



The
Wave Bender

March 2017



WRARC PREZ SEZ

It is March already, the last month of the 1st quarter of 2017. This has been one of the strangest years in recent history so far and shows no signs of changing. Even the weather has been confused so far this year, not that I am complaining. Who would have imagined that we would be walking around in our shirt sleeves in February.

We have a busy year coming up, the Easter Seal walk in Boardman Park will kick it off for us, and we have several large events coming up this summer and fall. We have several return events, as well as a new one that will be very interesting. We will be working the Youngstown Marathon this year for the first time. I look forward to helping solve the challenges that an event this size will bring. Also, there is our spring road cleanup on Rt. 446 in Canfield we have set the date on that for May 13, and the start time will be set shortly.



Our club had its anniversary net on Feb 18th. We had stations operating on 15, 20, and 40 meters on HF as well as a continuous "ragchew" type 2 meter net. I would like to thank all those that participated in the nets. We had people from a wide area of NE Ohio, and a few from Pa. also.

I look forward to participating in the various functions our club is committed to for this year, and to enjoying the Amateur Radio community in general this year. I hope to talk to the other clubs in the area that I have not had the opportunity to meet yet and to get to know them better.

All that being said, I am looking forward to being an active member of the Amateur Radio community in the Mahoning Valley this year.

Wishing a good upcoming month, and a great 2017 for all.

73, Bob, N8RCM



DAYLIGHT SAVING TIME..
Don't forget on Sunday, March 12
you need to move your clocks
ahead 1 hour

IN THIS ISSUE

2017 Officers:

President: Bob Mitzel, N8RCM n8rcm@wrarc.net

VP: Joe Wojtowicz W0JO w0jo@wrarc.net

Secretary: Jo Wilms, KD8SNW kd8snw@wrarc.net

Treasurer: Rose Marko, KD8TII kd8tii@wrarc.net

Past President: Roy Haren, KD8IJF kd8ijf@wrarc.net

Trustees:

Russ Williams NR8W nr8w@wrarc.net
 Darrin Cannon, N8DMC n8dmc@wrarc.net
 Roy Haren, KD8IJF kd8ijf@wrarc.net

Appointed Positions:

Social: Maureen Stein, KD8NXS kd8nxs@wrarc.net

Publicity: Joe Wojtowicz, W0JO w0jo@wrarc.net

Nets: Steve Fabry, KC8SOY kc8soy@wrarc.net

Classes/Testing: Al Avnet ab8aa@wrarc.net

Newsletter/Web: Jane Avnet K8JAA k8jaa@wrarc.net

Historian: Rose Marko, KD8TII kd8tii@wrarc.net

Badges: Al Avnet, AB8AA ab8aa@wrarc.net

Facebook: Terri Mitzel, N1TAM n1tam@wrarc.net

Chris Monske, WF8U wf8u@wrarc.net

Harry Harker, KD8PQK kd8pqk@wrarc.net

Officer's Meeting:

March 14, 2017, 7:00 P.M. At Eat 'n Park,
 Austintown, Eat 'n Park,
 5451 Mahoning Ave
 All members welcome

Members Meeting:

March 21, Davidson's
Speaker: Steve Randlett, K8SRR
Topic: Digital Radio



<http://www.wrarc.net/>

7Th Anniversary HF net.	11
A Note from our Treasurer	8
Birthdays this month	12
Calendar	20
February 15 Test Session	8
February Meeting	19
From Our VP	3
Learning Morse Code Without Trying	16
Let's Talk	12
Lets Learn CW Together	17
More from Scott - NIMS / ICS Training	13
Possible New Entry Level License	15
Severe Weather Symposium	6
Skywarn, Basic Training	6
Star's seven Earth-sized worlds set record	6
Still Don't Phase Me None!	10
Swap'n Shop	7
Thank You	8
The Technical Coordinator	14
Warning From MVAS Reflector	9
What's coming up?	4
Where Are We Going?	9
WRARC Prez Sez	1



<https://www.arduino.cc/>

OTHER IMPORTANT WEB SITES

FOR THE ARRL SEARCHABLE HAMFEST CALENDAR,
 <[HTTP://WWW.ARRL.ORG/HAMFESTS-AND-CONVENTIONS-CALENDAR](http://www.arrrl.org/hamfests-and-conventions-calendar)>

THE ARRL EXAM SEARCH PAGE
 <[HTTP://WWW.ARRL.ORG/FIND-AN-AMATEUR-RADIO-LICENSE-EXAM-SESSION](http://www.arrrl.org/find-an-amateur-radio-license-exam-session)>

OHIO SINGLE SIDEBAND NET
 <[HTTP://WWW.OSSBN.ORG/INDEX.HTML](http://www.ossbn.org/index.html)>

FROM OUR VP

As I'm writing this month's newsletter, I'm listening to the last hour of our Western Reserve Amateur Radio Club's 7th anniversary net on 2 meters. Kudos to Mark Stein, KD8YMK, who volunteered to be Net Control in the 5:30-6:00pm time slot. It was his first time, and he did a great job. I think when we planned this scheduling it for the middle of February, we expected a lot of people to be homebound because of the weather, but surprisingly today was like an autumn day with sunshine and no snow. I don't think we got as much participation if the weather was normal and worse for this time of year. However, even with the good weather, everything appeared to go pretty well even though the HF bands also were terrible. That's why I'm doing this now as I couldn't hear anyone with all the interference. Thanks to all our members and nonmembers who participated. Your club officers and board members greatly appreciate it.



I'm pleased to report that we have another new Public Service event scheduled for this year. This will be the Youngstown Marathon, www.youngstownmarathon.com, which is going to be held on Sunday, June 4th. We don't have the times right now, but as we get closer to the date, we'll let everyone know where to meet and the times. According to the website, the courses for the Full Marathon, Half Marathon and 5K have been updated and finalized. They do state the start line will be Route 224 in front of Second Sole, in order to utilize more of beautiful Mill Creek Park and minimize running on busy city streets. It looks like the event will finish up in downtown Youngstown. The maps of the courses are on their website.

Their motto on the website is "Let's Run Youngstown" and is sponsored by Chemical Bank (formerly Talmer Bank) and the Braking Point Recovery Center. The Youngstown Marathon drives to support the community by bringing runners from Ohio, Pennsylvania and West Virginia, in addition to professional runners from around the country together in beautiful Youngstown, Ohio.

The Chemical Bank & Braking Point Recovery Center Youngstown Marathon is projected to have an economic impact of over a million dollars for businesses within the city and the surrounding areas of tourism. A portion of the proceeds of the race will go to various charities in the community.

The Race Director is from my hometown, New Castle, PA, and when I originally contacted her, she told me her father was also an amateur radio operator and he told her it would be a good idea to contact the local amateur radio clubs for assistance with the event. The timing of my call to her couldn't have been better as she was very welcoming of our club's assistance. She asked for our club logo which I have already sent to her and it will be put on their website as well as other media for the event. We will also be allowed to put up our new club banner at the finish line which will give our club more public exposure.

I may point out here that the event organizers for all these community fund-raisers are extremely happy to have our members out there as extra "eyes and ears" for their events and every single one of them have asked us to return and participate again.

The Full Marathon route is approximately 26 miles, so we're going to need as many licensed members (we're also welcoming licensed nonmembers) to help us if we're going to be effective. These usually take about three or four hours of your time. If you're interested in participating, you can reach me either at 330-544-5865, or W0JO@arri.net.

Our next upcoming event will be the Easter Seals 5K Walk/Run to "Make the First Five (Years) Count" which will be held this year on Saturday, April 15th at Boardman Park. This event usually only takes a few hours, so if you can help, we'd greatly appreciate it. We'll have more details on this as we get closer to the date.

The next monthly club meeting will be held on Tuesday, March 21st at Davidson's Restaurant, 3636 Canfield Road, Canfield, OH 44406. We have dinner starting at 6:00pm EDT and our meetings start at 7:00 P.M. Our scheduled guest speaker for our March meeting is Steve Randlett, K8SRR, who will be speaking about digital radio which I'm sure will be very interesting and informative. We welcome all of our members non-members who are licensed Amateur Radio Operators, or anyone interested in learning more about the hobby/service to our monthly club meetings. and look forward to seeing you there. Until then . . .

WHAT'S COMING UP?

- March 14 Board meeting, Board meetings are open to all interested members.
- March 07 Skywarn Training in Trumbull County
- March 14 National π Day
- March 21 Member's Meeting
- March 29 Columbiana County Skywarn Training

- April 11 Board meeting, Board meetings are open to all interested members.
- April 15 Easter Seal Benefit 5K Walk/Run, Boardman Park
- April 20 Member's Meeting
Speaker: C. Matthew Curtin, KD8TTE -
Topic: Amateur Radio in CERT
- April 19 Testing American Red Cross 3530 Belmont Ave #7
Mahoning County Skywarn Training

- May 06 **WRARC Day at DX Engineering**
- May 09 Board Meeting
- May 16 Member's Meeting
Speaker: Bill Fraedrich, WB9LBI,
Topic: The National Traffic System
- May 13 Community Service Event, 446 Road Clean up

- June 04 Youngstown Marithon
- June 21 Testing American Red Cross 3530 Belmont Ave #7
- June 23,24, 25 Field Day
- June 24 Testing 10 A.M.@ Field Day

- Aug 16 Testing American Red Cross 3530 Belmont Ave #7
- Aug 27 Panerathon 2017

- September Community Service Event, 446 Road Clean up

- Oct 07 Walk To End Alzheimer's - Tentative
- Oct 18 Testing American Red Cross 3530 Belmont Ave #7,
- Oct 22 Youngstown Peace Race - Tentative



CONTACT WRARC ELMERS WITH YOUR QUESTIONS - QUESTIONS@WRARC.NET

Avnet, Allan AB8AA Beatty, Dave KC8WY Fabry, Steve KC8SOY Haren, Roy KD8IJF Williams, Russ NR8W Wojtowicz, Joe W0JO	Antennas, radio setup, mobile, grounding, classes, anything anything Yaesu FT8900, FT8800, Mobile ??? Electrician, tele-data, Amateur Extra ICOM radios, D-Star	ab8aa@arrl.net kc8wy@zoominternet.net kc8soy@yahoo.com harens@juno.com rwiliams@neo.rr.com w0jo@arrl.net
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He who is afraid of asking, is afraid of learning

Articles from members for the Wave Bender are encouraged. They must be received by the editor on the 20th each month. Please send your articles to: k8jaa@arrl.net, and put WRARC on the subject line of your email. You may also send your articles to the editor: Jane Avnet, 2050 E. South Range Rd., New Springfield, OH 44443

Join us for the WRARC Friday night Net 9:00 P.M.
 KD8DWV - 145.270, PL -110.9
 Upcoming Net Control Operators

Mar. 03	Rose, KD8TII
Mar. 10	Rocky, KE8ENM
Mar. 17	Jane, K8JAA
Mar. 24	Roy, KD8IJF
Mar. 31	Darrin, N8DMC
Apr. 05	Maureen, KD8NXS
Jun. 23	Bill, KD8HCQ



Contact Steve, KC8SOY to take a turn at Net Control
 330-774-6346

WRARC Simplex Frequency 146.565

Mahoning County ARES® Nets

1st Monday 8.30 PM ET W8QLY Repeater - 146.745 (PL 110.9)

&

3rd Monday 8.30 PM ET W8QLY Repeater - 146.745 (PL 110.9)

ARES thanks MVARA for the use of their repeater

W8SGT is facilitating The Ohio HF net every Tuesday - 7:00 PM

The net is run from the State of Ohio EOC on the

Ohio ARES Admin frequency 3875 kHz LSB

moves to 7240 Khz after 20-min.

All are welcome to check in.



The Ohio ARES/OES Digital Emergency Net held every Tuesday at 8:00PM.

held on 3585 kHz USB.

Please note all digital communications are Upper Side Band.

<http://www.http://ohden.org/> for net details. Net Manager Gary NJ8BB

COLUMBIANA COUNTY DIGITAL NET

Wednesdays 8:30 pm - 9:30 pm

145.510 MHZ SIMPLEX

First Wednesday of the Month Mahoning County Skywarn Net

is held on the W8QLY repeater 146.745 (-) at 8:30P.M.

Thanks & 73 To all of our members (and others) look forward (hopefully) to getting this newsletter every month, so keep sending those articles, jokes, and suggestions!

March 7, 2017 6:30 PM
630 PM KSU Trumbull Campus
Technology Building Room 117
4314 Mahoning Ave
Warren, OH



March 29, 2017 6:30 PM
Columbiana County Vocational School
Columbiana County will hold SKYWARN Training on 29 March 2017 at the
Columbiana County Career
and Technical Center
9364 OH-45, Lisbon, OH 44432
The CCCTC is on routes 30 and 45 just South of Lisbon near the OSP Post 15.

April 19, 2017 600 PM
Austintown Fitch High School Auditorium
4560 Falcon Drive



SEVERE WEATHER SYMPOSIUM

SEVERE WEATHER SYMPOSIUM (from Michael Schulsinger, N8QHV)

The Ohio State University MetClub is hosting the 21st Severe WeatherSymposium. The symposium is free, though there is a charge for parking at the Ohio Union on OSU's main campus.

The 2017 symposium is scheduled for Friday, March 24th. Lunch is available in the Union, or at restaurants across High Street.

I have attended most of these and only regretted one year - the year a tornado outbreak plowed across northern Kentucky, southern Indiana and southern Ohio during the conference! The link to RSVP is <http://u.osu.edu/metclub> .



STAR'S SEVEN EARTH-SIZED WORLDS SET RECORD

By Paul Rincon
Science editor, BBC News website

Media captionAll seven planets are thought to have Earth-like characteristics
(Photo credit: Nature)



Astronomers have detected a record seven Earth-sized planets orbiting a single star. The researchers say that all seven could potentially support liquid water on the surface, depending on the other properties of those planets. But only three are within the conventional "habitable" zone where life is considered a possibility. The compact system of exoplanets orbits Trappist-1, a low-mass, cool star located 40 light-years away from Earth. The planets were detected using Nasa's Spitzer Space Telescope and several ground-based observatories are described in the journal Nature.

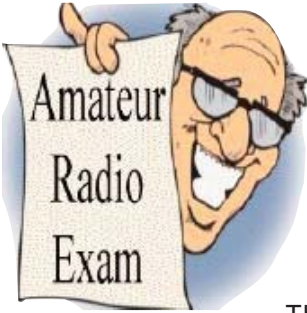
SWAP'N SHOP



Cushcraft Model XM-520 20 Meter 5 El Beam	\$200
Yarsu FT-757GX-II HF Radio	\$250
Kenwood SP-430 Speaker	\$ 25
Nye Viking, MBI-001 Tuner,	\$100
Shure model PE515, Microphone	\$ 15
Shure model 444D, Microphone	\$ 15
AEA model QT-1, Antenna tuner	\$ 25
Radio Shack 2 meter HTX-202	\$ 25
Astron Power Supply Model RS-20M	\$ 50
Astron Power Supply Model VS-35M	\$ 75
Pyramid Power Supply model PS-25	\$ 50
Bencher ST-1CW Paddle	\$ 70
Coax Switches (3)	\$ 10 ea
Code Keys Standard (4)	\$ 10 ea
Dentron Jr. Monitor	\$ 45
HEIL Headset	\$ 30
HEIL ICM Mike	\$ 40
Icom AH-4 Auto Tuner	\$150
Icom IC-MB5 Mounting Bracket	\$ 20
Kenwood TH-22AT 2 Mtr HH	\$ 25
KENT Iambic Paddle Model TP-1B	\$ 60
KENT Single Paddle	\$ 65
MACAW Model DPM-1 SWR/ Power Meter	\$ 20
MFJ MFJ-204B Antenna Bridge	\$ 30
MFJ MFJ-906 6 Mtr Antenna Tuner	\$ 50
MFJ MFJ-9040 40 Mtr CW transceiver	\$100
MFJ MFJ-971 Antenna Tuner	\$ 65
MFJ MFJ-492 Memory Keyer	\$ 50
MFJ MFJ-464 CW Reader/ Keyer	\$100
MFJ MFJ-105B 24 hour Clock	\$ 10
MFJ MFJ-484 Grandmaster Memory Keyer	\$ 45
Heathkit HM-9 QRP Wattmeter	\$ 40
Heathkit HFT-9A Antenna Tuner	\$ 40
Heathkit HG-10 VFO	\$ 40
Heathkit AM-2 SWR/ Power Meter	\$ 20
Heathkit HM-11 SWR/ Power Meter	\$ 20
Heathkit SB-600 Speaker	\$ 25
Heathkit IM-10 VTVM	\$ 25
Heathkit DX-60 10 thru 80 Meters HF	\$ 75
Heathkit 75 Meter Single Bander	\$ 75
Heathkit HP-23 Power Supply	\$ 50
Heathkit GR-88 152-174Mhz Receiver	\$ 10
Heathkit VTVM Model IM-11 (A)	\$ 25
Heathkit Condenser Checker Model C-3	\$ 25
Ten-Tec OMNI VI HF Model 563	\$500
Ten-Tec Amp Meter	\$ 20
Ten-Tec Argosy II Model 525-D	\$250
Ten-Tec Antenna Tuner Model 247	\$ 50
Ten-Tec Kit Shortwave Receiver Model 1253	\$100
Ten-Tec Kit 6 Mtr Transverter	\$ 40
Ten-Tec Power Supply 252G	\$ 45
Ten-Tec Power Supply 961	\$ 75
Ten-Tec Remote Tuning Knob	\$ 50
Variac 120V 10A	\$ 50

Will take reasonable offers.
 Contact Allan, AB8AA
 at
 ab8aa@arrl.net or
 330-207-3296

FEBRUARY 15 TEST SESSION



Our February 15 test session was held at our new permanent location, the Red Cross office on Belmont Ave. in Liberty. We had three folks testing, sadly only two passed. Rod B Lubline, KD8WTI, from Diamond, passed his Extra, and Ralph Streb III, KE8GCM, passed his Tech. Congratulations to you both on passing, and to Ralph, welcome to Amateur Radio.

Those VEs who helped Al, AB8AA, with the W5YI test session were Jane, K8JAA; Dave, KC8WC; Roy, KD8IJF; Bobby, AB8OP; Terri, N1TAM; and Bob, N8RCM. Thanks so much for your help.



A NOTE FROM OUR TREASURER

Here it is, the third month of the new year. Our last two months have been fun-filled and now we're looking forward to more fun in the coming months. In January, we held our After the Holidays Annual Meeting/Party and it was a big success. Last month, February, we hosted the second year of our Western Reserve Amateur Radio Club Anniversary Net. WRARC is 7 years old, and the Net too, was a big success. Also, our YL Breakfasts these last two months have been enjoyable.

The next YL Breakfast is set for Saturday, March 4, at Eat 'n Park in Austintown at 9:00 A.M. In case any of you don't know, it's located on Mahoning Ave. and Rte. 46 right next to the Sheets Gas Station. I hope we have a big crowd. In March. The YLs who joined us in February were KD8DWV, KD8SSB, Sherri, Donna, KD8TII, KD8NXS, K8JAA, Janet, & KD8QNY. We were having so much fun, I forgot to take pictures. I will be sending an email later in March as to where our next breakfast will be held and I hope to have more YLs/ ladies join us.



Now we are looking forward to future events such as the Easter Seals 5K Walk/Run to "Make the First Five Count" on Saturday, April 15th. Saturday, May 6th, is the WRARC Day at DX Engineering in Tallmadge, OH. and our road clean-up day is Saturday, May 13th, in Canfield, OH. WRARC hopes to get more of our members involved to help out at these events. They are a learning experience for all Amateur "Ham" Radio Operators from WRARC and other clubs in the Valley. To find out more about these events, you can contact Joe, W0JO, for more information.

In conclusion, anyone who has not yet renewed their membership can still do so. You can send a check or money order to me, Rosemary Marko, 416 S. Edgehill Ave., Austintown, OH., 44515. Please make out your check or money order to WRARC. Or you can come to our monthly general meetings and pay me in person. Our meetings are open to anyone who may be interested in amateur radio.



**New Disney Ride?
Want to try this one??
NO PARACHUTE**

<http://surprise.ly/v/? PK0HI0kWELE:0:0:0:100>

WHERE ARE WE GOING?

February 18, we celebrated seven years as the newest Amateur Radio Club in the Mahoning Valley. We have come a long way since we started in 2010. At our first recorded meeting we had 13 members present, counting then President Al Avnet AB8AA, we had four guests, two of which joined that night. Our membership has grown over the years, with some years showing more members than others.

WRARC was formed with the idea that there would be no cliques, we'd all be friends and work together on projects and events that would show the area what Amateur Radio's potential was in times of an emergency. We hoped the Hams who decided to join us would have the same idea. I realize everyone is not interested in DX, Building something, Public/Community Service, or maybe even Nets. Your license says you have an interest in Amateur Radio. Our Constitution says:

"The purpose of the Western Reserve Amateur Radio Club Inc. is to promote the exchange of information & cooperation between amateur "HAM" radio operators. In addition, to promote amateur radio knowledge & to conduct programs & activities so as to advance the general interest & welfare of amateur radio in the Mahoning County . . ."

Joe, W0JO, has been working hard to get WRARC a number of Public Service Events for the members of WRARC to provide communication to a number of fund-raising events that help our neighbors here in the Mahoning Valley. Ted, KD8IJE, got our only Community Service event, the 446 Road Cleanup, which shows our Community we care. These events gives us experience working in a net, valuable if you ever have to volunteer to help with an emergency. Comradery is a definite bonus.

The club we belonged to in SoCal is dying due to lack of interest of its members. No one wants to run for office, there is no interest in Nets or Field Day. No one wants to work events. Members who are interested in these things, have quit the club and gone to other clubs where they can participate in these Ham related activities, or have dropped out of Amateur Radio entirely. "I don't know what can be done when nobody wants to be the leader, except those who have been leaders before, which leads to burnout," N6ISY.

Is this the road we're on? I hope not. We need members to share their time with WRARC, and participate in the exciting activities we have coming up, Consider being a member of the Board, run for an office during our elections this fall. New ideas are always welcome. That's how a club grows.

Back to our Anniversary net - I volunteered to take the time slot noon to 12:30. Because of the QRM I experienced coming from the two HF stations in our lower level Ham Shack, I had to ask KC8WY to take over about 15 min into my time on the net. I did manage to get nine contacts while I was on, most of which were members of the Board, or members who volunteer when asked, and a couple Hams that are not members. I listened to the net the entire time, 10A.M. to 6P.M., and found my experience to be what the other volunteers experienced. You can't expect a few members to do all the volunteering and expect WRARC to survive. Please, consider volunteering when asked. After all, we are considered a Service by the FCC, and these fun activities, which can only be done with your FCC license, are practice for emergencies we hope never occur.



K8JAA

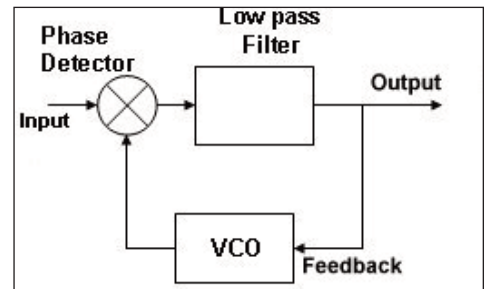
A WARNING FROM MVAS REFLECTOR

A MVAS member was at a meeting in Leavittsburg, 2/2/17, and thought she'd pass this along. One of the women there did get a call and I think they warned people on TV about it. Apparently someone calls and starts to talk and says "Can you hear me?" When you answer yes this gets them to use your voice to ok opening credit cards and stuff in your name. Didn't sound real to me but apparently it is. My friend said the young man who called her sounded like a person from this country and young in age. No accent although supposed to be coming thru India. Also uses local area code. I had the local area code happen to me in the past. Phone Co. said they buy cards and can use any area code they wish. Another of the women said she got a call from her own number. Of course she didn't answer. Should you get a call you can report the number but since they buy cards to do it, I doubt it would help. Crazy eh?

STILL DON'T PHASE ME NONE!

Last month we talked about using a Phase Locked Loop for FM Demodulation and discovered the output of the PLL was a difference signal between an incoming signal and a VCO built into the PLL. That creates some possibilities to use the PLL to give us a high accuracy output that we can easily change frequency.

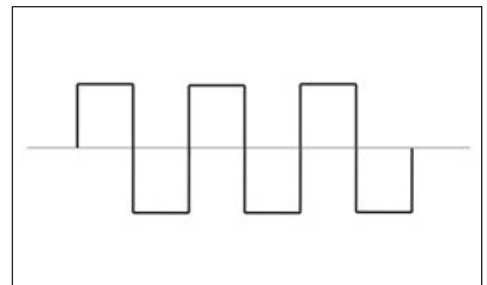
Just to refresh, we were using the block diagram shown to the right. The circle with the X in it is a Phase Detector but we discovered it is also known as a mixer. The block labeled VCO is a voltage controlled oscillator, which means it produces a wave whose basic frequency is set by the parts we connect to it, typically a resistor and capacitor, and that a voltage applied to it will change it from the basic frequency.



What we didn't get into last time was that there is a signal fed back from the output to the VCO. Let's take a case where we set the frequency of the VCO to 18 Mhz. And we will input a signal from a crystal oscillator into the left side of the circuit where its labeled Input. A crystal oscillator is a circuit that produces a wave and is very stable and accurate. We will use a 20Mhz crystal oscillator. We know from last month there is going to be a difference signal at the output of the Phase Detector. That difference is between the 20Mhz coming in and the 18Mhz VCO, so it is 2Mhz.

Now that we are considering the feedback, the 2Mhz difference will come through the filter and into the right side of the VCO. Without getting too deep, the action of the feedback is to change the frequency of the VCO to try to get it to match the input frequency. This is a condition called lock, so the feedback tries to drive the VCO into lock. Suppose the feedback changes the VCO frequency to 19Mhz. That goes into the detector and now the difference is 1Mhz, so the feedback continues to drive the VCO up. Continuing the same process, as long as there is a difference between the Input frequency and the VCO frequency, there will be a feedback driving the VCO. Now comes a trick, and just take this at face value. When the VCO frequency matches the Input frequency and there is no difference and you would think there is no longer feedback. But if we eliminate the feedback, the VCO will resort back to its original 15Mhz frequency, so at this point the phase detector continues to give a difference signal, but now it is a difference in phase. Hence the name Phase Locked Loop.

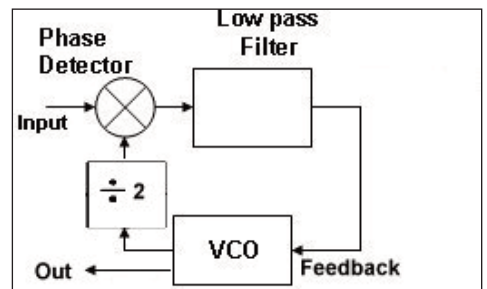
Whew, that was ugly. So when all is said and done, the action of the PLL is to cause the VCO to match the incoming frequency. Ok, let's get digital. There is a digital circuit called a counter. It receives an input and counts the number of cycles of the input. It's easier to think of this with a square wave, like the one shown here.



Let's just look at the part of the wave that starts at the bottom and rises to the top. That is called an edge and it's what the counter would be counting. So if we had 5 of those rising edges, the counter would count to 5.

Suppose you were using a counter that just counts to one. So an edge comes in, it counts to one. On the next edge it resets back to zero. On the next edge it counts to one again, and so on. In digital circuits a one and a zero are represented by high and low voltages, so just like the drawing of the wave, the output of the counter is a square wave. But did you notice it took two edges coming in to do a transition from zero to one and back? So two edges coming in give one edge coming out. A counter that can only count to one is also called a divide by two circuit.

What if we take the output of the VCO into a divide by two, and the output of the divider is now the input to the Phase Detector? Ok, again suppose input is 20 Mhz and VCO is 18Mhz. But the output of the VCO is divided by two, so the Phase detector sees a 9Mhz signal from the counter. The difference between the input and the 9Mhz is 11Mhz, a large difference, and the feedback rapidly drives the VCO up. Suppose it drives the VCO to 20Mhz, now the output of the counter is 10Mhz and the difference is 10Mhz, so there is still a difference signal driving the VCO up. This will continue until the two inputs to the Phase Detector match, that is they



Continued page 11

STILL DON'T PHASE ME NONE! - CONTINUED FROM PAGE 10

are both 20Mz. But because of the counter, the VCO will be at 40Mhz to give a 20Mhz output from the counter. What if we tapped the output of the VCO? We would have a 40 Mhz signal with all the accuracy of the original 20Mhz Crystal Oscillator. And if we used a divide by 3 counter we could get a 60Mhz signal with the same accuracy.

They make counters with multiple outputs, so you could use a switch to pick which divide ratio you want to use, and therefore what frequency will come out of the VCO. This is the basis for a Frequency Synthesizer and was used in many radios in the 70's/80's to control the TR/RX frequency.

Well we have one more circuit to talk about next month, that is DDS or Direct Digital Synthesis.

You may recall from last month that Russ, NR8W, was collecting all comments and complaints on that article. I am sad to announce that Russ got uppity (go figure) and had to be fired. So now comments should be directed to Rose, KD8TII. But just remember she's likely to make them a topic of discussion at the following YL Breakfast!

73, Dave, KD8NZF

7TH ANNIVERSARY HF NET.

I started out on 14.305 MHz (20 Meters) at 10AM. Conditions were not the best, but I was able to make contacts. Around 12 Noon, Rocky, W8RKY, showed up to learn about HF operations. He sat and listened for a while, and then I had him get on the air.

We had a good pipeline to FL with good reports. He made a few contacts and then turned it back to me. I worked stations for a while more then turned it back over to Rocky. Then he was able to work quite a few more contacts. All in all, we had a good time.

When it was done, we had made 125 contacts. We contacted the states of FL, AZ, WA, OK, KS, ND, LA, OR, AR, CA, MT, PR and BC. Not bad for poor conditions using 100Watts and a vertical antenna.

The other person on the air was Mike, KC8UNR on 21.300 MHz (15 Meters) who made a few contacts. The band was really bad.

We all had a FUN time. It is always a good time when you can spend time on the airwaves.

73, Allan, AB8AA



LET'S TALK

Hey Gang,

Have you seen that the NEWEST "Handbook Giveaway" drawing on the website? It's there...!! To enter the drawing all you need to do is fill in a couple of boxes on the form.. (your name and email). That's you need to do to be entered into a drawing to win a 2016 ARRL softcover Handbook. There's nothing else required (Oh.. You do need to be a resident of Ohio to win..) The winner will be mailed the Handbook at my cost. This is being offered just to see how many folks are really checking in on the website. Got the idea? Best of luck to you!!



Are you getting those emails from me? If not, all you have to do is to "Opt-In" to receive them. Heck, just send me an email n8sy@n8sy.com I'll get you added to the mailing list. There's a link to do this on the Ohio Section website, it's on the bottom left corner. For your convenience. Here's a direct link to it: <http://arrl-ohio.org/forwarder/forwarding.html> I urge all of you to make sure that everyone, regardless of whether they are a League member or not, gets signed up for one of these options. You can always "Opt-Out" at any time if you feel this is not what you were expecting.

Let's talk about the Ohio Section website. You can find the Ohio Section Website at: <http://arrl-ohio.org> If you don't have this website set as your home page, I urge you to do so. It changes a lot and it's so important for you to be kept up to date with the very latest information.

On that same subject, there's another NEW one question

questionnaire on the Ohio Section Website! This question is really important for me to know. It will only take about 2 seconds for you to answer it, and you can see how your answer stacks up with others instantly. If you haven't done it yet, please do. I really want to hear from you.

Are you a member of the ARRL?? If you aren't a League member, this is a great opportunity to become one. Want more information on how to join? Here's the link: <http://www.arrl.org/membership-levels>. There's even a 90 day FREE trial that you can apply for if you've never been a member.. Got questions about being a member or what the League is all about? Send me an email n8sy@n8sy.com I'll be happy to call or write to you. We can even meet and have coffee if you'd like, and I'll buy!!

I'm sure all of you have heard me say that I'm always available for you, whether you're an ARRL member or not. It's true, and you can feel free to write or call me anytime. If you have any questions, concerns, or would just like to sit and chat awhile over a cup of coffee or something cold to drink, feel free to call or write me (419) 512-4445 or n8sy@n8sy.com That's going to do it for this month. I hope to see you all at your hamfests, club meetings or on the air!

73, Scott, N8SY
Scott Yonally, N8SY
Section Manager
n8sy@arrl.org



BIRTHDAYS THIS MONTH

KB8VRF Jack Twaddle
WB8LCD Tom Sly
KD8NFD Carol Gottesman



MORE FROM SCOTT - NIMS / ICS TRAINING

Every Ohio ARES member needs to have at least these 4 basic courses completed. Why are these courses so important? The simple answer is this - we need these courses as part of our requirement for our state credentialing system. As you know, the State of Ohio has a credentialing system that we are a big part of, and to obtain your credential when the time is needed, means that you need to have these courses completed and turned in to the database. So, without these courses being completed, you won't be able to get credentialed!



Here's the latest count we have on everyone.. Members included in the database: 629, Members completing NIMS: 415, and Total Courses taken: 4,115

NIMS / ICS Training <<https://training.fema.gov/nims/>>

Hey Gang, get those oh | so important ICS certificates in to me and to your Emergency Coordinator!!

Ok, hold it a minute. I'm sure by now that all of you are sick of seeing this article appear each time I send the updates out. Why in the world am I pushing this so hard? It's this simple. There will be a day when something bad happens, and when that day comes, it will be too late for you to get that training in so that you'll be of use to not only us, but your EMA, Red Cross, Salvation Army or any of the other served agencies.

We have over 28,000 licensed Amateurs in Ohio, of which we have 1,700 that are members of our ARES program. If you look at the numbers below we still have a lot of folks out there that either aren't taking courses, or have not turned in their course certificates yet. WHY? None of us want to be told that we can't participate when something happens, so why let that happen? Please, if you haven't started taking these classes, do so now. If you have, and just haven't turned in your certificates to your E.C. AND me, get it done NOW, before that time comes.

Every Ohio ARES member needs to have at least these 4 basic courses completed. Why are these courses so important? The simple answer is this - we need these courses as part of our requirement for our state credentialing system. As you know, the State of Ohio has a credentialing system that we are a big part of, and to obtain your credential when the time is needed, means that you need to have these courses completed and turned in to the database. So, without these courses being completed, you won't be able to get credentialed!

Here's the latest count we have on everyone.. Members included in the database 631, Members completing NIMS 418, and Total Courses taken 4,131

These are fantastic statistics for sure, and they just keep growing. These numbers were from yesterday and they are already outdated with more coming in. This is the way it should be, but PLEASE, make sure that you get these certificates to your local Emergency Coordinator too.

Stuff

Did you know that this newsletter gets out to more than just the Amateur Radio folks? It does. It's sent out to our partners at the Ohio VOAD (Volunteer Organizations Assisting in Disasters) who in turn send it out to all of their members. Wow.. What a neat way of getting our message out all over the state! Thanks Ohio VOAD!



Interesting thought.. The term HOT WATER HEATER is an oxymoron. If the water is already hot, why do you need to heat it? George Carlin

Remember, life is short, go have FUN..!!

THE TECHNICAL COORDINATOR

On Sunday, February 12, I connected up with the Central Ohio Radio Club located in, you guessed it, central Ohio! They have a Tech Net most Sunday evenings at 7:30pm. They asked me to be the featured guest on one of their nets. Some of you might realize this causes a problem since I live in the Cleveland area. Enter the technical side of the hobby and IRLP. IRLP (Internet Radio Linking Project) is a service that connects amateur stations together using Voice over Internet Protocol (VoIP). Different from other ham radio VoIP services, IRLP requires the Internet link be connected to an RF link, usually a repeater or simplex node. Using the LEARA 146.880 repeater in Cleveland (a club which I'm Vice President and a bunch of other stuff) and Internet linking technology, I was able to join their net as if I were local to Columbus.

The CORC Tech Net contacted me looking for information on technical resources available in the section. I got the chance to do an introduction about myself we'll quickly move past that ;) Then I talked about how the technical resources fit into the ARRL organizational structure. If you're new or haven't looked at it before, at the top are the ARRL Officers: president, first & second vice presidents, COO, etc. The ARRL Board Committees include the Executive Committee, Administration & Finance, Programs & Services, Public Relations, DX, LoTW, etc. Then Divisions, of which there are 15 total, with Director and Vice Director positions. In Ohio, we're included in the Great Lakes Division. Finally, our section is the Ohio Section where Scott - N8SY is our fearless leader and Section Manager (SM).

Below the SM are their appointees who may or may not include (depending on the section): Section Traffic Manager (STM), Section Emergency Coordinator (SEC), Assistant Section Manager (ASM), Official Observer Coordinator (OOC), Technical Coordinator (TC), Affiliated Club Coordinator (ACC), Public Information Coordinator (PIC), State Government Liaison (SGL), Section Youth Coordinator (SYC). If you're reading this, the people above and below me in this Journal make up this list. I won't spend too much time here as details can be found on the "About ARRL" page at <http://www.arrl.org/about-arrl>.

As the Technical Coordinator, I'm responsible for the Technical Specialists. The Specialists and I are here to promote technical advances and experimentation in the hobby. We encourage amateurs in the section to share their technical achievements with others in QST, at club meetings, in club newsletters, hamfests, and conventions. We're available to assist program committees in finding or providing suitable programs for local club meetings, ARRL hamfests, and conventions in the section. When called upon, serve as advisors in RFI issues and work with ARRL officials and appointees for technical advice.

The Technical Specialists really make all this happen. In the Ohio Section, there are about 20 qualified and competent Specialists willing to help. They meet the obligation of advancing the radio art bestowed to us by the FCC. The TS' support the Section in two main areas of responsibility: Radio Frequency Interference and technical information. RFI can include harmful interference (interference that seriously degrades, obstructs, or repeatedly interrupts a radio communication service) from bad insulators on telephone poles to grow lights and poorly made transformers, RFI direction finding, or assist in locating bozo stations. Technical information is everything else from building antennas, repeaters and controllers, digital, computers, networking, and embedded devices.

How can we help? The knowledge and abilities of your Technical Specialists are quite impressive. Here are some examples of the knowledge the Technical Specialists provide:

- * Documentation and training.
- * VHF/UHF portable operation.
- * Antennas (fixed, portable, and mobile).
- * Batteries and emergency power.
- * Experts in RFI from powerline and consumer devices.
- * VHF/UHF/SHF contesting.
- * Experts in test equipment.
- * Automotive electronic compatibility (EMC) and interference (EMI).
- * Repeaters.
- * Digital modes (D-STAR, DMR, Fusion, P25, APRS & IGates. HF: MT63, JT65, Olivia, PSK).
- * Computers and networking (VoIP AllStar link, software engineering, embedded systems Raspberry Pi, Arduino).
- * Society of Broadcast Engineers (SBE) members knowledgeable in interference problems.

Continued page 15

THE TECHNICAL COORDINATOR - CONTINUED FROM PAGE 14

This impressive list of qualifications is available to all in the Ohio Section. Looking for help in one of these areas? Feel free to contact myself. My contact info is near my picture and on the arrl-ohio.org website. I'll try to assist or get some more information from you and put you in touch with an appropriate Technical Specialist. One of the Specialists might hear a plea for help and reach out to you as well. If you would like to add your talents, check out the description at the ARRL site: <http://www.arrl.org/technical-specialist> and talk to Scott or myself.

Thanks again to CORC (<http://corc.us/>) for inviting me as the featured guest on their Tech Net and LEARA (<http://www.leara.org/>) for the use of the IRLP node to make this connection possible.

That's about it for this month. Stay tuned for next month's article, got something good planned. Thanks for reading and 73...

de Jef, K8JTK
THE TECHNICAL COORDINATOR
Jeff Kopcak, TC
k8jtk@arrl.net
<https://www.jeffreykopcak.com/>



Amateur Radio Operator "Amateur means we're simply professional volunteers" ARRL reflector



POSSIBLE NEW ENTRY LEVEL LICENSE

ARRL Seeks Opinions Concerning Possible New Entry Level License (from ARRL Bulletins)

An Entry Level License Committee was established by the ARRL Board of Directors and appointed in September 2016. As part of its ongoing work, the committee is gathering member input and will make recommendations to the Board for possible rules changes to submit to the FCC.

The result could mean changes to the Technician license, but it could also be an additional, but simpler, license with privileges that would give a newcomer a taste of most facets of ham radio from HF to VHF and UHF.

The committee has created an online member survey. Please complete and submit the survey no later than April 7, 2017. Survey results will be published.



Trivia -

On This Day.2/10. The Boston Molasses Disaster happened in 1919 in the United States. A large molasses storage tank burst, and a wave of molasses rushed through the streets, killing 21 and injuring 150. The event has entered local folklore, and for decades afterward residents claimed that on hot summer days the area still smelled of molasses.

Remember, life is short, go have FUN..!!
73, Scott, N8SY..
ARRL Ohio Section
Section Manager: Scott D Yonally, N8SY
n8sy@arrl.org

LEARNING MORSE CODE WITHOUT TRYING

Researchers have developed a system that teaches people Morse code within four hours using a series of vibrations felt near the ear. Participants wearing Google Glass learned it without paying attention to the signals -- they played games while feeling the taps and hearing the corresponding letters.

<https://www.sciencedaily.com/releases/2016/10/161028115427.htm>

It's not exactly beating something into someone's head. More like tapping it into the side. Researchers at the Georgia Institute of Technology have developed a system that teaches people Morse code within four hours using a series of vibrations felt near the ear. Participants wearing Google Glass learned it without paying attention to the signals -- they played games while feeling the taps and hearing the corresponding letters. After those few hours, they were 94 percent accurate keying a sentence that included every letter of the alphabet and 98 percent accurate writing codes for every letter.

This is the latest chapter of passive haptic learning (PHL) studies at Georgia Tech. The same method -- using vibrations while participants aren't paying attention -- has taught people braille, how to play the piano and improved hand sensation for those with partial spinal cord injury. The PHL projects are all led by Georgia Tech Professor Thad Starner and his Ph.D. student Caitlyn Seim. The team decided to use Glass for this study because it has both a built-in speaker and tapper (Glass's bone-conduction transducer).

In the study, participants played a game while feeling vibration taps between their temple and ear. The taps represented the dots and dashes of Morse code and passively "taught" users through their tactile senses -- even while they were distracted by the game. The taps were created when researchers sent a very low-frequency signal to Glass's speaker system. At less than 15 Hz, the signal was below hearing range but, because it was played very slowly, the sound was felt as a vibration.

Half of the participants in the study felt the vibration taps and heads a voice prompt for each corresponding letter. The other half -- the control group -- felt no taps to help them learn. Participants were tested throughout the study on their knowledge of Morse code and their ability to type it. After less than four hours of feeling every letter, everyone was challenged to type the alphabet in Morse code in a final test. The control group was accurate only half the time. Those who felt the passive cues were nearly perfect. The research was recently presented in Germany at the 20th International Symposium on Wearable Computers.

"Does this new study mean that people will rush out to learn Morse code? Probably not," said Starner. "It shows that PHL lowers the barrier to learn text-entry methods -- something we need for smartwatches and any text-entry that doesn't require you to look at your device or keyboard." Previous research on PHL used custom hardware to provide the tactile stimuli, but here researchers use an existing wearable device.

"This research also shows that other common devices with an actuator could be used for passive haptic learning," he says. "Your smartwatch, Bluetooth headset, fitness tracker or phone." "In our Braille and piano PHL studies, people felt vibrations on their fingers, then used their fingers for the task," said Seim.

"This study was different and surprising. People were tapped on their heads, but the skill they learned was using their finger."

Seim's next study will go a step further, investigating whether PHL can teach people how to type on the trusted QWERTY keyboard. That would mean several letters assigned to the same finger, rather than using only one finger like Morse code.

Story Source: Materials provided by Georgia Institute of Technology. Note: Content may be edited for style and length.

Georgia Institute of Technology. "Learning Morse code without trying: New study demonstrates silent, eyes-free text entry." ScienceDaily. ScienceDaily, 28 October 2016.

<www.sciencedaily.com/releases/2016/10/161028115427.htm>.



LETS LEARN CW TOGETHER



Welcome to Lets Learn CW Together, a group dedicated to working together to improve their CW skills.

We will meet every Saturday morning at 10 A.M. beginning February 11 and running through the month of March. We will be meeting at the West Side Community Center. 304 Matta Ave. Youngstown 44509. Matta is right off Mahoning Ave. across from West Side Merchants. Just go all the way down on the right side. It's behind McGuffey Elementary School. We will monitor the 146.745 repeater if you need help finding us.

I have attached a couple documents for your review.

For the first session be sure to bring pencil or pen and paper. If you have a laptop bring it if you have the G4FON software installed or we can help you install it at the session.

Here is a how to install the software we will be using: Go to <http://www.g4fon.net/>

On the right side of the page, click on the link Koch CW Trainer Version 9

In the middle of the page click on the link to download version 9 and save it to your hard drive.

Execute the file you just saved and install the software.

Once installed start the program, click on "about" in the upper left corner for directions on usage.

Have fun! If you have any questions please email me.

73 Rich, KB8GAE
KB8GAE@yahoo.com

**There are worse things than getting a call for a wrong number at 4 a.m.
for example, it could be the right number.**

A few days ago I was having some work done at my local garage.
A blonde came in and asked for a seven-hundred-ten.
We all looked at each other and another customer asked, 'What is a seven-hundred- ten?'
She replied, 'You know, the little piece in the middle of the engine, I have lost it and need a new one.'
She replied that she did not know exactly what it was, but this piece had always been there.
The mechanic gave her a piece of paper and a pen and asked her to draw what the piece looked like.
She drew a circle and in the middle of it wrote 710. He then took her over to a car just like hers which had its hood up and asked 'is there a 710 on this car?'.
She pointed and said, 'Of course, its right there.' the mechanic fainted
If you're not sure what a 710 is . . .



The Birth of 33

Clara had her ticket
 She also had a rig
 Because she was just startin
 It wasn't very big
 She slowly tuned the crystal,
 And watched the meter drop.
 Then tapped the key a couple times
 To be sure it wouldn't stop.
 Now everything was ready,
 She called a short CQ
 And received an answer
 On thirty-six sixty -two.

They chewed the fat "bout stuff and things."
 bout dresses, work and dates.
 They finally called it QRT
 the girl sent eighty-eights
 Clara though it might be funny
 Whether it be Miss or Mrs.
 To end a perfect QSO
 by sending "Love and Kisses"
 It sounds too sentimental;
 Just a little too much "goo
 To be sending "Love and Kisses"
 to a girl the same as you.

For an entire week she pondered;
 Wouldn't even touch the rig.
 She pushed her slide rule by the hour,
 Employing "logs" and "trig"
 She added and subtracted.
 What could the answer be?
 To reach a happy medium
 Twixt eighty-eight and seventy-three.
 Clara finally looked up from her work
 All smiles and not forlorn.

Twas July in Nineteen Forty
 that thirty-three was born.
 There's no real definition
 Bit it's meaning is known well.
 It's how a YL says good evening
 To another friend YL.

Author Unknown.

No trees were killed to bring you this News Letter,
 but millions of electrons were terribly inconvenienced.



FEBRUARY MEETING



Our Speaker: Bob Dukis, KK8DX

FEBRUARY TEST SESSION



March 2017 CALENDAR

PREPAREDNESS LEADS TO READINESS - MATT W8DEC



Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3 WRARC Net 9:00PM 145.270 Swap n' Shop Ask the Elmers	4
5	6 ARES Net 8:30 PM 146.745 PL 110.9	7 Skywarn Training Warren 	8 Skywarn Net 8:30 P.M. 146.745	9	10 WRARC Net 9:00PM 145.270 Swap n' Shop Ask the Elmers	11
12 Daylight Saving Time 	13	14 Ham Breakfast Eat'n Park Boardman 8:30 A.M. Board Meeting Eat'n Park Auatintown 7:00 P.M.	15	16	17 WRARC Net 9:00PM 145.270 Swap n' Shop Ask the Elmers	18 St.Patrick's Day 
19  WaveBender Articles Due	20 ARES Net 8:30 PM 146.745 PL 110.9 	21 WRARC Meeting 7:00 P.M.	22	23	24 WRARC Net 9:00PM 145.270 Swap n' Shop Ask the Elmers	25
26	27	28 Eat'n Park Boardman 8:30 A.M. Ham Community Breakfast 	29 Skywarn Training Lisbon 	30	31 WRARC Net 9:00PM 145.270 Swap n' Shop Ask the Elmers	