



MTARA NEWS



| FEBRUARY 2021 | [Mountain Top Amateur Radio Association](http://www.mtara.org) |

President: Vic Marquez, KK6WKI

Secretary: Dave Esquer, K6WDE

Ed/Membership: Tracy Lenocker, WM6T

The Rim of the World ARES group is an ARRL affiliated organization and part of the Mountain Top Amateur Radio Association.

Vice President: Gary Johnson, AA6GJ

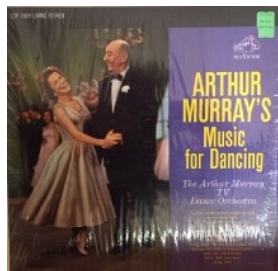
Treasurer: Patty Szychowski, KK6LWH

Past President: John Snedden, KT7P

President Vic's Message

Greetings from your President, Vic, KK6WKI.

We have a new administration and a new plan for COVID-19. Let's hope we get a handle on this pandemic, soon. I miss Paula's monthly meeting goodies, especially the cherry turnovers.



For Christmas, Debbie and Gary graciously sent me an official Arthur Murray LP,

this is NO JOKE! Practicing religiously, my snow dances have improved and the snow gods were suitably impressed. We did get a nice coat of white on the mountains during the last weeks of January. Hopefully, our fire danger has diminished for the winter season.

Don't forget **Sunday, February 14th, Valentine's Day!** Nothing says 'I love you dear' more than a new hand-held, mobile or base station radio for your sweetheart!

Stay radio-active and as always, **if you see something, say something!**

73, Vic

Monthly Club Meetings

Our monthly meetings are on the first Tuesday of each month. **February 2 is our next Zoom meeting. Our guest speaker will be Kevin Zanjani, KI6DHQ, from Bioenno Power** who will discuss their new light weight **[solar panels and powerpacks](#)**.

The virtual meetings begin at 7:00 p.m. and last until about 8:00 p.m. Our meetings are open to everyone, licensed amateur radio or just interested parties. Our purpose is to provide educational opportunities, mentoring, radio communication training and providing radio communications for community events.

For our virtual meetings, interested parties, NOT members of the club will need to email tracy@lenocker.com with their name and callsign. The credentials for the meeting will then be emailed to that person.

See and hear you Tuesday!

Treasurer's Report - KK6LWH

Our opening balance was \$9,641.92, deposits for January were \$360.00. There were no expenses for the month and the total funds on deposit in our account is now \$10,001.92 as of January 29.

73,

Patty

Editor's Update, QSO Today Ham Expo - K6WDE

March 13-14 will be the second **[QSO Today Virtual Ham Expo](#)**. ARRL is a QSO Today partner.

Quoting from their website ... "Our first QSO Today Expo was a great success with over 16,000 attendees! We're working hard to make our upcoming Expo even better with new speakers, panel discussions, kit building workshops, easy-to-use video technology to meet with exhibitors, and much more. There's no need to travel - anybody can participate in this groundbreaking, amateur radio Expo built on a virtual reality

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platform. Early Bird Tickets are just \$10 (to help cover the cost of this event, \$12.50 at the "door") and include entry for the Live 2 day period as well as the 30 day on-demand period."

It should be an exciting event, worth the cost of admission. Click the link to purchase your early bird tickets or to check out the vendors and presenters.

Online Zoom tech meetings

Our Zoom meetings are on THURSDAYS at 2:00 p.m. Check out the MTARA Website home page for a listing of what each of the presentations will be about. If you need help setting up Zoom on your laptop or smart phone please contact Tracy, WM6T, who will help you get set up and running.

Echolink Update

We now have Echolink capability on two of our repeaters. These are MTARA2 (Channel 12) and MTARA5 (Channel 15) which are 2-meters and 1.25-meters respectively. The Echolink on MTARA2 is still the same and the call sign is WM6T-L. The newest Echolink capability is on our MTARA5 channel which is our private 220 repeater. The call sign is WA6MTN-R. It is now fully functional but might get a few tweaks over the next month or two which should not affect any use. This capability on MTARA5 will

allow more members to participate in the Tuesday night discussion nets and for the ladies in the Friday YL Happy Hour net. Both Echolink systems are available 24/7.

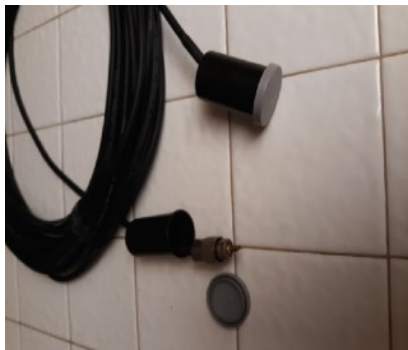
NEW - Construction Tips with Greg! - AJ6FN

1 . I burned out a meter by measuring the AC line voltage on the resistance scale. Of course, it was my fault for only glancing at the meter and not paying close attention to the meter setting. After that, I used some



white paint to mark the dot and arrow on the selector switch

of my two remaining meters. Hopefully this will help me avoid that mistake in the future. By the way, meters should be stored with the selector switch in the highest voltage position. That too would have saved my meter.



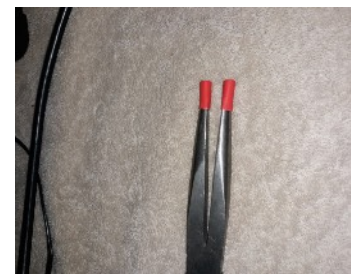
2. Coax connector protector. I use

35mm film canisters to protect coax connectors in the field. Simply cut an "X" across the bottom of the container and push the connector through from the bottom up through the container. When the cable is not in use, pull the cable so the connector is inside the film canister and snap the lid on. This keeps dirt out of the connectors when erecting antennas in the field.



3. On a couple of projects, I wanted black screws but they

were not easy to find. After spray painting the screws, I wanted to be sure not to scratch off the paint while installing these front panel screws. A piece of transparent tape worked pretty well to prevent scratching. Electrical tape may also work if the screw slot is wide enough.



4. Heat shrink tubing, leather, or tape can be placed over the jaws of

pliers to prevent marring.

Stay tuned next month for more tips! I know you have tips too, share them with us by sending them to Dave! - 73, Greg

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Building a QRP Labs CW transceiver - K6WDE

When I was 12 years, my dad bought me a Heathkit AM radio kit. Together, we built it over a few nights and it actually worked when we first turned it on. It had a tube that glowed! That simple

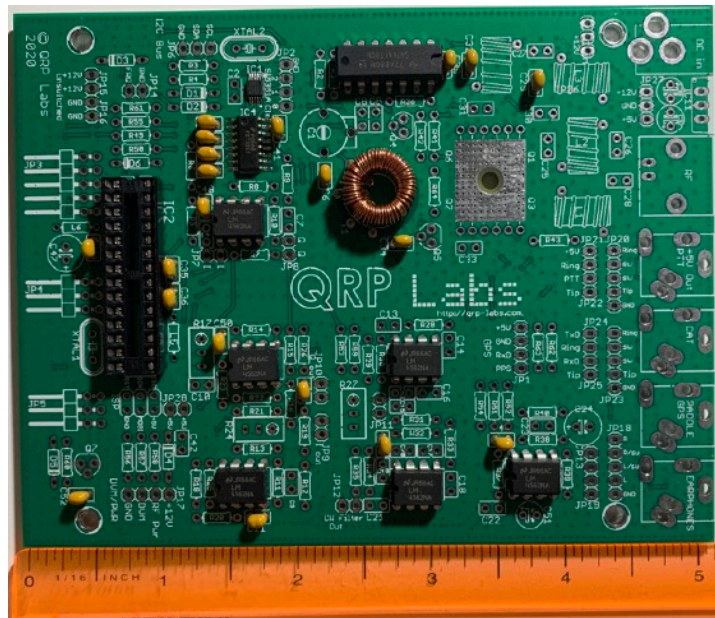


radio piqued my interest in math, science and electronics and ultimately my college degrees and 20 year career in Aerospace Engineering.

Fast forward to 2017, and the homebuilt radio kit bit me. I had just finished the February CWOps CW Academy Level 1 morse code class. I was itching to build something. The Elecraft KX3 and my ICOM IC-7300 were cool but I had the urge to be 'hands-on'. There are many inexpensive ham radio kits available these days, [QRPGuys](#), [HFSignals](#), and the QRP Labs folks come to mind, they all make great and inexpensive kits for a variety of HF modes.

I purchased a \$49.00 [QRP Labs](#) 20 meter QRP CW only "QCX" transceiver, However, even though I was itching to build, other things kept getting in the way. I freaked out at the complexity of winding toroids. I lost my motivation and it sat in a drawer unbuilt. In June, 2020, I bought another QRP Labs kit, this one an updated "[QCX+](#)" kit ([\\$55 now](#)) for 40 meters. Hans Summers, G0UPL, the designer, 'plus' sized the original QCX board with a little more room, builders improvements and a really cool case. The price went up slightly, but for \$85.00 (case and a [GPS module](#) included) it is a bargain.

The lockdown finally freed me up to begin the QCX+ build. Greg, AJ6FN, also has built 2 of these rigs. Another ham WWFF/POTA friend, Randy, W6MMA, also has built a couple. Both of these guys rave about the



radios and I have seen them in portable action. Their peer-pressure was huge and I finally ran out of excuses during the weeks leading to Christmas.

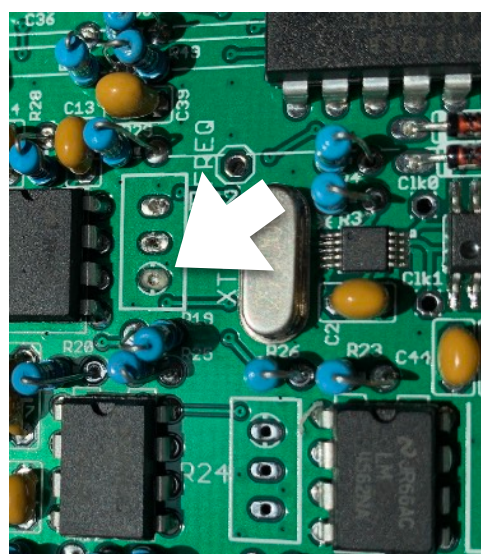
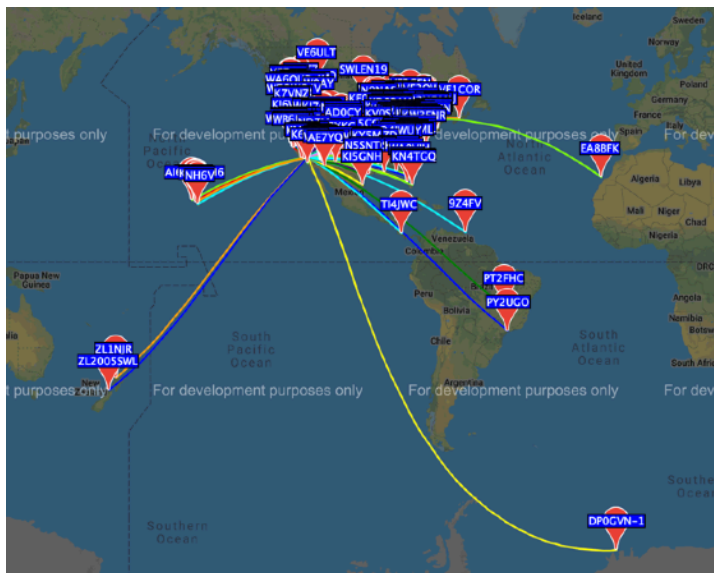
I am NOT an electrical engineer by any stretch of the imagination. I am good at following directions, the manual at 130+ pages is amazing. You start with a blank PC board, parts inventory and begin populating the board with resistors, capacitors, inductors, diodes, transistors, you-wind toroids and coils, switches, on-board headers, LCD display, potentiometers, power connectors and so on. I triple-checked each step. It's like a paint-by-numbers exercise. Over 3 days and 18



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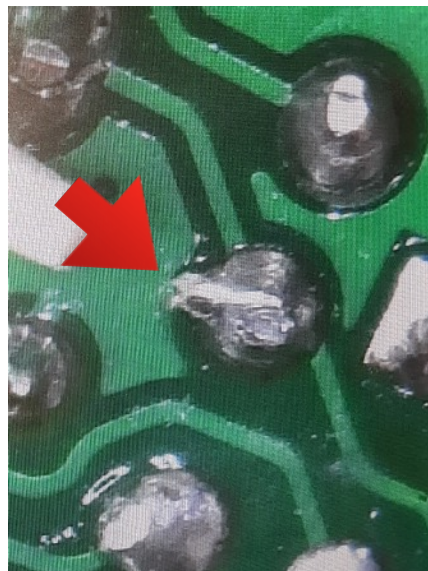
hours mid-December, I finished the QCX+. On the last day with the end in sight, I lost a switch (the ON/OFF switch, no less!) in a parts-bag/carpet-eating explosion and had to wait for a replacement. Right before Christmas, the replacement switch arrived, I installed it, finished the alignment (with built-in on-board test equipment) and it fired right up! No magic smoke release! This is it in WSPR mode with 500 milliwatts, the result over a few hours on Christmas Eve.



Well, with that one out of the way and functioning well, both Greg and Randy, egged me on during the Christmas-New Year's week to build that forlorn 2017 20 meter QCX. I became VERY COCKY, that 'I got this attitude', I was not humble.

This second build was much faster, about 10 hours.

However, I 1) installed a trimmer resistor backwards, ruining the PC board connection for that resistor (it's called 'lifting a solder pad') in the process of its removal, 2) installed the LCD header offset by 2 pins, not good and 3) soldered a 'microscopic bridge' on the bottom of the PC board. This tiny bridge, visible with a USB camera, prevented me from completing the alignment of the radio. AJ6FN bailed me out on problems 1 and 3, he taught me how to wire wrap and scrape through a copper trace on the bottom of the board and after a thorough troubleshooting session, he found the solder bridge!



Both radios are phenomenal, the quality and build process are fun and amazing. If I can do it, YOU can do it. Gene, KJ6LMP is underway with his QCX+ 20 meter CW radio. If you want an even smaller radio for WWFF/POTA, Hans has developed a new [QCX Mini](#)

(same \$55 price). Same radios, in a much smaller 'deck-of-cards' form factor with lots of the components already on the board in a surface mount design. He has built one of these in 80 minutes, start to finish, including alignment.

Remember, if I can do it, so can you! Now, back to my CW practice ... have fun and 73 - Dave

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Local Weekly Nets

	Repeater	Time	Activity	Purpose
Monday	MTARA-2	7:00 p.m.	Weekly Check-in	MTARA news
Monday	144.330 Mhz	8:00 p.m	'Gordo' net	Simplex readiness
Tuesday	MTARA-5	7:00 p.m.	Weekly Check-in	Tech discussions
Wednesday	HF	7:30 p.m.	7.223 Mhz	Band(s) status
Friday	MTARA-5	5:00 p.m.	XYL Happy Hour!	It's Friday!
Daily	CBARC	7:00 a.m.	Technet	Elmer sessions

Membership Info

Membership in the Mountain Top Amateur Radio Association© is open to any person interested in learning more about Amateur Radio.

Members do not have to be a licensed Amateur Radio Operator to be a member but licensure is recommended. Members must be active in club activities which includes trainings, events, club meetings and Field Day. Membership is on an annual basis and is from January 1 to December 31 of each year. There are no prorated memberships. The annual membership is \$20 for a single member or \$30 for an entire family.

Current members do not need to fill out the renewal application form for 2021. You can just mail your check

to MTARA, PO Box 2441, Lake Arrowhead, CA 92352-2441. We already know who you are. Those who joined in November or December of this year are already paid for 2021. The membership form can be downloaded by [clicking here](#).

"A Lid" - don't be one, continued!

We talked in the June 2020 premier episode of the MTARA newsletter about acting as a "lid". We present a few more gems below for your entertainment. Many thanks to Rusty Bumpers, N4LID!

- ▶ Use as many Q signals as possible. Yes, I know they were invented solely for CW and are totally inappropriate for two-meter FM, but they're fun and entertaining. They keep people guessing as to what you really meant. For example, "I'm going to QSY to the kitchen." Can you really change frequency to the kitchen? QSL used to mean "I am acknowledging receipt," but now it appears to mean "yes" or "OK." I guess I missed it when the ARRL changed the meaning.
- ▶ Utilize an alternative vocabulary. Use words like "destinated" and "negatory." It's OK to make up your own words here. "Yeah Bill, I pheelbart zaphonix occasionally myself."
- ▶ The better the copy on the repeater, the more you should use phonetics. Names should be especially used if they are short or common ones. I.E. "My name is Al... Alpha Lima" or "Jack.. Juliet Alpha Charlie Kilo." If at all possible use the less common HF phonetics "A4SM... America, Number Four, Sugar Mexico." And for maximum "LID points", make up unintelligible phonetics. "My name is Bob... Billibong Oregon Bumperpool."
- ▶ Always use a repeater, even if you can work the other station easily on simplex -- especially if you can make the contact on simplex. The coverage of the repeater you use should be inversely proportional to your distance from the other station.

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Upcoming Calendar of Events

Activities that MTARA will be participating in or supporting during the upcoming months:


- ▶ MTARA monthly meeting - February 2 at 7:00 p.m.
- ▶ MTARA monthly meeting - March 2 at 7:00 p.m.
- ▶ [QSO Today Virtual Ham Expo](#), March 13-14

Upcoming VHF/UHF and HF Ham Radio contests or special events

A few fun events that club members can participate in and/or sharpen their communication skills with!

- ▶ [Slow Speed Con\(Test\)](#) for CW operators, 00:00-01:00 UTC **EVERY Monday** (4:00 - 5:00 p.m., US PST Sundays), a great learning tool for us new operators!
- ▶ [Weekly Phone Fray](#) by NW2K. A great way to get your feet wet for 30 minutes. It is weekly on Tuesday nights from 6:30 p.m. to 7:00 p.m. PST on SSB. The rapid-fire exchange is OP name and location ('Dave CA', e.g.). Folks start on 15 meters and then migrate to 20, 40, 80 and even 160 meters, its fun to watch the bands change as seasonal propagation does!
- ▶ [Vermont QSO Party](#), February 6-7
- ▶ [Minnesota QSO Party](#), February 6
- ▶ [North America QSO Party](#), RTTY only, February 27
- ▶ [North Carolina QSO Party](#), February 28

MTARA jackets

 We have our optional MTARA jackets, you too can look smart and cool! Two colors are available which are forest green or black. The forest green matches our polo shirts. Sizes available range from small to 6X. Here is a list of the sizes and **prices that include the lettering and sales tax.**

The Port Authority jackets without the \$6.00 name, call sign and MTARA logo are approximately \$6.47 less.

If interested, you need place your order with Mary at Classic Images in Crestline. Her number is 909-338-2281. She is there Tuesday through Friday and the address is 23723 Rocky Dell Drive, Crestline, CA 92325.

Size	S	M	L	XL	2X	3X	4X	5X	6X
Price	\$45.23	\$45.23	\$45.23	\$45.23	\$46.31	\$48.47	\$49.54	\$51.70	\$52.78

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Welcome to “Ponder the Pool” by AA6GJ

Ponder the Pool is my column for the MTARA Newsletter. Every month I pick a point to ponder (a question) from one of the three FCC question pools and try to explain it more and review the concepts because,

“If you don’t use it, you lose it!”

This time, we will ponder a question from the Extra Class pool: Question No. E5B07 ICE from “ELI the ICE Man” (page 154 in Gordon’s Extra Class Book)

E5B07 – What is the phase angle between the voltage across and the current through a series RLC circuit if X_C is 500 ohms, R is 1 kilohm, and X_L is 250 ohms?

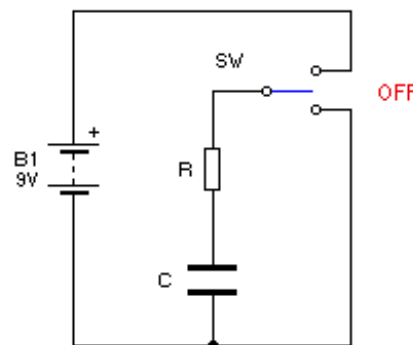
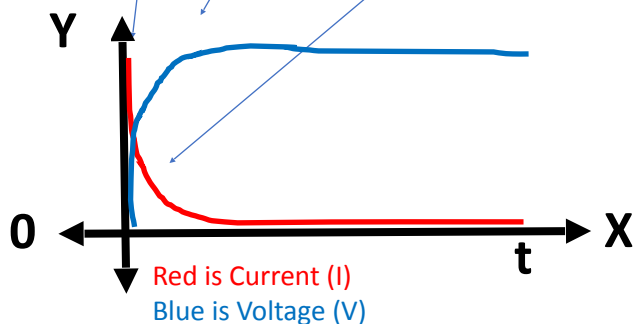
Wow! I’m exhausted already! Forget it! Just memorize the answer and move on! Oh...sorry, that’s not what I am supposed to do here. Ok, let’s try to figure this one out. We may be here for a while, so go get a beverage. Here’s what I am going to do. I am going to take this RLC circuit apart and make it just an RC circuit. We’ll deal with the L next time. There isn’t enough time go into all of the whys, so were going to make some assumptions that the wheel has already been invented, and we will use equations that we already know and love.

The first part of the question talks about X_C . Let’s do some definitions.

X is reactance measured in Ohms. The C relates to the reactance to current flow in a Capacitor in an AC circuit. R is a non-reactive resistor put in the circuit as a load. It is also measured in Ohms.

Look at the circuit. When the switch is closed, the voltage on the capacitor will gradually increase and approach some maximum level, probably the voltage of the battery. What’s happening with the current? The current will immediately be huge and then the current will taper off and approach zero. The current will be falling to zero and the voltage will be rising to the voltage of the battery. So, what’s happening here? Let’s review. The current flows into the capacitor until it fills up, then the current starts to drop because when the capacitor is full (charged), no more current can flow. It acts like an open circuit until something causes the capacitor to empty (discharge). What happened first? Current (I). What happened next? Voltage (E) (V). Put the **C** (Capacitor) between the **I** and the **E** and voila - **ICE**. 😊 The Current leads the voltage.

Conversely, the voltage is lagging the current.

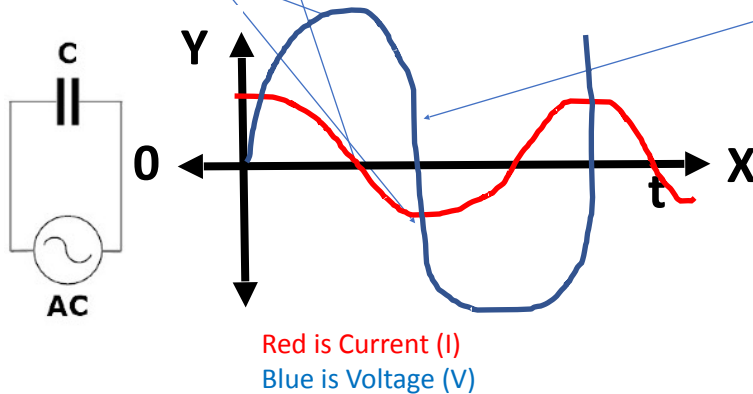


Current (I) flows first to fill up the Capacitor. As the capacitor fills, current decreases, and voltage (E) increases across the capacitor. ICE

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Now, imagine the positive charging, then zero charging, then negative charging, and then back to zero every full sine wave over time. Wow! That **is** exhausting! That capacitor hardly has time for a breath as it sloshes back and forth. But no matter how frenetic it gets; the same action occurs. As above, when the voltage is at a maximum, the current is zero, and the capacitor is instantaneously fully charged. As the voltage decreases, the current will be increasing in the opposite direction. Same as above, but now it will alternate back again, and as the voltage goes negative, the current goes positive, and so on, and so on.

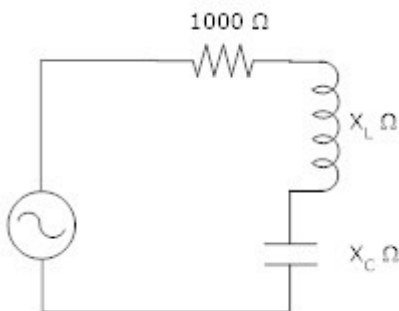


The important thing here, without going into all of the calculus, is that the current does not occur at the same time the voltage does. We say that relating to **time**, the voltage is **out of phase (time)** with the current. So, here comes the punch line. Which one is leading, and which one is lagging? Here's how it works; look at the zero X axis. Don't look at the top of the waves. The **red** line (I) is descending. The **blue** line (E) says, "Ok, now I will descend." Then, the **red** line says, "Now, I will ascend." and then the **blue** line says, "It's my turn to ascend." and so on and so on. So, the **current** is **first** to descend. It is **leading** the **voltage**. Then, the **voltage** descends. It is **lagging** the **current**. As a matter of fact, in this case, the current is 90 degrees out of phase with the voltage.

So, after that long winded explanation, we can move on to answer the question. And remember, I am glossing over a lot of calculus and trigonometry here, so please bear with me.

X (Reactance) is not the same as R (Resistance) even though both of their values are expressed in Ω (Ohms). In a pure resistance, current and voltage go through it at the same time; we say they are in phase. As we have learned from above, capacitors **react**, not **resist** which changes how current and voltage flow as they slosh back and forth in an AC (Alternating Current) circuit. Inductors also react in exactly the opposite way. In a perfect world, current and voltage are 90 degrees out of phase.

Our question deals with R (Resistance)(a resistor), L (Inductance)(a coil), and C (Capacitance)(a capacitor) in series. Each of these react differently to the flow of AC.



Now we need to use a few of those equations we already know.

We need to find X_L (Inductive Reactance). The equation is $X_L = 2\pi fL$.

Where: $2\pi = 6.28$, f = Frequency in Hertz, and L = Inductance in Henrys.

The question already gives us the answer to this equation. It is **250 Ω** .

X_C (Capacitive Reactance) is the opposite of X_L 's equation.

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It is $X_C = \frac{1}{2\pi fC}$ Where: $2\pi = 6.28$, $f =$ Frequency in Hertz, and

$C =$ Capacitance in Farads. Again, the question has already given us the answer. It is **500 Ω** . And, we also know that R is **1 kilohm (1000 Ω)**.

X_L in Ohms	$X_L = 2\pi fL$	Inductive Reactance Equation
250		
X_C in Ohms	$X_C = \frac{1}{2\pi fC}$	Capacitive Reactance Equation
500		
R in Ohms		Phase Equation
1000		
-14.63001442 °	$Tan \phi = \frac{X_L - X_C}{R}$	
-0.255341921 R		



The Green Wave is **Current**. The Yellow wave is **Voltage**.
The current ascends first and then the voltage ascends. The Current is Leading, and **Voltage is Lagging by 13.32°** (This was as close as I could get to 14°)

There is one more equation that we may not already know. It is the equation to find the phase relationship of current and voltage. Remember all that stuff above? Here it is: $Tan^{-1} \phi = \frac{X_L - X_C}{R}$. This looks ridiculously

difficult, but with modern cell phone calculators, all you have to do is subtract 500 from 250, you will get -250. Divide that number by 1000. That answer will be **-0.25 Radians**. Now we have to change radians to degrees. Easy peasy! I'm using an iPhone, but this works on other phones as well. Take -0.25, tap the **2nd** key, and look for the **tan⁻¹** key and tap it. And voila, the answer magically appears: **-14.036°**. The minus means the **voltage is lagging the current** or **the current is leading the voltage (ICE)**. Guess What?? We just answered the question!!!

So, why do I care about this?? Well, these circuits are valuable in designing antenna tuners, filters, audio equalizers, and more. Plus, it's simply good to experiment with circuits and math to keep our brains healthy. So, stay interested, and keep learning!

The official answer to this question is: **14.0 degrees with the voltage lagging the current**

There you have it, *Ponder the Pool* for another month. I hope it was helpful. 😊

Stay tuned, and we'll do another one next month. Next time we will talk about the **ELI** part of the circuit as we explore another Extra Class pool question. – 73 – Gary

If you have any questions or comments, drop me an email at AA6GJ@arrl.net.