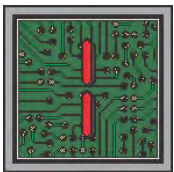- *Impedance vs. Resistance*
- *N1MM+ Logging Software*

Upcoming Special Events

Field Day: June 24-25

Maggie Fischer X-Bay Swim: July 14th

Fire Island Lighthouse Weekend: August 19th & 20th

President's Message

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hope all our veterans had a great Memorial Day although it was a damp, rainy day. I would like thank you all for the service that you have given to our country. As we know, some served and some gave their lives for us and our families and the United States of America.

OK, here we go: June 24th and 25th FIELD DAY—YES! - is getting close and we need to do a lot of prep work. So from now till the week of FIELD DAY we need everyone to help with the testing and prep work with the trailer towers and go over the set-up routines like we did last year. I would like to thank Kevin AB2ZI for building the shelter storage boxes. They will make it easy to set up and put away a much-needed item.

Also Tony N2ATP did a great job re-labeling the shelters and storing them in the boxes.

Bob K2TV has been working very hard getting the word out to the officials about Field Day and going through the laptops with Jeff KC2ZQO and Keith AC2MI. As most of you know, we had a huge problem with the laptop power supplies creating a horrible noise problem. We found the cure: a real Dell laptop power supply was needed, so we found them for a good price and are replacing all the power supplies now.

Ed KD2ADC has the whole satellite station at his QTH as of June 3rd -- I gathered up all the parts and brought it to him and thanks to Justin K2ZMB for lending us his trailer for the satellite antenna tower.

I would like to thank Charlie N1RR. He is bringing a 40 meter Hy-Gain Yagi to use on Field Day for the CW side, which will also have a 40 meter dipole. We once again will have the triplexers in service so that three radios can use each beam antenna. On the SSB side, you will have a 40 meter wire beam facing west to help you in addition to the dipole. The 10, 15 and 20 meter stations on phone will be on the beam on the tower and 80 meters will be on the wire dipole only. We need a ton of operators to show up this year if you want to get another great high score!

We are going to have great Field Day CW operators. I have spoken to Charlie N1RR and Ken N2ZN -- all good -- also Pat N2IEN is onboard for the late shift as will be Pres W2PW.

Now here is the request for HELP. We need many to help with set-up and take-down. You all love the big set-up -- six stations, multiple antennas—and the only way we get it done is by teamwork. There is no "I" in teamwork. If we don't have enough people to help set up it will cause a problem in getting on the air on time. Operators are needed for the SSB side daytime, nighttime and late-late nighttime.

So if you like to help set up, please be there no later than 7 a.m. There will be two shelters going up, two towers and multiple wire antennas. We have a ton of equipment to move out of the EOC and get ready.

The computers and laptops will be ready to go and color-coded so there is no mistake! Keith AC2MI is getting all that ready.

Here is the time line for Field Day:

- Friday June 23rd—5 p.m. get the north side dipole up and tested
- Saturday June 24th—Early morning crew 6 a.m. lead persons for set-up
- Saturday June 24th—7 a.m. set up shelters, tables, towers and antennas until 1 p.m. I hope to have everything up and running no later than 1 p.m. so we can take a breather and have lunch. Once again, I will provide lunch for the set-up crew as I do every year since becoming president. It is the least I can do to thank you all for your hard work. A few regulars will not be with us this year due to family or military events. They will be missed as they have been major players in the setup. It's a lot of work to get it all up and take it all down with all the hard work going into getting ready I hope there no issues.

Rich K2BBQ is gearing up for some great smoked brisket and pulled pork as well as some other smoked items and of course the homemade salads his YL makes every year.

Please feed the donation jar! He lays out a lot of money so we can have a great dinner on Field Day Saturday—as we have done the last two years. Sunday morning breakfast we will do the same thing again. We have a very good local deli that gave us great food and a good price so we need to know who will be taking part in the breakfast. I will be posting the price per person as we get closer.
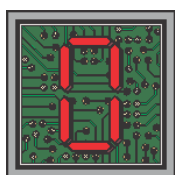
If you don't know how to work one of the radios or need help understanding N1MM, just ask at any Open House.

73, John Melfi, W2HCB

In the Classroom with AB2ZI

Impedance vs. Resistance

By Kevin AB2ZI

ne of the most used terms in ham radio has to be the word *impedance*. We hear it used when talking about antennas, test equipment and when discussing circuits in general. Some hams may become confused when they hear other hams using the word impedance when they are talking about resistance. We all learned about resistance from our earliest studies of electronics and our introduction to Ohm's law. Quite often you'll hear hams using the word impedance interchangeably when talking about pure resistances. So what is the difference between impedance and resistance?

Resistance refers to a purely resistive circuit, that is, one with no reactive components such as capacitors or inductors. In a purely resistive circuit both voltage and current are in phase with each other no matter what frequency is applied to it.
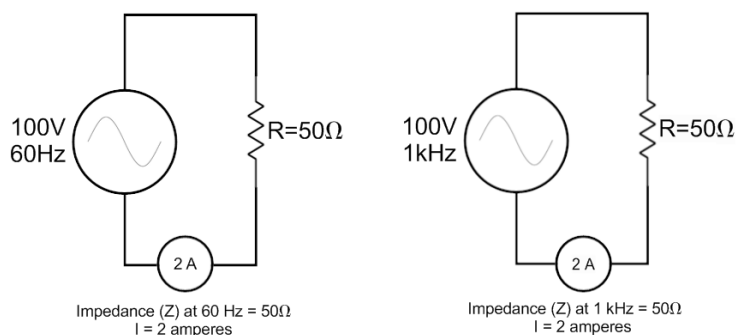
AC circuit at 60Hz (left) and 1kHz (right). Impedance is equal to resistance, voltage and current are in phase, current is 2 amps in both, and power consumption is 200 watts using any of the 3 power formulas.
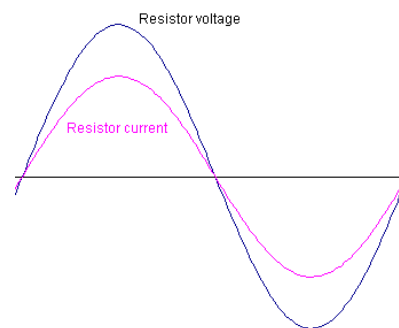
When a circuit contains reactive components there is a phase difference between the voltage and current which effectively robs some of the power from the load. This is because inductors and capacitors *react* differently to the applied voltage and current because of how they work.
Phase relationships of current and voltage in
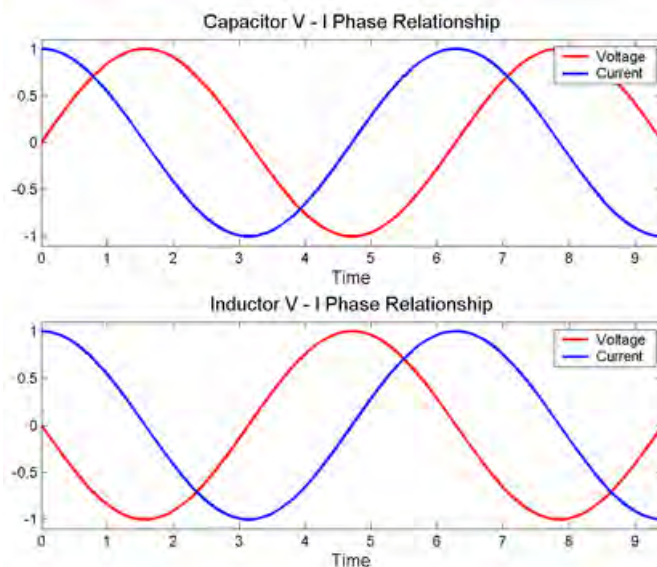
a capacitor and an inductor.
Pure capacitance = current leading voltage by 90º
*Pure inductance = voltage leading current by 90º*

While these components do not use power, they *do* however have an opposition to current flow based on their value (i.e. how big or small they are) and the frequency of operation. Inductors and capacitors *react* to different frequencies by varying their opposition to current flow. That opposition is called *impedance* and is measured in ohms just like resistance. This impedance, combined with the pure resistive part of the circuit, affects the total current in the circuit. This is because any impedance (opposition) to current flow will result in less current flowing then in a dead short. We find total current flow by substituting impedance (Z) for resistance (R) in ohms law: $I = E / Z$

Total current is used then to calculate the circuit's actual, or *real*, power consumption. Power consumption is measured with respect to the *resistive load* only! From the earliest Technician exam material we learn 3 different formulas for

Growing the Ranks vs. Growing the Enjoyment

By Dan Romanchik, KB6NU
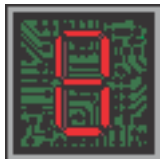
ecause I teach amateur radio classes and publish a series of popular amateur radio license study guides (www.kb6nu.com/study-guides/), I often get kudos for "growing the ranks." In fact, Gordon West, WB6NOA, told me this just last week, when he stopped by the booth I was in at the Dayton Hamvention. I'm paraphrasing a little, but after telling me that he's heard good things about my study guides, he said something like, "You're doing good work in helping get more people into ham radio."

People say that as if this is—or should be—the ultimate goal of teaching a license class. While this may be one of the goals, if that's your primary goal, I think that you're barking up the wrong tree.

In a way, creating more hams is selfish. If there are more licensed amateur radio operators, they say, then amateur radio will have more political clout with the FCC and with Congress, making it easier to pass legislation like the Amateur Radio Parity Act. While this may certainly help the new ham down the line, its main thrust is to reduce restrictions on those who are currently hams.

My goal in teaching amateur radio classes isn't to create more hams. Instead, my goal is to help more people have fun with ham radio. The first step in helping people have fun with ham radio is, of course, helping them get their license. I do that by publishing my study guides and teaching ham classes.

The next step, and I'm only really getting started on this right now, is to help people learn what they need to know to become better ham radio operators. That's why I got a little excited when I saw the article, "Making a Good hobby Better Through Post-Licensing Enrichment" by Tim Busch, N0CKR in the latest issue of Radio Waves, the ARRL's email newsletter for amateur radio instructors.

In the article, Tim describes several activities that his club encourages, including a "new ham net" and the Field Day GOTA station, but he also details a program of "mini classes" that will teach specific skills related to ham radio. These include:

- Programming Radios and Getting on the Air
- Soldering 101
- Multimeter 101
- Build and Use a Roll-Up J-Pole Antenna
- Build and Use a Satellite Antenna
- Foxhunts
- Operating Digital Modes: IRLP, AllStar, D-Star, EchoLink, etc.
- Remote Operation
- Software-Defined Radios
- Transitioning from VHF/UHF to HF Operating
- Chasing Awards
- Learn CW
- Contesting

Tim writes, "Each class is intended to be no more than two hours at a sitting, so they can be held before a monthly club meeting. The variety of subject matter allows many club members to get involved in leading a topic. Materials kits are prepared in advance, so students walk away with practical items they can use at home."

I think this is a great set of classes, and I plan to try some of these in the fall. A couple of other topics that occur to me are:

- Power Supplies 101
- Mobile Operation 101
- ARRL 101
- RFI/TVI 101

Helping new hams—and old hams—have more fun with amateur radio is a lot more satisfying to me than just "growing the ranks." It would be nice to say that we have a million licensed radio amateurs in the U.S., but I think it would be a lot more valuable to the hobby to say that a larger percentage of licensed hams were active and enjoying ham radio. I know that, for me, increasing the number of active, engaged hams would be more personally satisfying than simply creating a lot of new licensees.

When he's not working on helping new hams, Dan operates CW on the HF bands and blogs about amateur radio at KB6NU.Com. If you have a good idea for a new ham "mini class," e-mail him at cwgeek@kb6nu.com.

power: $P = EI$, $P = I^2R$ and $P = E^2/R$. When we use any of these formulas in a purely resistive circuit we get the same answer for power. However, when we have circuits containing series or parallel reactances the first formula, $P = EI$ actually calculates the *apparent power* of the circuit in units of volt-amperes, or VA. It *appears* that the circuit is producing a certain amount of power, but some of the power is lost in storage of the reactive components and is directly related to the phase angle of the current to voltage.

Impedance (Z) at 60 Hz = 2.7kΩ
I = 37 milliamperes

Impedance (Z) at 1 kHz = 1.6kΩ
I = 63 milliamperes
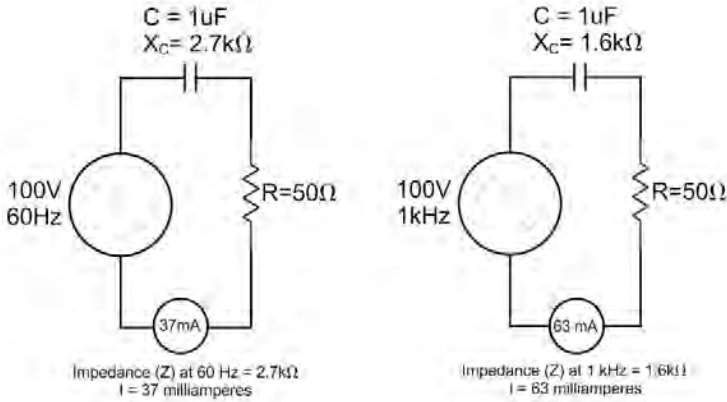
The majority of impedance contributed in the above example is from the capacitor. In this case, a series RC circuit, consumed power is calculated using $P = I^2R$ only taking into account the resistor's value. In the circuit on the left we have 68.5 milliwatts and on the right 198.5 milliwatts. This is the real power. The apparent power is E x I and is 3.7VA (volt-amperes) on the left and 6.3VA on the right. The power factor is calculated by dividing real power by apparent power. On the left we have 68.5mW/3.7VA which equals 0.0185 which is about 1.2%. This represents a phase angle of –88.9°. The angle is negative because the voltage lags in a capacitor (current leads).

The same math applies to the series circuit on the right. Here the frequency has increased resulting in a lower X_C. This means less overall impedance and so results in an increased amount of current flow in the circuit. Here the apparent power is 6.3VA and the real power is 198.5mW. Power factor is 198mW/6.3VA = 0.0315 or about 3.2%. 0.0315 represents the cosine of the phase angle which is –88.2°.

If the reactance and resistance are in series, we use the formula because current (I) is the same in all components of a series circuit, and yes, the R in this case is the value of total *resistance* excluding the reactance. If the circuit components are in parallel, then the voltage is the same across all the branches and we use the formula .

Calculating the impedance of these circuits and the phase angle between the voltage and current involves the use of right angle trigonometry with resistance plotted on the positive X-axis and reactance plotted on the positive or negative Y-axis (positive for inductive, negative for capacitive).
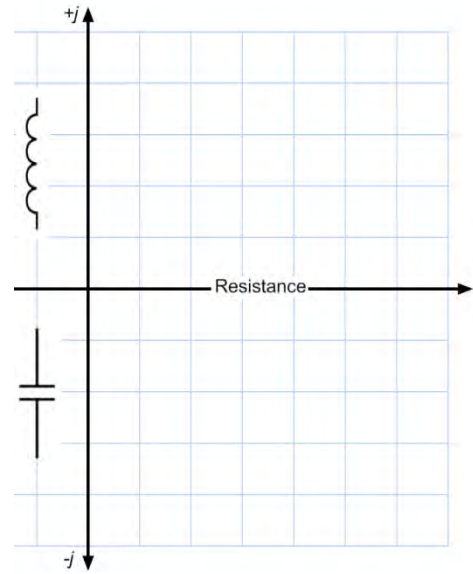
With a *series circuit* the plotting and calculations are straightforward. Given a 30 ohm resistor and an inductor with 40 ohms of X_L we end up with the following triangle plotted:
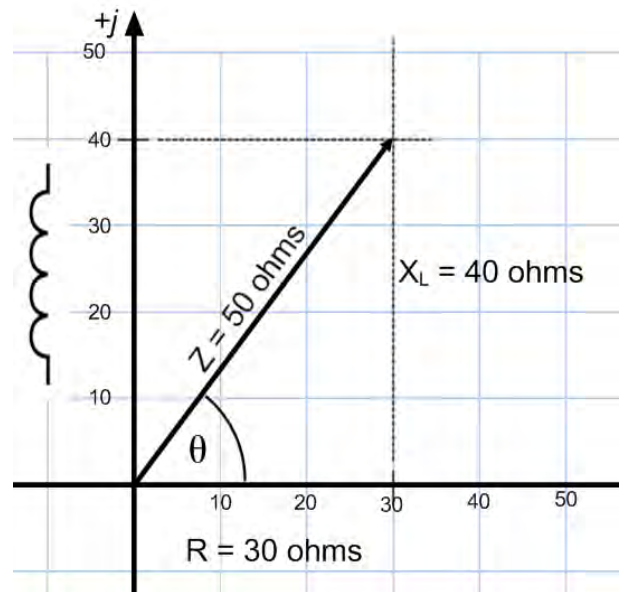

The impedance (Z) of the circuit is equal to the hypotenuse of the triangle which is calculated using the Pythagorean Theorem where $c^2 = a^2 + b^2$.

$$Z = \sqrt{R^2 + X^2} = \sqrt{30^2 + 40^2} = \sqrt{900 + 1600} = \sqrt{2500} = 50 \; ohms$$

The phase angle θ is calculated by first finding its tangent, which is equal to the opposite side divided by the adjacent side, or 40 divided by 30 which is 1.333. Then using a scientific calculator we take the inverse tangent (TAN-1 on most calculators, or ARCTAN) and find that the angle is 53.13°. This is the amount the voltage is leading the current. That angle's cosine is also the power factor of the circuit, in

Inside the Squirrel Cage

by Caryn, KD2GUT
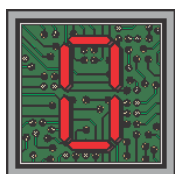
perating barefoot as I do, at a time when the bands aren't necessarily on their best behavior, I'm not surprised to hear a contact tell me - on more than one occasion - "sorry, you're down in the mud." Sometimes I feel like my 100 watts is screaming from the summits (and sometimes it is), but there's nothing like a report of a little mud to keep a ham humble.

But if you really want to get the dirt on mud, ask some of us who went to last month's Dayton Hamvention. Rain and an earthy Ohio county fairground made for a wet and gunky welcome mat that left hams operating barefoot in another way: it ended up ruining their shoes.

To which I say: if you can afford a linear amp, you can certainly afford new sneakers. Stop the mud-slinging, folks!

You'll recall that two years ago an overnight storm of wind and rain battered our GSBARC Field Day tents outside the EOC right up through the early morning hours. We endured, dodging the meteorological mess above and the mucky morass below. After all, we were testing our mettle, which is what Field Day - coming again in just a few more days - is all about. We drank coffee. We made contacts. We had a great time.

Meanwhile in Dayton, where the greatest propagation could be found among the rain clouds on opening day, we also had a simple solution: We drank coffee. We made contacts (eyeball QSOs this time). And yes, we had a great time.

There are those who contend that amateur radio is a contact sport, which of course it surely is. But don't forget too it is also one Tough Mudder. ◉

this case the cosine of 53.13º is 0.6 or 60%. So if there were 100 volts applied total current is E/Z, which is 100/50 or 2 amperes. The apparent power is E x I, or 100 x 2 = 200 VA (volt-amperes) which when multiplied by 0.6 gives us 120 watts. We can check this using I^2 x R: 2^2 x 30 = 4 x 30 = 120 watts.

This shows that if you remember that power factor is equal to the cosine of the phase angle, you can calculate the real power usage of the circuit without needing to remember which power formula to use other than E x I.

Parallel circuits are more difficult to calculate until you've done enough examples for it to become second nature to you. The first trick to help remember the procedure is to remember that when we calculate parallel resistors (or series capacitors) we use the reciprocal of reciprocals formula:

$$R_{equivalent} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \cdots}$$

This will help you remember that parallel reactive circuit impedances need to be calculated using reciprocals as the starting point. This initial calculation is called an admittance calculation, admittance (Y) being the reciprocal of impedance and vice versa. So, using the same numbers from our last example, but putting the resistor and inductor in parallel this time we begin by plotting the reciprocal of the resistance and reactance **but with one important difference**. When we plot the reciprocal of the reactance it is plotted with the opposite sign, that is, an inductive reactance's reciprocal is plotted as a negative (in the capacitive reactance quadrant) and a capacitive reactance's reciprocal becomes positive! So, with R = 30 ohms and X_L = 40 ohms we first plot their reciprocals like this:
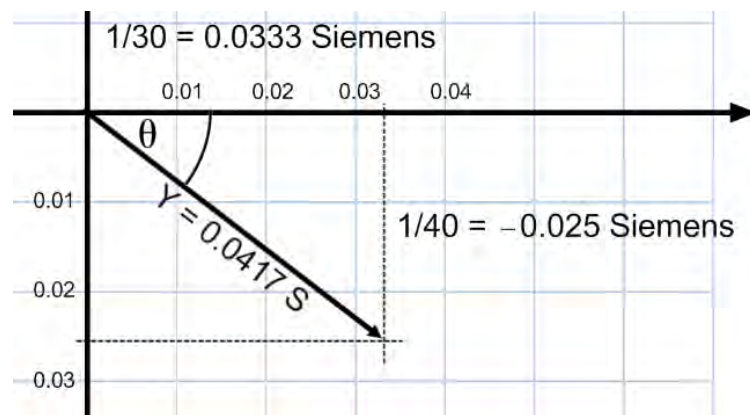
Then calculate the hypotenuse, which is the admittance Y, using the Pythagorean Theorem:

$$Y = \sqrt{0.0333^2 + (-0.025^2)} = \sqrt{0.0011 + 0.0006} =$$

$$\sqrt{0.0017} = 0.0417 \; Siemens$$

The phase angle θ is

$$\tan^{-1}\frac{-0.025}{0.0333} = \tan^{-1}0.75 = -36.87°$$

Now to obtain the impedance we flip the angle's sign from negative to positive and take the reciprocal of Y.

$$Z = \frac{1}{Y} = \frac{1}{0.0417} = 24\ ohms$$

The cosine of 36.87° is 0.8 (or 80%). Calculating power we first get the total circuit current with E/Z. Let's use 100 volts again for this case: I = E/Z = 100/24 = 4.17 amps. Using E^2/R to find real power we get 333.6 watts. Checking this with E x I to get apparent power and then multiplying by 0.8 we get:

*E x I = 100 x 4.17 = 417VA x 0.8 = 333.6W*

...and we're done! ⚜

N1MM+ Logging Software

A brief synopsis by Kevin, AB2ZI

Thursday night, June 8th was a field day training session covering the use of the N1MM+ logging software we will be using for Field Day. An overview of procedures was given by Bob, K2TV. If you'd like to play with the software you can ***download it by going here***. N1MM is by hams, for hams, and is free to download and use.

When you sit down at any of the operating positions there will be a club laptop running N1MM+ that is interfaced with the radio you will be using. The software will be up and running with all of the configurations already made. You will not have much to do except to first use the "OPON" command in the call window to bring up a window to enter *your* callsign in. This allows us to know who was operating for the various QSO's made at that particular radio.
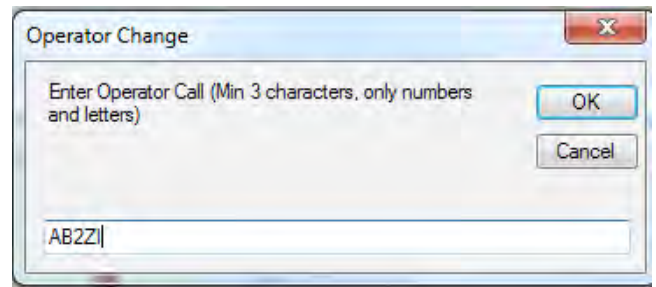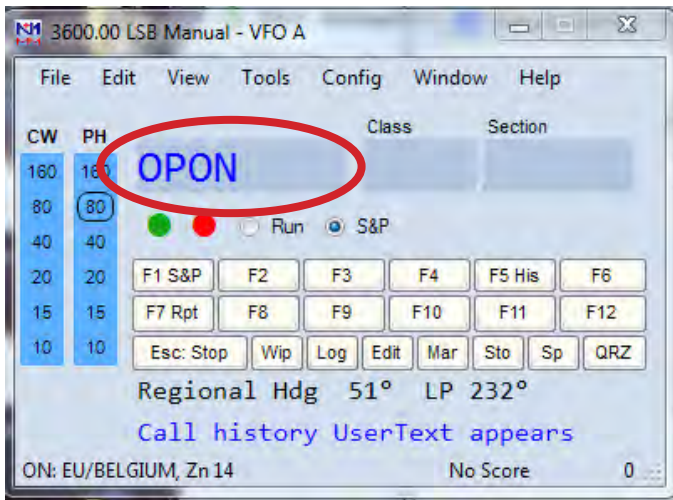
On the main window you will see 2 vertical columns. One for CW and one for Phone (labeled CW & PH). The band you are currently operating will be circled. Here you can see 80 meter phone is circled. The current frequency and mode are shown in the menu bar.

Just to the right and below the space you enter call signs, you will see 2 options: Run and S&P. This is for the method you are using to make your QSO's. If you are sitting on a frequency and calling CQ Field Day, choose "Run," if you are going up and down the band looking for other stations calling CQ to contact then you will choose "S&P" for search and pounce.

If you enter a call sign of a station that's already been worked for the band and mode you are operating you will see the notification **Dupe** appear like this:
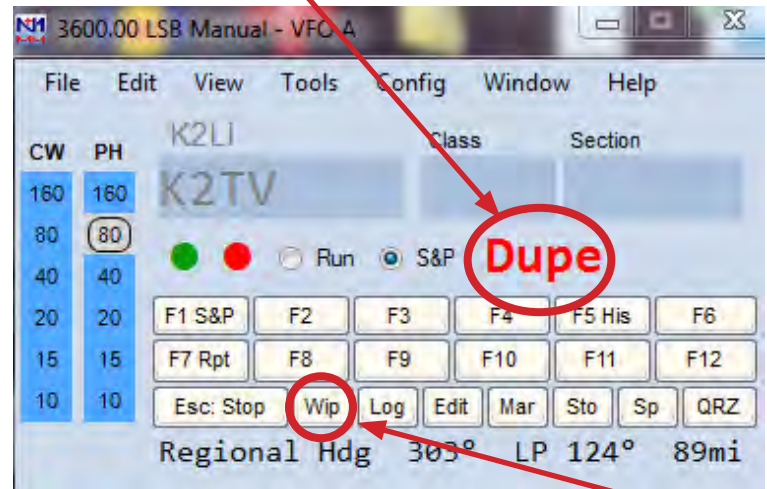
If that happens simply hit the wipe button (labeled Wip) and move on. The space bar will move you from field to field in the entry windows.

When you are turning over your station to the next operator try to make it a habit to type in OPON in the call sign field and bring up the window for the next operator to enter their call sign into the software.

If you find yourself with questions, need a break, something to drink, etc., assistance is a call away on simplex frequency, 147.535 Mhz with a 110.9 pl.

73 and remember to have fun! ⚜

Club Apparel

Want a shirt, jacket, hat, sweatshirt or t-shirt with a Great South Bay club logo? We now use *Mr. Shirt,* located at 80 East Montauk Hwy in Lindenhurst (*www.mrshirt.com*). Now you can get color matched backgrounds on your logo too. Check them out... ⓦ

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,
   http://www.huntingtonnyaresraces.org/
Div. 3—Town of Islip ARES/RACES
   Mondays 8:30 PM
   EC/RO: John J Blowsky, KB2SCS, 631-467-2410
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: Ted Debowy, AC2IR, 631-751-6576
Div. 6—Riverhead ARES/RACES
   EC/RO: Steve Casko, W2SFC, 917-701-3919
Div. 7—Southampton ARES/RACES
   EC/RO: Dennis O'Rourke, KB2ZWW, 631-728-5424
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: Nat Raynor, N2NEI, 631-324-3738
Div. 10—Shelter Island ARES/RACES
   EC/RO: Neal Raymond, N2QZA, 631-749-9330

Suffolk County
ARES/RACES Net:
Mondays 2100 Local - 145.330/R (136. 5PL)
Alternate Frequency - 146.820 (136.5 PL)
New York State
RACES Net (HF)
Sundays 0900 Local, 3993.5 KHz LSB

2017 VE Session Dates

- June 17th
- July 22nd
- August 26th
- September 23rd
- October 28th
- November 25th
- December 23rd

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 CSCE's you may have. Non programmable calculators are allowed. The exam fee is $15 payable by cash or a check made out to "ARRL VEC".

Visit FCC Universal Licensing System site to register for an FRN number to use on the paperwork.

GSBARC Free License Class Schedule:

Technician: April 25th thru June 20th.

General: June 20th thru August
Note: All Classes Tuesday evenings from 7 to 9:30 PM. Class text book is the current ARRL License Manual for that level. For more info email Kevin, AB2ZI at kmorgan6@optonline.net

Club Name Badges

Club name badges are available from *The Sign Man (www.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" ⓦ