



THE

January 2017

# PROPAGATOR

The Monthly Newsletter of the South Orange Amateur Radio Association

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## Meeting

Jan. 23, 2017

7:00 PM

N.P.  
Murray Center  
Veterans  
Way  
Mission Viejo

## SOTA — Summits on the Air

All are welcome to the next SOARA general meeting on Monday, January 23 at 7pm at the Norman P Murray center in Mission Viejo. This month's speaker is Paul Gacek, W6PNG, with a presentation about Summits on the Air (SOTA), the ARRL National Parks on Air (NPOTA), hiking and photography. An amateur radio testing session will start prior to the meeting at 6pm.



If we have any directors who are considering not running for re-election then we need to find replacements for them.

Please support your club. We can only survive from the efforts of our volunteers and I don't think any of us are getting younger. It's a rewarding experience and you will gain insight to the inner workings of SOARA.

Prior long service in SOARA is not required. Some of us volunteered in our first year in SOARA.

-Heiko, AD6OI, & Mike, K6MSM,  
Communications & Publications Directors.

## President's Message

Welcome to the New Year with SOARA! As your club's president, one of my responsibilities is to set direction and to guide the club throughout the year. Recently, with input from your Board, I have identified the four following goals and objectives that we'll be working to facilitate and implement in 2017.

**First**, we will be working to complete the transition of SOARA to an IRS 501 C-3, charitable organization. Currently we are incorporated as a 501 C-7, social organization. The major difference between C-7 and C-3, is that as a C-3 organizations, donations to the organization are tax deductible to the donor. This change will not only benefit member donors, but will also help the club with fund raising by providing donor incentives.

**Second**, we need to further research, design, and implement an inter-site linking system to enable us to link all 4 of our repeater

*(Continued on page 3)*

## SOARA Needs You!

We (SOARA) are looking for an Activities Director to take charge of our special events, Field Day, the Picnic, and the Holiday Party.

Communications is looking for one more Tuesday night net operator to handle one week per month.

We are also looking for someone to help out with the Sunday morning 40m net.



**Quartzfest**  
Jan 22-28

**SOARA Meeting**  
Jan 23

**SOARA Saturday**  
Jan 28

**Palm Springs Hamfest**  
Feb 4

**Yuma Hamfest**  
Feb 17-18

## VEC License Exams

6pm—before the General Meeting

Please see our [website](#) for more info.

Walk-ins ok.

Extra | General | Technician

## Open Source Codec Encodes Voice Into Only 700 Bits Per Second

Longtime Slashdot reader Bruce Perens writes: David Rowe VK5DGR has been working on ultra-low-bandwidth digital voice codecs for years, and his latest quest has been to come up with a digital codec that would compete well with single-sideband modulation used by ham contesters to score the longest-distance communications using HF radio. A new codec records clear, but not hi-fi, voice in 700 bits per second -- that's 88 bytes per second. Connected to an already-existing Open Source digital modem, it might beat SSB. Obviously there are other uses for recording voice at ultra-low-bandwidth. Many smartphones could record your voice for your entire life using their existing storage. A single IP packet could carry 15 seconds of speech. Ultra-low-bandwidth codecs don't help conventional VoIP, though. The payload size for low-latency voice is only a few bytes, and the packet overhead will be at least 10 times that size.

## SOARA Saturday January Report

Many enjoy this informal hands-on educational environment. It's easy to walk around and ask questions and see things work. So, attend, ask questions, have fun, share your experiences, and knowledge. SOARA will provide [coffee and donuts](#).

### Past, November SOARA Saturday:

Many attended and we practiced t-hunting around the Murray center with our hand-built tape measure antennas as well as commercial antennas. Finding the T was more difficult than I thought. Learning how to use my equipment was half the problem. Hint, check out your equipment ahead of any t-hunt. Erik, KK6UZS, hid the T for the first hunt and then I hid the T for Erik. Thank you Erik for helping to make a fun Saturday morning.

### Future, SOARA Saturdays:

January 28, Murray Center 9am-noon, **QRP radio**. Check out the pixie kit if built one in the past SOARA Saturday when you learned to solder. Or, bring your QRP radio equipment and share your experiences. I expect to bring several built radio kits including some tuna cans from [www.qrpme.com](http://www.qrpme.com).

- March 4, DMR, Murray Center, 9am to noon, **DMR Radio**, Mikkel NR6E will present and demo DMR radio. Bring your DMR radio and share your experiences.
- Suggestions are welcome for future Saturdays. I'm thinking we build a Harbor Freight DMM signal strength meter? Contact: Ed Barnes, WA6ED, [WA6ED@soara.org](mailto:WA6ED@soara.org)

## Director of Communications Report

First off our first special event went off in spite of wet and muddy conditions this morning in O'Neill Park. Our operators, Mike K6MSM, Eric KK6UZS, Scott K6WHC, Patti AD6OH, and myself had a good time there. Several of us went to breakfast afterwards.

We have a good set of net controls for our nets but are always willing to add some more. If you are interested in either the Tuesday 8pm VHF/UHF net or the Sunday Morning 8am 40m net please get in touch with me.

Our 447.180 repeater is starting to see some more traffic but our other repeaters could use more support, feel free to shift over to one of the other repeaters if you want to have more than just a short conversation. Our high level 224.640 repeater as just as good coverage as the 447.180 machine, and our lower level machines cover all of the OC very well. For more information look in the members handbook or on our website.

I have mentioned that I would like to try a 10 meter net for our HF operators who might have a hard time with our current 40m net on Sunday mornings.

If you have any interest please e-mail me at [<AD6OI@soara.org>](mailto:AD6OI@soara.org) Thanks, Heiko

## Silent Key

It is with great regret that I tell you Jim Dixon WB6NIL passed away on December 15th. Jim and I became friends through the AllStar project many years ago. Jim was a very smart guy. Probably one of the brightest people I ever knew. Of course, Jim was the main developer of app\_rpt, the radio over IP application for Asterisk known as AllStar. Jim loved to talk story about a wide variety of subjects. I loved his sense of humor which was etched into many of his circuit board designs, commented in his C code and boldly displayed on his web site. His passing is a great loss in many ways.

The AllStar project will continue. There is a small group (which I am a part of) headed up by Steve Zingman N4IRS which is insuring the longevity of AllStar. The transition to this new management is moving smoothly. There will be a migration to new core AllStar servers. Our repeaters, our linking and our servers have very little to do with the AllStar core servers due to the distributed nature of AllStar. Even if there were a core outage our repeaters would continue to work standalone and could be linked with little or no locally performed reconfiguration.

Jim's passing is very sad indeed. But we can take solace knowing that Jim is in a better place and that he will be pleased knowing his legacy will continue.

-Tim Sawyer

*(Continued from page 1) - **President's Message***

sites together. This will allow us to tie several or all of our repeaters together for nets or emergency operations. Equally, if not more important, this system must be designed to give us positive remote control of the radios on the sites, as required by the FCC. Currently we use telephone lines to each site to provide this control function, but phone line charge increases have become a large portion of our annual budget expenditures.

**Third**, we need to rewrite, renew, and establish agreements, known as Memorandums of Understanding, or MOU's with the several EmComm groups that rely on SOARA's repeaters for communications. The landscape in terms of EMComm groups has changed over the last few years as new groups have come online, and others have waned, so old agreements and understandings may no longer be optimum. The objective of these agreements is to minimize confusion and congestion while maximizing efficient use of our repeaters, especially during an area-wide emergency or disaster.

**Finally**, perhaps the most important goal is to establish active member committees to assist SOARA in achieving all of the above. We want to increase the opportunities for members to participate and take an active role in keeping the club in the forefront of ham radio clubs in the section, state and division.

I encourage everyone to think about these goals and objectives, come up with ideas and suggestions to help us accomplish them, and of course join the committees that will enable us to accomplish this together. See me or any of the club officers or directors to lend a hand, and identify a committee where you may want to help out.

Thanks and best 73 for 2017,

-Ray, AE6H



### The K7RA Solar Update 1/20/17

Last week's bulletin featured zero sunspots for the entire seven days. This week (January 12-18) the average daily sunspot number rose to 22.6.

Average daily solar flux rose from 72.5 to 77.1. Average planetary A index declined from 14.3 to 6.

Predicted solar flux is 80 on January 20-23, then 78, 77 and 75 on January 24-26, 77 on January 27 through February 1, 76 on February 2, 75 on February 3-8, 76 on February 9, 77 on February 10-14, 78 on February 15, 80 on February 16-21, 78 on January 22, and 77 on January 23-28.

[WM7D's Solar resource Page](#)



**DX Operations:**  
[www.ng3k.com](http://www.ng3k.com)

**ARRL HF Propagation Charts**  
[Charts](#)

## Request for Bouvet DXpedition-2018 Financial Support

An experienced DXpedition team of 20 operators are in the advanced planning stages of a DXpedition to Bouvet Island (3YØZ). The DXpedition is scheduled for early 2018. This DXpedition may be the most expensive DXpedition ever! Bouvet Island is known as "The Most Isolated Island on Earth", and is currently ranked #2 on the ClubLog's "most wanted" list.

The DXpedition leaders are: Erling – LA6VM, Bob – K4UEE, and Ralph – KØIR. This is the same leadership team that brought you 3YØX-Peter I Island, K5D-Desecheo Island, HKØNA-Malpelo Island, FT5ZM-Amsterdam Island and, most recently, K1N-Navassa Island.

We have an extraordinary international team of 20 operators. These team members collectively have been part of scores of DXpeditions and have handed out an amazing 4,600,000 QSOs. The Antarctic and harsh climate experience of this team includes Heard Island, South Sandwich (twice) South Georgia (twice), the South Orkneys, and Peter I (twice). Non-Antarctic DXpeditions with these team members include places like Amsterdam Island, Malpelo, Navassa, Desecheo, Bhutan, Saba, Easter Island, Wake Island, Palmyra, Reunion, Midway, Kure, Fiji, Swains, Baker Howland, Conway Reef, Kingman Reef, Eritrea, Lakshadweep, Svalbard and others.

We have all the permits necessary for landing on Bouvet Island, establishing a camp and setting up our ham radio equipment and antennas. We first applied for a permit after 3YØX, so we have been working on this project for ten years. We now have the right combination of a ship, a helicopter, and a workable financial plan. Everything is in place except our financing. This is where we need your support---the support of your Club and individual members.



The DXpedition team expects to be away for about 7-8 weeks. The voyage to Bouvet will require about two weeks as will the return. We plan to be at the island for three weeks and weather permitting, expect to be on the air for 14-16 days. We will transport our team and equipment ashore by helicopter, setting up on the Slakhallet Glacier at approximately 200 meters ASL. This location is on the northeastern part of Bouvet. This area will maximize our ability to work all continents. We have deliberately chosen not to do a beach landing and operation, since beach landings are extremely hazardous and beach locations do not give clear, unobstructed paths to major population areas. Also, the Nyroysa site used by previous DXpeditions has been declared off-limits by the Norsk Polar Institute.

This will be an all-band, all-mode DXpedition with stations on every open band. Antennas will include Yagis for the high bands and verticals for the low bands. We will run maximum legal power. Our primary station and hardware sponsors are Flex Radio Systems and DX Engineering. We are aware that the low bands will be of great importance, therefore Nodir – EY8MM is working with other low band enthusiasts from around the world to maximize our footprint on these bands. At a minimum, our station count will be nine with reserves in place. We believe we will be able to do EME without compromising resources on the HF bands.

Our QSL manager will be N2OO and his SJDXA crew. We will have an on-line log and submit our logs to LOTW within six months after our return.

Our total budget for this DXpedition is \$610,000. As with our previous DXpeditions, the team is committed to paying 50% of the expenses. The upfront cost for each operator is projected

*(Continued on page 6)*



### Membership Report

We now have 179 paid members and 49 unpaid. This is great progress. If your dues are unpaid and you want to continue your membership please pay your dues as soon as possible. As usual, we will make all unpaid members inactive just before the election.

Let me know if you need a new badge or a membership handbook. Also, many board members now have extra handbooks to make access even easier. Suggestions to make SOARA better are welcome too.

Contact:

Ed Barnes,  
WA6ED  
[member-ship@soara.org](mailto:member-ship@soara.org).

Now Pay Dues Online  
Just [Click Here](#) 

## Ham radio users can use hands

[Rules restricting cellphone use for drivers don't apply to CBers.](#)

**Q.** I agree with the texting-while-driving law. However, it goes too far. What about amateur radio and citizens band operators? I am a ham, and have been communicating this way from my vehicle for over half a century with no issues. Many hams are involved in emergency-communication drills and actual situations on a regular basis. A call to the American Radio Relay League indicated that, yes, I could go ahead and talk, but I could be ticketed for it regardless of the situation. They also said that I would probably prevail in court. What is your take?

– Thomas Baldwin, Anaheim

**A.** Honk's take doesn't matter, Thomas, but **Tino Olivera's** does.

He is a spokesman for the California Highway Patrol and, more importantly, an officer with a citation pad.

"The recent law only applies to cell phones," he said about the one that as of Jan. 1 makes it illegal to have a cell phone in a hand while driving and talking. "They can still use it," the good officer added, talking about all you hams and CBers.



## OC Winter Trail Run Series

**HEAT UP YOUR WINTER!** The OC Chili Winter Trail Run Series will keep you fit and well fed this winter! A beautiful 5 mile, 7 mile or 10 mile train run through O'Neill Regional Park, high quality t-shirt, and post race chili is included in registration!

If you wish to participate on the 2/25 and 3/25 runs, please contact Heiko at [ad6oi@soara.org](mailto:ad6oi@soara.org).

See the picture to the right from the January Installment of the race. Dress in layers for this event!



*(Continued from page 4)*

to be a minimum of \$15,000 plus travel to and from our embarkation and disembarkation point, likely to be Punta Arenas, Chile.

Club/Foundation and individual donors can be seen on our website: [www.bouvetdx.org](http://www.bouvetdx.org)

All donors will be acknowledged on our website. Clubs will have their logos posted with major contributors receiving proportionately more space. The contribution required for your logo on our QSL card is a minimum of \$500. For your club's name on the QSL the minimum is \$250. Individual DXer's contributions of \$100 or more will be listed on the QSL card.

We encourage you to visit the Bouvet Island website (<http://www.bouvetdx.org>) and donate via the PayPal link. It's free and easy -- and you can contribute with a major credit card, even without a PayPal account. If that is not convenient, you may make a check or money order payable to DX Expeditions, Inc. - Bouvet and mail to Bob Allphin-K4UEE the address shown below. Remember to put your club's name or your callsign on the "for" line.

Please make your check to: DX Expeditions, Inc. – Bouvet and mail the check to:  
Bob Allphin-K4UEE  
4235 Blackland Dr.  
Marietta, GA 30067

If any members of your club have questions, I would be happy to address them personally. Our team would be honored to be considered for your support of the Bouvet Island DXpedition-2018.

73 and great DXing, Bob Allphin-K4UEE

## New “Amateur Radio Parity Act” Bill Introduced in US House of Representatives

01/16/2017

**H.R. 555** — a new “Amateur Radio Parity Act” bill — has been introduced in the U.S. House of Representatives. The bill's language is identical to that of the 2015 measure, H.R. 1301, which passed in the House late last summer but failed in the waning days of the US Senate to gain the necessary support. As with H.R. 1301, the new measure introduced on January 13 in the 115th Congress was sponsored by Rep. Adam Kinzinger (R-IL), with initial co-sponsorship by Rep. Joe Courtney (D-CT) and Rep. Greg Walden, W7EQI (R-OR). Walden now chairs the House Committee on Energy and Commerce, to which the new bill has been referred. H.R. 555 will get an initial airing in the Subcommittee on Communications and Technology. When H.R. 1301 came up in committee, Walden spoke forcefully in favor of the measure, which ultimately attracted 126 House cosponsors.

“Rep. Kinzinger has again stepped forward to introduce this important legislation,” said ARRL CEO Tom Gallagher, NY2RF. “His commitment stems from exposure to what the Amateur Radio community brings to the service of all communities. The ARRL and radio amateurs nationwide owe Rep. Kinzinger a resounding ‘Thank You!’ for his efforts on their behalf.”

H.R. 555 calls on the FCC to establish rules prohibiting the application of deed restrictions that preclude Amateur Radio communications on their face or as applied. Deed restrictions would have to impose the minimum practicable restriction on Amateur Radio communications to accomplish the lawful purposes of homeowners association seeking to enforce the restriction.

The ARRL Board of Directors is expected to discuss the pending legislation when it meets January 20-21.

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
General Meeting 7:00 PM	23	27	20	17	15	19	17	21	18	16	20	-
Program	SOTA	TBD	TBD	TBD	<a href="#">Spring Auction</a>	<a href="#">Field Day Prep</a>	TBD	<a href="#">SOARA Fair</a>	TBD	TBD	<a href="#">Fall Auction</a>	-
VE Testing	23	27	20	17	15	At Field Day 24	17	21	18	16	20	--
Educational Classes	21	25	18	15	13	17	15	19	16	14	18	-
SOARA Saturdays (9am)	28	Mar 4	25	22	20	-	-	-	-	21	25	-
SOARA T-Hunt	8	5	5	2	7	4	2	6	3	1	5	3
Board Meeting	30	Mar 6	27	24	22	26	24	28	25	23	27	-
Special Events	<a href="#">Quartzfest</a> 22-28	<a href="#">Yuma Hamfest</a> 17-18	<a href="#">Palm Springs Hamfest</a> Feb 4	<a href="#">Visalia Intl DX</a> 21-23	<a href="#">Dayton Hamvention</a> 19-21	<a href="#">ARRL Field Day</a> 23-25	HRO Ham Jam	<a href="#">SOARA Picnic</a> 6		<a href="#">JOTA</a>		<a href="#">SOARA Holiday Party</a> TBD
Ham-Related Swap Meets	<a href="#">TRW</a> 28 <a href="#">C.A.R.S.</a> 21	25 18	25 18	29 15	27 20	24 17	29 15	26 19	30 16	21 28	25 18	30 16
Major HF Contests		<a href="#">ARRL DX-CW</a> 18-19 <a href="#">CQWPX RTTY</a> 11-12	<a href="#">ARRL DX-SSB</a> 4-5 <a href="#">CQWPX SSB</a> 25-26		<a href="#">CQWPX CW</a> 27-28	<a href="#">ARRL Field Day</a> 24-25			<a href="#">CQWW RTTY</a>	<a href="#">CQWW SSB</a>	<a href="#">CQWW CW</a>	
Volunteer Events	<a href="#">OC Chili Run</a> 21	<a href="#">Paws Fur Pink</a> 26 <a href="#">OC Chili Run</a> 25	<a href="#">OC Chili Run</a> 25 <a href="#">Baker to Vegas</a> 25-26	<a href="#">Desert Storm Rally</a>	<a href="#">HD Trails</a> <a href="#">OC Marathon</a> 7 <a href="#">Memorial Day 1/2 Marathon</a> 29	<a href="#">ARRL Field Day/Setup/Ops/Clean</a> 23-25	4th of July Fire-works 4			<a href="#">Vision Quest</a>		<a href="#">Run for a Claus</a>

\*Dates subject to change. Check the [SOARA website](#) to verify locations and times.

**SOARA** meets at the [Norman P. Murray Center](#), 24932 Veterans Way, Mission Viejo, CA on the third Monday of every month at 7:00 PM. For the months of January and February the third Monday is a holiday and the meeting is held on the fourth Monday.



**License Exams:** Amateur License Exams are given prior to SOARA meetings, except June. **Exams are at 6pm.** Prior registration is not required and walk-in applicants are welcome. For June, exams are held at Field Day. For further information, email Sean Reigle, AJ6B, at [aj6b@soara.org](mailto:aj6b@soara.org).

**SOARA Library:** SOARA has many amateur radio related books such as hand books, books about electrical theory, etc. available to lend out to club members. Contact Heiko Peschel [ad6oi@soara.org](mailto:ad6oi@soara.org) for more info.

**Web Site:** SOARA maintains a web site with current club information. The URL is: <http://www.soara.org/>

**Repeaters:** The Laguna Beach, San Clemente, and Trabuco repeaters are open. The Santiago Peak repeaters are closed. For details or questions on the repeaters contact the repeater director, or [repeater@soara.org](mailto:repeater@soara.org).

	2m — 147.645 — (110.9)	Laguna Beach
	2m — 146.025 + (110.9)	San Clemente
	2m — 145.240 — (110.9)	Trabuco
D-STAR	2m — 146.115 + (K6SOA C)	Laguna Beach
	220 — 224.100 — (110.9)	Laguna Beach
	220 — 224.640 — (123.0)	Santiago Peak. (C)
	440 — 445.660 — (110.9)	Laguna Beach
D-STAR	440 — 445.705 — (K6SOA B)	Laguna Beach
	440 — 447.180 — (131.8)	Santiago Peak. (C)
D-STAR	1.2G 1282.600 — (K6SOA A)	Laguna Beach

#### **Nets:**

UHF/VHF (447.180, 147.645 & 224.640): Tuesdays @ 8:00PM

D-STAR (146.115 C module):  
Wednesdays @ 7:30PM

40 meter HF (7.200 MHz +/- for QRM), Sundays @ 8:00AM.

Gordo HF (7.250 MHz +/- for QRM), Weekdays @ 8:30AM



#### **SOARA OFFICERS**

**President:** Ray Hutchinson, AE6H 949-322-8468  
[ae6h@soara.org](mailto:ae6h@soara.org)

**V.P.:** Sean Reigle, AJ6B 714-261-1717  
[aj6b@soara.org](mailto:aj6b@soara.org)

**Secretary:** Lambert Matias, KK6WOW 312-545-2270  
[kk6wow@soara.org](mailto:kk6wow@soara.org)

**Treasurer:** Lori Carey, KK6ORR 949-444-8190  
[kk6orr@soara.org](mailto:kk6orr@soara.org)

#### **SOARA DIRECTORS**

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[nj6n@soara.org](mailto:nj6n@soara.org)

**Publications:** Mike Mahan, K6MSM 949-279-9936  
[k6msm@soara.org](mailto:k6msm@soara.org)

**Membership:** Ed Barnes, WA6ED 949-468-7706  
[wa6ed@soara.org](mailto:wa6ed@soara.org)

**Education:** Steve Kuver, K6UVR 949-874-1972  
[k6uvr@soara.org](mailto:k6uvr@soara.org)

**Technical:** Tom Hobbs, AE6SH 949-830-8131  
[ae6sh@soara.org](mailto:ae6sh@soara.org)

**Communications:** Heiko Peschel, AD6OI 949-859-3868  
[ad6oi@soara.org](mailto:ad6oi@soara.org)

#### **SOARA APPOINTMENTS**

**Past President:** Tom Hobbs, AE6SH 949-830-8131  
[ae6sh@soara.org](mailto:ae6sh@soara.org)

**Activities:** *[Open]*—*Please contact us ([board@soara.org](mailto:board@soara.org)) if you are interested.*

**S. Saturdays:** Ed Barnes, WA6ED 949-468-7706  
[wa6ed@soara.org](mailto:wa6ed@soara.org)

**Raffle:** Hal Silverman, WB6WXO 714-897-5002  
[wb6wxo@soara.org](mailto:wb6wxo@soara.org)

**Testing:** Sean Reigle, AJ6B 714-261-1717  
[aj6b@soara.org](mailto:aj6b@soara.org)

**Website:** Sean Reigle, AJ6B 714-261-1717  
[aj6b@soara.org](mailto:aj6b@soara.org)

**Ambassador:** Spencer Ammermon, NG6K *[In England]*  
[Blog](http://ng6k@soara.org)  
[ng6k@soara.org](mailto:ng6k@soara.org)



**Ham Radio 101**  
**HW32A Hybrid**  
**Progress Report**  
**By Hal Silverman WB6WXO**

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It is no secret that my expertise dates back to the 1960s through the 1980s. I am more comfortable with those things that keep you warm on cold winter nights: vacuum tubes.

Several years ago, I wanted to put my hand on these things called transistors. I became convinced that you could replace vacuum tubes with both bipolar transistors and FETS.

I looked at the HW32A as a vehicle to try my hand at this. If you looked at the schematics from Heathkit, you see that you can put together almost all stand-alone circuits.

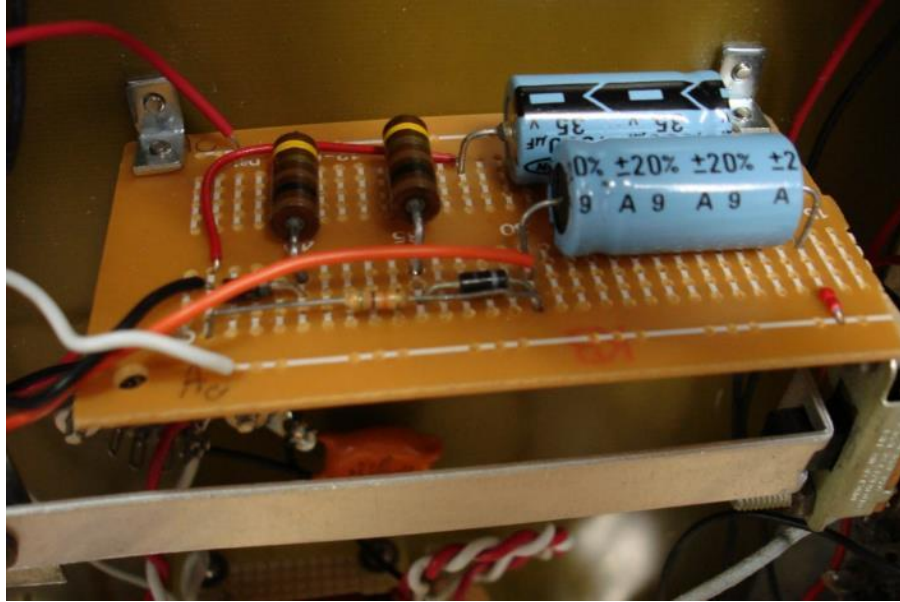
As with the HW22A that I reported on in the last article, there are 4 oscillators in the HW32A. The carrier oscillators for USB and LSB are the same as in the 22A.

What I want to do in this article is to review what has been done and what will be done for the next progress report.

Since the HP23A filament supply is lightly loaded, I used this to create two DC power supplies. I have made a 24V supply using a voltage doubler and a 12V supply with a bridge rectifier and a pass transistor.

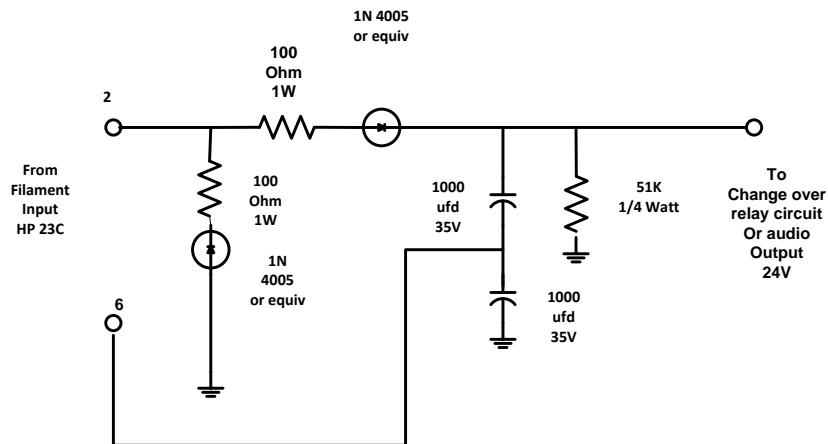
The pass transistor is a bipolar 2N3053. It can comfortably handle one watt power dissipation.

There is also a bleeder resistor in case the 2N3053 fails “open”. The bleeder gives a path for the filter capacitor to discharge.



**Figure 1**

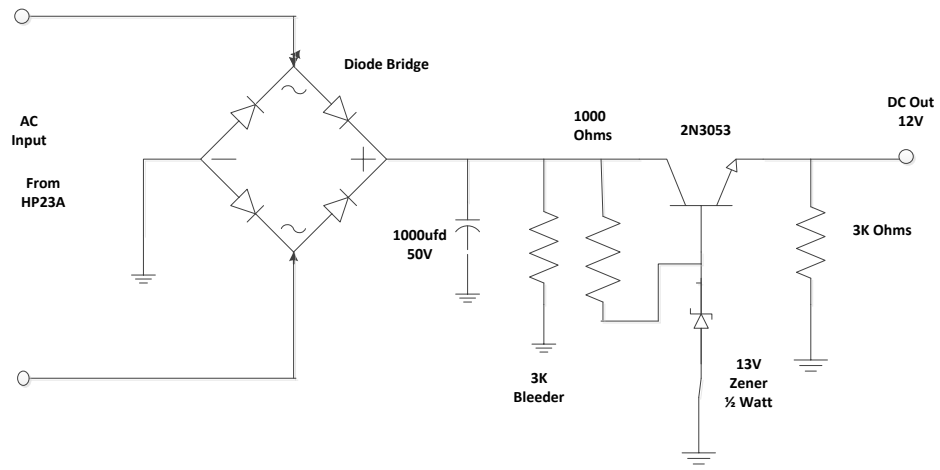
**24V DC Voltage doubler**



Heath Hybrid HW32A  
Voltage Doubler  
Rev A  
Revised 01/02/2017

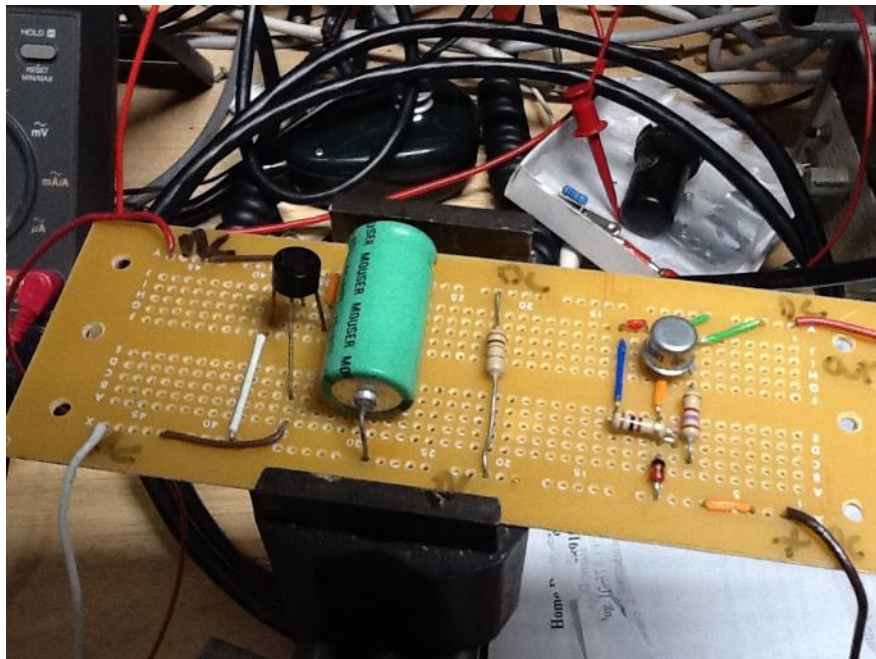
**Figure 2**

**Schematic Diagram 24V Doubler**

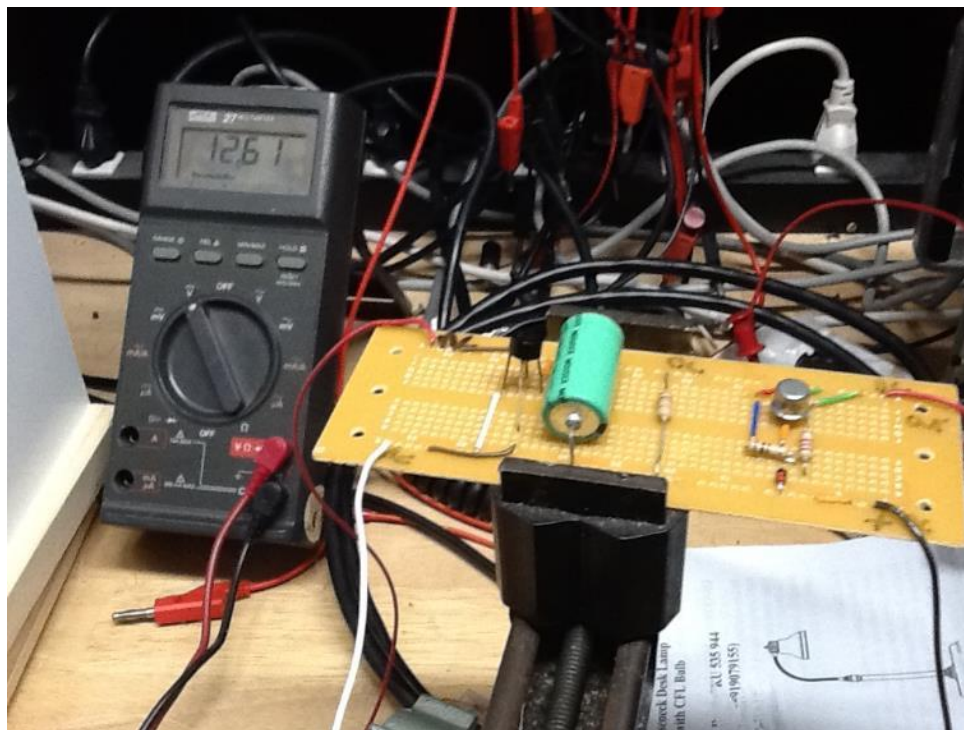


12V DC Power Supply  
01/02/2017

**Figure 3**  
**12V DC Power Supply**



**Figure 4**  
**12V DC Power Supply~ Assembly & Layout**



**Figure 5**

**12V DC Power Supply with Meter.**

It is noted here that there are several ways to build a 12Vdc power supply. I could have used a LM240-12 or a LM317 three terminal regulators. I chose to have a little tutorial in the article.

I wanted to look at another subassembly that has been built and tested. I have built and tested the heterodyne oscillator. This is a crystal controlled oscillator that forms part of the frequency determining signal to get to the 20M band.

The oscillator frequency is 18.275 MHz. The crystals are available from International Crystal in Oklahoma.

Instead of using a tube, I have substituted a 2N5484 FET. The biasing resistors have been trimmed for the lower voltage. L5 and the RFC were cannibalized from a Junker.

In the next progress report, I will provide oscilloscope wave forms.

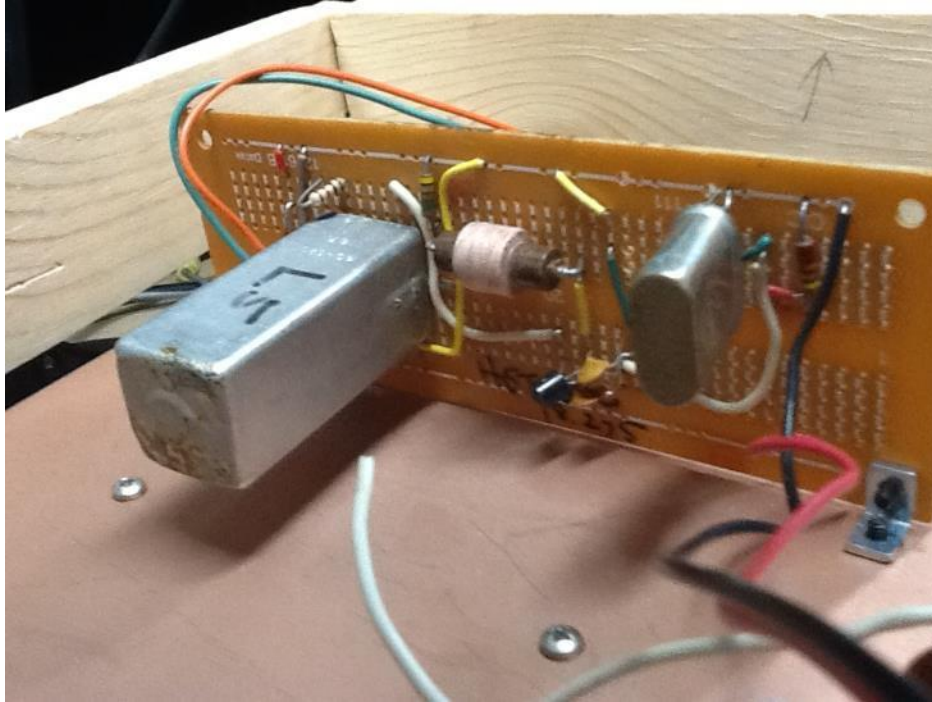


Figure 6

### Heterodyne Oscillator Layout

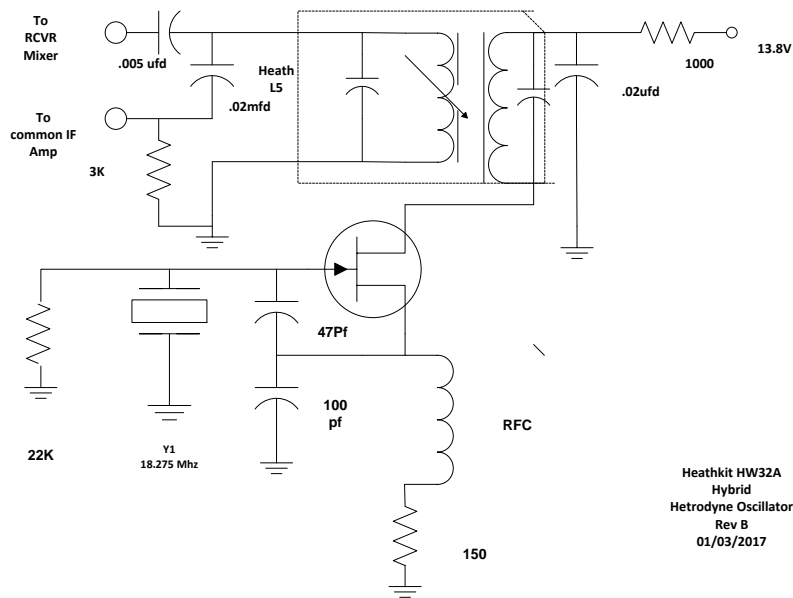


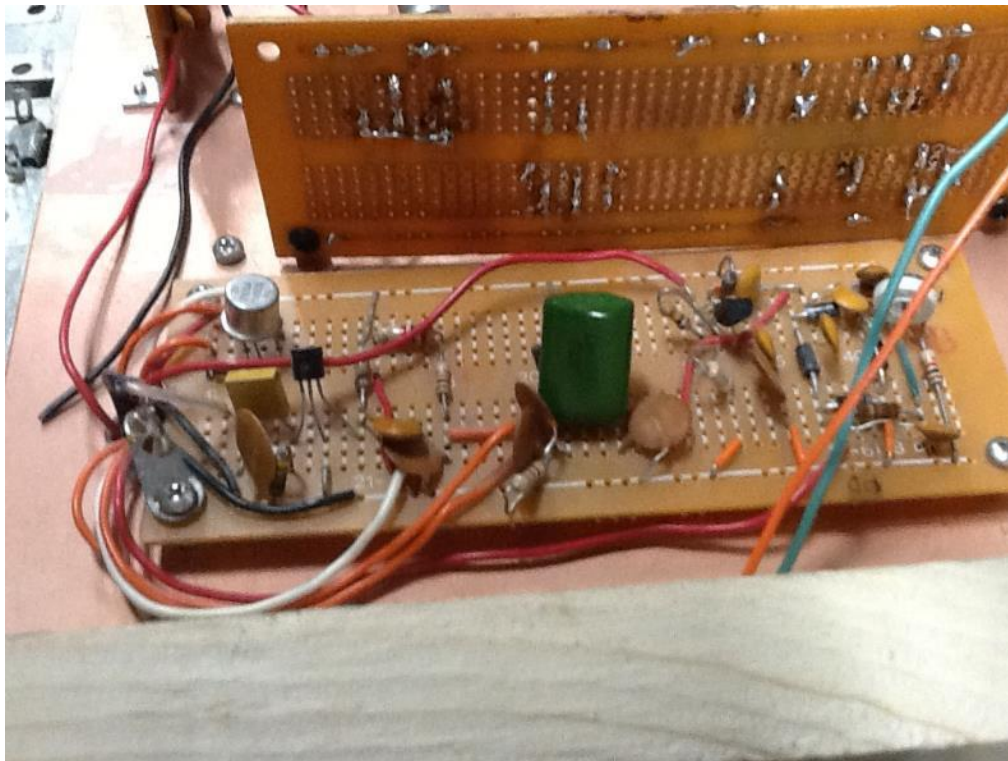
Figure 7

### Heterodyne Oscillator Schematic

The last subassembly that has been assembled and tested is the microphone input circuits. It combines the Microphone amplifier circuit and the relay transmit / receiver line.

The microphone replaces V1 in the original HW32A with two 2N5484 FETs. The changeover relay V2 is replaced by a 2N2907 bipolar transistor.

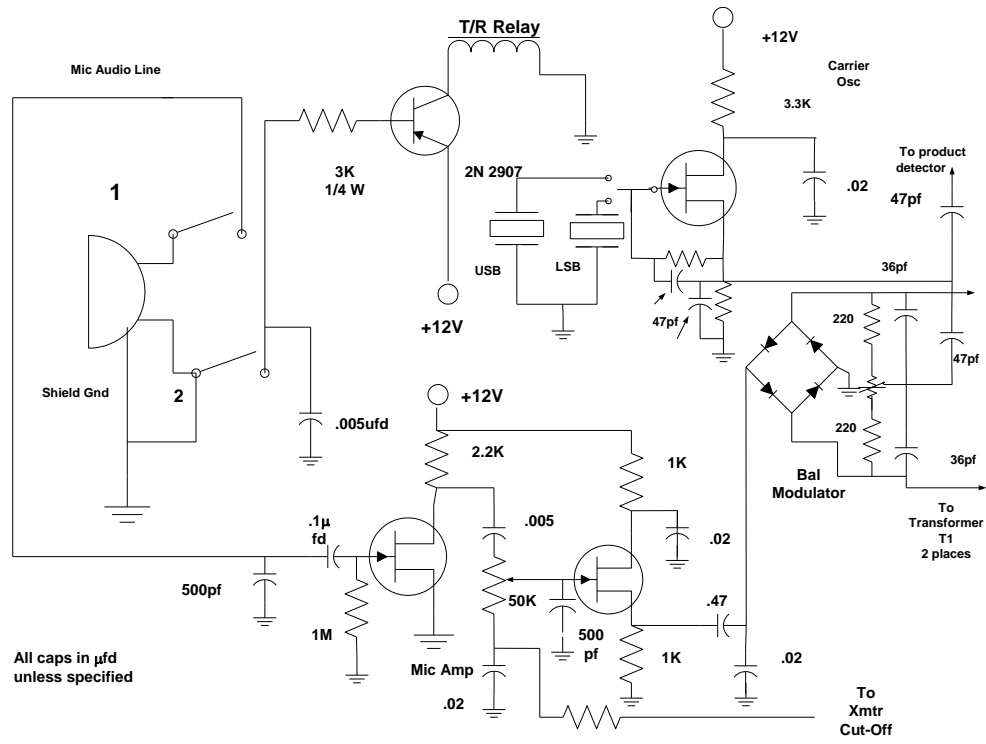
The relay itself is not shown in this picture. I started with a 24V DC relay but was able to change to a 12V DC relay.



**Figure 8**

### **Transmit/Receive Circuitry**

The schematic not only shows the microphone circuit and changeover circuit but also has other circuitry that has not been built yet.



**Figure 9**

### **Transmit / Receive Circuitry. Microphone Input**

The schematic in figure 9 has more than what is on the layout. I am using two each 2N5484 FETs. The biasing has been adjusted for a lower voltage.

The circuitry for the changeover relay is a 2N2907.

There are several circuits under construction. I am in the process of building the carrier oscillator. I also need to mount the 12V DC power supply and the carrier oscillator board.

I have to finish the interface between the HP23A power supply and the hybrid. I will report more on this in the next report in March.

I also need to get back to the HW22A and resolve the intermittent that turns the receive signal to transmit without actuating the mic.

If you have any questions, please contact me at [WB6WXO@SOARA.org](mailto:WB6WXO@SOARA.org).