



Official Publication of the
West Allis Radio Amateur Club

Hamtrix

[click here to go to web site](#)

Volume 72, Issue 1 January , 2023

JANUARY CLUB HAPPENINGS

Dinner Meeting

January 10, 2022 6:00pm

dinner at

**New Berlin Ale House
16000 W. Cleveland Ave
West of Moorland Rd.**

Spouses are welcome meal is Dutch treat.



NUT NET

3.985mhz

Monday-Saturday

8:15am CT

NUT NET

Breakfast

8:30am fourth

Tuesday

of the month

Milwaukee-Florida Net

Every Day on 14.290 Mhz

7:00AM - 9:15AM ET

6:00AM - 8:00AM CT

Wisconsin QSO Party

**March 12, 2023 - 1800Z to 0100Z March 13
(1:00PM CDT to 8:00PM CDT on Sunday,
March 12)**

> First day of Daylight Saving Time <

2023 Dues due see page 6 for more details

Index

Editors Letter..2

Meeting Minutes3

Member spotlight.....4

DX/contest update.....5.

Digital Digest..... 6

Dues info.....7

Net Breakfast.....8

Heathkit SB-220.....9

Slow Speed CW net...15

Editor's Corner

Looked around my ham Shack/man cave for an idea to write about for this editorial. My eyes fell on my old Heathkit HW-8. It was involved in my early ham radio experiences. I got my Novice when I was in Illinois (1975-1980) my rig was a home made transmitter from my Elmer, Ray W9ONN (SK) the receiver was a garage sale heathkit GR-54 general coverage receiver. Amazingly I did make some contacts with it.

Not too long after that we moved to Hales Corners I did get my technician license and added a 6 meter AM transmitter and converter for my receiver to use primarily on the 6 meter net my Elmer had.

Then I started working on my General. The test was not much of a problem. Code was. The HW-8 had come out and looked interesting and affordable. As any Heathkit it went together easily and worked first time. With that I was able to get on and have code practice almost daily with my Elmer++++. I got good enough to pass my general and almost pass the advance.

After getting my general and getting a used Collins set up the HW-8 wasn't used a lot. It did get taken on a few trips to factory schools. The most memorable one was to Los Angeles. One night I contacted my Elmer back in WI with a portable 15 meter dipole hung in my hotel room with HW-8 at 1.5 watts. That was the best contact I had portable. Both of us were amazed with that one!

Getting back into radio radio I have had fun with QRP

Frank KA9FZR



WARAC

Find Us On The Air

VHF Simplex 146.55 Mhz

Looking for a Club Member to chat with? Fire up the VHF rig and give a shout out on the VHF Simplex Frequency 146.55. You'll be surprised how often someone is listening. Hit the PTT and say "Hello"

DMR - BM TG 3155 WI State

The WI State 3155 TG is available on all the local DMR Repeaters AND via your HotSpot. Put yourself monitoring and come find a Club Member

Nut Net - Mon to Sat on 3.985 Mhz @ 8:15 AM

Join The Nut Net on 80 Mtr SSB from 8:15 to 9:00 AM Mondays thru Saturdays. Check-ins are from all over WI. You'll be a Nut Netter regular in no time. This is a general discussion net that gets your day started out right.

Milw - Florida Net - Mon to Sat 14.290 Mhz 7:00 AM

Join Tom, K9BTQ, for this early morning Check In Net, Mon thru Sat on 20M from 7:00 AM to 8:00 AM. Get the news to get your day started out just right.

6 Meter Chat - Wed, Fri 50.160 Mhz @ 9:30 AM

Paul, W9PCS, hosts this informal 6m online get together on Wed and Fri starting at 9:30 AM. This is a round table discussion and everyone is welcome to drop by and join in.

WARAC General Meeting Minutes – December 13, 2022

Club meeting was called to order by Mike Johnson WO9B @ 7:01 pm.

Attendance: 12 members.

Hamtrix Minutes: November General Meeting minutes were accepted and approved.

Board Minutes: November Board Meeting minutes were accepted and approved.

Treasurer's Report: Savings, checking, scholarship, petty cash ~ \$22,500.00.

Bill N9KPH stated if anyone wants more detailed reports. Just ask.

Mike WO9B is creating a new design of the clubs website.

Phill Tollefson WA9AQL resigned as a board member. We need a replacement. Erwin WI9EV volunteered.

Club committee reports:

1. Hamtrix: Frank – absent.
2. Field Day: Dave – absent.
3. Scholarship: Howard – Scholarship is in great shape. Annual report is being prepared.
4. WIQSO Party: Tom – In good shape. May allow self spotting. March 12, 2023. Will try to have W9FK on CW. February meeting – update for WIQSO Party.
5. Sendik's: Frank – absent. Last year we did 2 events.
6. Wednesday Park Ops: Mike – Plans to do coffee cafe ops. In January.
7. Slow Speed CW QSO Net: Monday nights. All are welcome to join.
8. Donated Equipment: No one to receive or store and sell equipment.

New Business:

No January Meeting - Holiday Party. January 10, 2023 @ New Berlin Ale House.

Mike WO9B is moving ahead with a unofficial club Pico balloon launch project. ~ June 2023.

Need some assists to fill the Team.

Old Business:

Mike WO9B still looking for someone to try his remote radio setup.

Presentation: WO9B “Winlink by the Numbers”

<https://winlink.org> You need to sign up for an account.

Winlink is a ham radio network for sending and receiving text emails (no images), of non-commercial nature. The 1st Or last miles can be by RF. Using a computer and sound card with a radio to connect to a winlink node. If you can do FT-8, you have the equipment to do winlink. HF, USB @ 300 baud. VHF, FM @ 1200 baud, UHF, FM @ 9600 baud. Sound card modems (UZ7HO free or Vara by EA5HVK ~ \$69.00. Download Email client for winlink: Windows – Winlink Express. Linux or Raspberry PI or Apple – Pat. And setup software. You can use telnet, winlink HF, vara HF, packet winlink VHF to send or receive emails. Winlink is a supported protocol for FEMA, Red cross, Salvation Army.

Meeting Adjourned @ 8:20 pm.

Respectfully Submitted

Bill Dargis KD9BJZ

Secretary WARAC, December 14, 2022

• — • — •

HAMTRIX MEMBER SPOTLIGHT

PHIL TOLLEFSON, WA9AQL BOARD MEMBER, LIFETIME WARAC MEMBER

At this month's board meeting, Board Member Phil Tollefson, WA9AQL announced he was stepping down from his board position due to health complications. I had a chance to chat with Phil about his decision and to gain some insight into his 50+ years as a member of the West Allis RAC. What became very clear is his continued participation and support for the club is very real and heartfelt. Case in point, unofficially WA9AQL was the single biggest sale at the late summer Sendik's Grill event. He walked away with so many brats, I think he needed a note from his doctor. Phil's back issues have made participation difficult for the past couple of years, but difficult or not, he continues his near perfect attendance at club meetings and events.

Phil got hooked on ham radio as a teenager in Manitowoc, WI in the late 1950's. His local elmer, W9DK, in the best tradition of our hobby, lit the fuse and then plied him with enough equipment to get his hobby started. Unlike a lot of us, Phil entered the ham radio service with the call he still retains. Of course his Novice variant was WN9, soon to become the first WA9 in the state. His radio bug led him into college and tech school for the next several years as he worked with various companies in the Milwaukee area, always in the electrical service field. By the mid 70's, he started with Wisconsin Electrical Manufacturing as a traveling Field Service Specialist where he would stay until retirement 34 years later in 2010. His job entailed extensive travel throughout North and South America as well as China and Indonesia. Additionally, he met his "Sweetie Pie" Phyllis through work and they were married in 1986.

Despite his rigorous travel schedule, WA9AQL has always maintained a station to keep him on the air wherever he was living. His Manitowoc parents home station featured a 40' used tower obtained via good fortune and elbow grease. More typically, his stations consisted of wire antennas and push up type masts. At one time or another, he has owned and operated the full range of gear from the 60's, 70's and 80's. Phil still has his well used Heathkit HW-8. He characterizes his radio style as being QSO oriented, talking with whomever, wherever. Best QSO Ever: K7UGA, Barry Goldwater, worked mobile (Phil, not Barry) with a Swan 350 set up in his car. I'd remember that one too. I asked him to summarize his radio career. "That's easy, Mad Scientist, Radio Hoarder!!" I'm still laughing at that.

His relationship with the West Allis RAC began back in about 1968. He walked into a meeting and just kind of never left. He said the club was very different back then. He always considered himself the New Kid. Breaking through the social ties back then was not his forte, but his desire for all things radio won the day. Work kept him away much of the time, but when he was in town, he made the meetings and events. Apparently Field Day in the 70's was quite the time. Ahem. Phil got "volunteered" into a board position in 2017. He also served as one of the rotating net controls on the Wednesday 2 meter net from 2017 through 2021 where he was known as 'Phil on the Hill' as he always worked the net from his car.

So that's the WA9AQL story. Say hello at the next club meeting.



DX Update:

3Y0J – Bouvet Island, the #2 most sought after country hopes to be on the air January 26 +/- a few days. After a failed attempt a few years back by a mostly US team we wish this primarily Norwegian team the best of luck. It would be an ATNO for me on digital as I was fortunate to work Bouvet on phone in the early 90's.

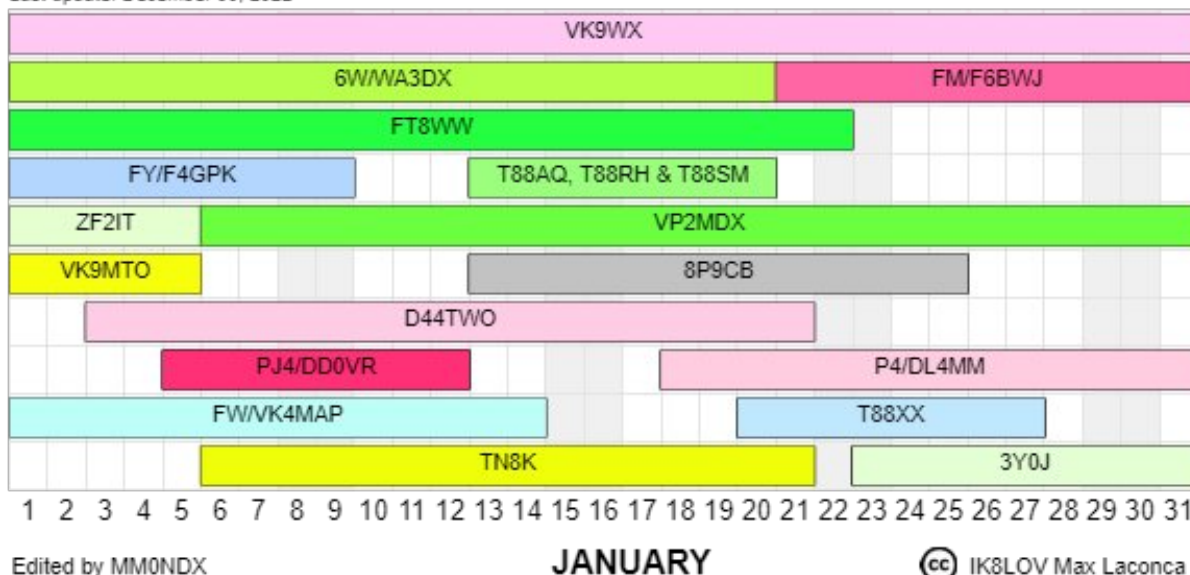
AT2WBRC – (Ganga)Sagar Island AS-13 January 5-17 by the West Bengal RC. Beach on the Air.

FT8WW- Continues to be active mainly on 30M and 20M with massive pileups. I got lucky with a QSO. Please read his QRZ page for details on how to contact him. He is using MSHV and NOT F/H.

VP2MDX- January 2 –March 31X

DX WORLD.net FEATURED DXPEDITIONS TIMELINE

Last update: December 30, 2022



DXPEDITION ELINE

Contesting:

Check page 74 in the January 2023 QST for more contests.

For more contests check out: <https://www.contestcalendar.com/contestcal.html>

Special Event Stations:

For special event station listings (there are many) check out:

<https://www.425dxn.org/index.php?op=wcal>

If you have further ideas or suggestions for this page please let WA9BZW (Al) know.
wa9bzw@arrl.net



Jan 2023

*

Hamtrix

*

By Michael Johnson, WO9B

Winlink VHF

At the December club meeting, I did a presentation on Winlink(<https://winlink.org/>) demonstrating sending and receiving an email via VHF. For those that did not make the meeting, Winlink is a way to send and receive email using amateur radio in lieu of the internet as your sending/receiving mechanism. The email still finds its way into the internet, but the first or last hop in the journey is transferred via radio. The Winlink network is accessible on both HF and VHF. So this month, I thought to discuss setting up a VHF Winlink operation. The reason for my interest in VHF is that connections support much higher baud rates and do not rely on HF propagation vagaries. It works with the same reliability of a simplex FM contact because that is exactly what it is. The typical VHF connection speed is 1200 baud but note that 9600 baud is also readily available. So yes, at those speeds and reliability, Winlink is well worth the effort. It also is oddly fun. There is just something about sending emails via radio that strokes my imagination.

Equipment Needs: The basic equipment needs are simple: Operating VHF FM radio, Sound Card Interface (i.e. Signalink), Computer (Win, Linux, Apple, Pi) running modem software and the Winlink email client. That's it. For VHF, you can put into play almost any VHF radio. I'm currently using a 1980's relic and soon will have a BaoFeng up and operating. It does not have to be complicated.

Radio/Sound Card: As mentioned, virtually any radio will work. You need (4) connections: Audio in (Mic), Audio out (Speaker), PTT and Ground. If you radio does not have a DIN plug on the back,

then you can use the microphone jack. A lot of new radios use modular connectors. If your's uses the popular RJ45, you can make a cable easily from any computer patch cable. I did. For 1200 baud connections, the sound card is not too particular. Signalink, Easy-Digi....will work just fine. I'm using a Signalink with my relic radio.

Computer/Software: For a computer, whatever you've got in your shack should work. The Winlink website has a useful page laying out the software options for the various OS's: <https://winlink.org/ClientSoftware> I'm using Win 10 and have the Winlink Express software loaded up. Works great. The Windows solutions are very easy to setup and use. If you are new to digital modes, Windows is the easiest entry. Linux is not far behind. Regardless your choice, YouTube has your back with a plethora of how-to videos.

Software Modem: Long gone are the days of plugging in a hardware TNC. You can still do it that way if you wish, but software solutions make it super easy. For Windows, the popular choices are UZ7HO's Sound Modem TNC for connecting to Packet Winlink Nodes or VARA FM for connecting to VARA FM Winlink nodes. I use both, and they are selected by the WinLink Express software depending on which VHF Winlink Node I am connected to.

Winlink Nodes: How to find a node? Using the Winlink Express software, finding nodes is easy. The software offers up a table of nodes you can select from. Set your radio frequency and click on the node

To winlink pg 8



RENEWAL OF MEMBERSHIP

ALL MEMBERS WHO JOIN ED BEFORE October 1 ST
MUST RENEW THEIR MEMBERSHIP BY September 30 TH
*****FILL IN ALL INFORMATION PLEASE*****

NAME: _____ CALL SIGN: _____
(As you want it to appear on the roster)

ADDRESS: _____ LIC CLASS: _____

CITY: _____ LIC EXP: _____

STATE: _____ OCCUPATION: _____

ZIP CODE: _____ E-MAIL ADDRESS: _____

HOME PHONE: _____ WORK PHONE: _____

CHECK HERE: _____ IF YOU WANT THE CLUB NEWSLETTER EMAILED TO YOU?

CHECK HERE: _____ If you are an ARRL member?

Would You Be Willing To Serve On A Committee? _____ Officer? _____

Club Activities You Would Like To Participate In?

Field Day _____ Programs _____ Swapfest _____ Hamtix _____ Elmer Sunshine _____

Education Community Service _____ Public Relations _____ Scholarship _____

QSO Party _____

Class Of Membership: Full Associate New Renewal

Dues Paid: Full \$15.00 _____ Associate \$10.00 _____ Family \$18.00 _____ Student

\$10.00 _____ Retired \$10.00 _____

*****FAMILY MEMBERSHIP *****

A family member ship includes the individual applying and all members of such person's immediate family residing in the same household who possess an Amateur Radio license.

NAME: _____ CALL SIGN: _____

LIC CLASS: _____ LIC EXP: _____

Date of Application _____ Amount Enclosed \$ _____

<p>FOR WARAC OFFICE USE ONLY</p> <p>Treasurer Received/ Date: _____</p> <p>Sec. Add Roster/Date: _____</p>
--

<p>MAIL TO:</p> <p>West Allis Radio Amateur Club, Inc.</p> <p>P. O. Box 1072</p> <p>Milwaukee, WI 53201</p>

Click on form for a "PC editable membership application"

non-life members dues are payable on November first, with a sixty day grace period, after which membership is considered lapsed. Dues paid ANYTIME during the club fiscal year applies to that year only. So for example if someone pays next July, that covers dues through October 31st only.

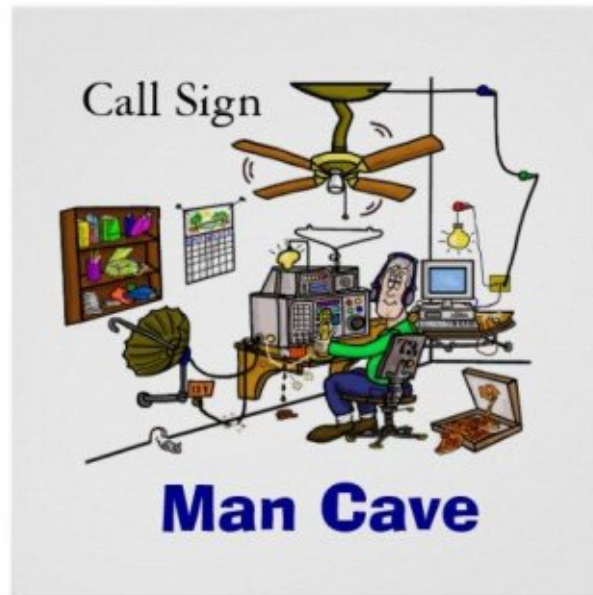
Paypal is preferred by selecting and using the friends and family option. Send to "[West Allis Radio Amateur Club, Inc](#)" Of course, this avoids the club being charged a transfer fee. Note that this option is only available using a direct transfer from a bank account and NOT using the "credit" option. However, any form of payment is welcome.

Winlink from pg 6

to activate. That's about it. In Milwaukee, for VARA you have two options: WO9B-10 and AC9DE-10. For Packet I've been using KD9CIV-10. All of these operate on 145.610.

Winlink has been a fun avenue to explore. The

big realization was how simple it is to accomplish. I don't mean to oversell the concept here, as I am sure you will hit a speed bump or two, but the journey was not difficult and leveraged existing gear for the most part. The hardest part is getting the cables right, but then that is the bane of our hobby. Give it shot...and send me an email: WO9B@winlink.org



2022 Challenge for our membership. Have someone you meet, Ham or Ham wannabe come to a meeting this year!



Nut Net Breakfast to start, AGAIN

Several years ago there was talk among Nut Net members that we should get to meet each other. A breakfast get together idea was started. It was open to all hams, XYL/partners and anyone who wanted to learn about amateur radio. Even visiting OM/XYL couples joined us.

So, on the fourth Tuesday each month at 8:30 am we will once again meet at Gensis Restaurant, corner of HWY 100 and Beloit Road, Greenfield, WI. Looking forward to seeing you, mark your calendar.

Phil, W9NAW

Used with permission of Author.

Web page <http://kn3b.com/heathkit-sb-220-restoration-and-modification/>
Part 1 of 2 parts

KN3B.COM

Heathkit SB-220 Restoration and Modification

This is my Heathkit SB-220 amplifier. There are many like it, but this one is mine.



I wasn't specifically looking for a new amplifier when I found this SB-220 on the QTH.com classifieds, but the price was worth the constituent parts of the amp on their own, never mind the two 3-500ZG tubes, so I knew it would be a worthwhile project no matter what shape it was in. After spending so much time attempting to repair my AL-80A I had developed an affinity for older tube gear, and I was intrigued and allured by the prospect of owning a tube amplifier that would get me over 1KW of RF and close to legal limit power.

I asked a few questions, and got a few answers. The seller had purchased it from a SK estate (couldn't remember who) and didn't know if anything had been done to it, but it did power on. After working out details with the seller and giving him a chance to test the amp, it was time to pick it up. With a promise to buy her dinner, the wife and I left town around 3PM on a Friday afternoon and started the 2 hour drive to Wilkes-Barre PA to pick it up.

Dinner was at Breaker Brewing Company in Wilkes-Barre, we got loaded nachos and paninis. Would recommend.

Upon return to the QTH, the SB-220 went straight to the bench. I didn't even turn it on, because I wasn't interested in how it operated now – I would be changing things. I wanted to know what I was dealing with first.

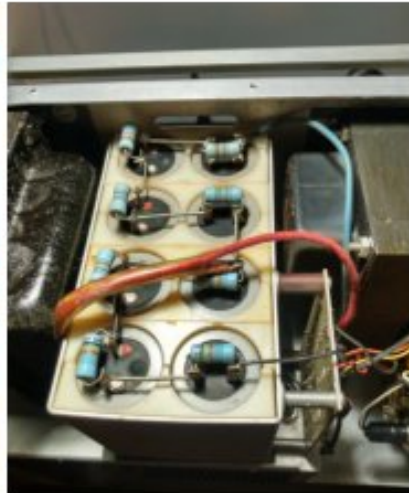
A note on disassembly of the SB220: It is time consuming. The entire chassis lives within a single piece outer shell, and removing the chassis requires orienting the amplifier in several different positions. This amplifier is HEAVY. Once the chassis is removed from this outer shell, the high voltage area of the amp is still sealed behind a panel with at least 12 screws. On my amplifier these screws had no less than 3 different heads. This also foreshadows the re-assembly of the SB-220...

"It appears to be mostly original"

The following images are the SB-220 out of its shell, before I made any changes. The meters and knobs appeared to be original. The knobs showed some wear, but this builds character so they won't be replaced.



SB-220 Removed from outer shell



SB-220 filter capacitor block



Power board, meters, input coils



SB-220 as I received it

The stock power cable had been extended, presumably because the OM who had last used it needed a few more feet to get to his 240v outlet. It was ugly, but spliced correctly and appeared to be fully functional. This extension would be removed and a new 240v 6-15R plug put in its place. I did not need the extra wire length because my 240v outlet is directly next to my radio rack.

The filter capacitor bank contained the original plastic spacers, but the Nichicon capacitors and resistors did not appear to be original. I tested them and they all seemed to be within spec. Regardless, their age could not be confirmed so they would be replaced.

The rectifier/metering board and all components were original. There didn't seem to be any issues with the board, and the meters did not appear to be modified with protection diodes. At this point I considered praying that the meters still worked. I wouldn't know until I turned the amp on for the first time.

The input coils were in good shape, but the 20m coil did not look original. Not sure if it was replaced or if it was just built with different wire.

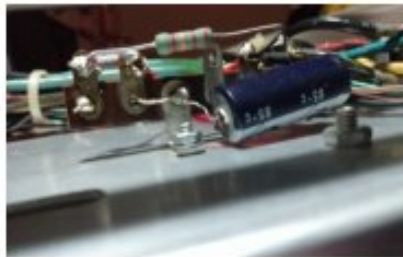
At first glance, or to the untrained eye, everything looks fine in the "tube chamber." It wasn't. There was a uniform amount of dust on all components, but this just meant that the amplifier hadn't been messed with much lately. I erroneously took this as the amp being "unmolested." I'll go into more depth with this later.

The guts of the SB-220 appeared fine at first. Digging in, a few things jumped out at me. There is a capacitor connected to a terminal leading to the 120v transformer that appeared to be replaced, and physically leaking. This capacitor is known to blow in case of tube flashover, so I marked it for replacement. This lead me to the grid connections on the tube sockets, which were not grounded. Grounding the grids on the SB-220 is considered best practice (explained later), so I added this to the todo list.

The fan was original, and it spun freely, which I've been told is unusual for this vintage. I decided to keep it, for now. Both transformers also appeared original and in good shape.



Original power board



Leaky capacitor



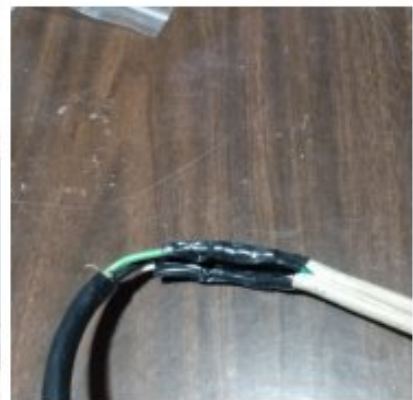
Input coils



Bandswitch, input coils, plate meter



Power board and filter capacitor bank



Power cable extension

Preparations

Now that I had some idea of what I was dealing with, I laid out my objectives. I already had a working amplifier, an Ameritron AL-80A, that (after repairs) had proven itself pretty reliable loafing along at 500-600w. I like this amplifier and have no intention of selling it. But I wanted this SB-220 to be the new primary amplifier in my station, capable of running 1KW+ for extended periods of time on most bands, with all the modern upgrades that would extend its life for another 20+ years and allow it to be keyed by modern rigs.

The SB-220 came with a pair of Taylor 3-500ZG tubes, which are PRC reproductions of the venerable Eimac 3-500Z. I did not know what electrical state these tubes were in, but I didn't want to replace them if I didn't have to, so I removed them, cleaned them, and packaged them carefully for long term storage (note: tubes can be cleaned with isopropyl alcohol, but the alcohol will remove the logos). New matched 3-500ZG tubes run about \$500, so I'd forego this cost if the tubes ended up being good.

[Harbach Electronics](#) makes several replacement board kits for the SB-220, and I opted to use all of them for this project:

- The RM-220 rectifier/meter board replaces the stock power board and is an improved design that also includes meter protection. As a result, the well-documented meter protection mod for the SB-220 that I planned on doing would not be required.
- The ES4SB220 filter board replaces the existing filtering capacitors and resistors and fits into the stock plastic spacers. The caps and resistors are rated higher than necessary for additional overhead and we are told they run cooler than stock, which is a good thing in an enclosure with tubes that generates a lot of heat.
- The 3-500Z is an "instant-on" tube, so the SS-221-240 soft-start board wasn't 100% necessary. But inrush current can also negatively affect hard to find (and expensive) components such as Heathkit on/off and band switches, so it's well worth the \$35 to install this board. Quoting Harbach Electronics: "The SS-221 limits inrush current during amplifier start-up by placing a small resistive load in series with the AC mains. The load is switched out of the circuit by the relays a few milliseconds later."
- Back in the 70s when this amplifier was designed, it was keyed by a boat anchor radio via 120VDC. Trying to key this amplifier with a modern transceiver would damage the transceiver's keying circuit, and possibly other parts of the radio. The SK-220 is a soft-key interface for the SB-220, allowing the amplifier transmit relay to be engaged with under 1VDC @ 1.5mA. This is a necessity.

SB-220 Restoration

Before building the new boards and installing them, there were a few things that needed to be addressed.

The plate tuning capacitor looked great at a glance. But closer inspection revealed that it had been arcing repeatedly, which had damaged the rotating blades. Only after removing the rotating blades from the capacitor did the extent of damage become apparent. I suspect that the capacitor arced once due to a bad

tune, which deformed the tip of a blade, which changed the capacitance of the capacitor, changing the tuning, causing more arcing, repeating over and over again. Clearly it had been abused. It would have to be completely disassembled to be repaired.

I removed the blades from the main assembly, and found that roughly half of them had been damaged. I believed it could be salvaged by sanding and polishing each of the blades. First I sanded the deformed part of each blade on a flat surface with 220 grit sandpaper. Once the blades were again flat, each was polished with 0000 steel wool. There was only minor loss of material on some of the tips of the blades. You wouldn't know unless you knew what to look for. The important detail is that now all the blades are straight and uniform thickness so they should mesh evenly.



Damaged blades



Damaged blades removed



Blades sanded and polished



Danger squiggles



Repaired plate tuning capacitor

I also disassembled the fixed blade assembly of the capacitor and found some neat squiggly electricity drawings, and some damage to a few blades. These were sanded and polished in a similar fashion, but the damage was minor in comparison to the rotating blades.

I knew enough about 3-500Z amplifiers to know that these parasitic suppressors were not original, which didn't concern me. But the fact that these suppressors were not soldered DID concern me. The leads of the resistor were just wrapped around the bent wire, free to slide around. There was evidence of arcing on the side of at least one of these resistors. And the suppressors themselves were not soldered to the lugs on the coil (despite these lugs being present), instead they were wrapped around the screw and held in place by friction. These would have to be replaced.



Poorly built parasitic suppressor



Another poorly built parasitic suppressor



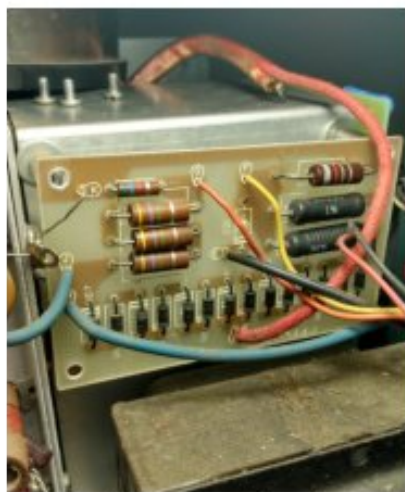
New parasitic suppressors

I built new parasitic suppressors with 18 gauge copper wire and 100 ohm 5 watt resistors, making sure to solder the connections between resistors and wire. These would not be installed until the tubes were back in their sockets, so I set them aside.

It was time to remove the original power board and filter capacitor bank, which would both be replaced by the modern Harbach kits. The capacitor bank is held in place by bolts on the bottom of the amplifier, some of which are hard to get to due to existing wiring, so rather than remove the capacitor bank completely, I just loosened those bolts enough that I could cut the leads connecting the capacitors and remove them. I took great care to not damage the original plastic spacers that hold the capacitors in place, they would be reused with the new kit.

With the old capacitor bank removed, I took out the screws holding the faceplate to the front of the amplifier and swung it to the right of the case to begin removing the original power board. There were also some structural components removed to do this, those were set aside for eventual reassembly. During desoldering and removal of the power board, I noticed that one of the two capacitors on the meter lamp circuit had failed catastrophically. The capacitor had blown hard enough to leave a residue on the back of the faceplate. I'm not

sure what could have caused this, and I crossed my fingers that it hadn't caused damage that I couldn't see. Parts were ordered, and both the blown capacitor and its original unscathed companion were replaced with new components.



Original power board



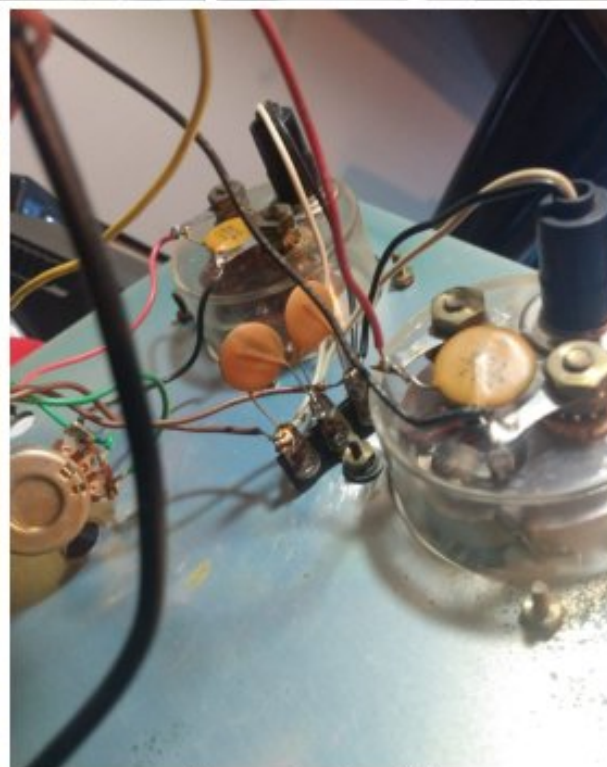
Original meter circuitry



Capacitor bank removed



Blown capacitor on meter lamp circuit



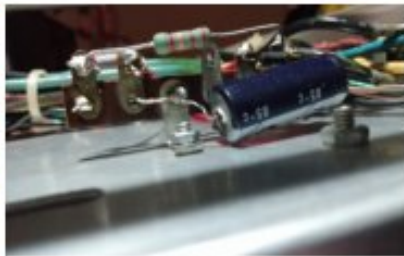
New capacitors installed

At this point I replaced that leaky capacitor attached to the 120v transformer. I had seen this capacitor referenced as one of the first components to release the magic smoke during a tube flashover, so I paid special attention to it. The fact that it had some discoloration around the negative terminal spoke to the

possibility that it had experienced some abuse, so it seemed a smart move to replace it. While doing so, I managed to snap the attached diode in half, so that was replaced as well. This was a simple job, but I did not realize that I would be removing that diode during the install of the Harbach soft key board in the near future anyway.



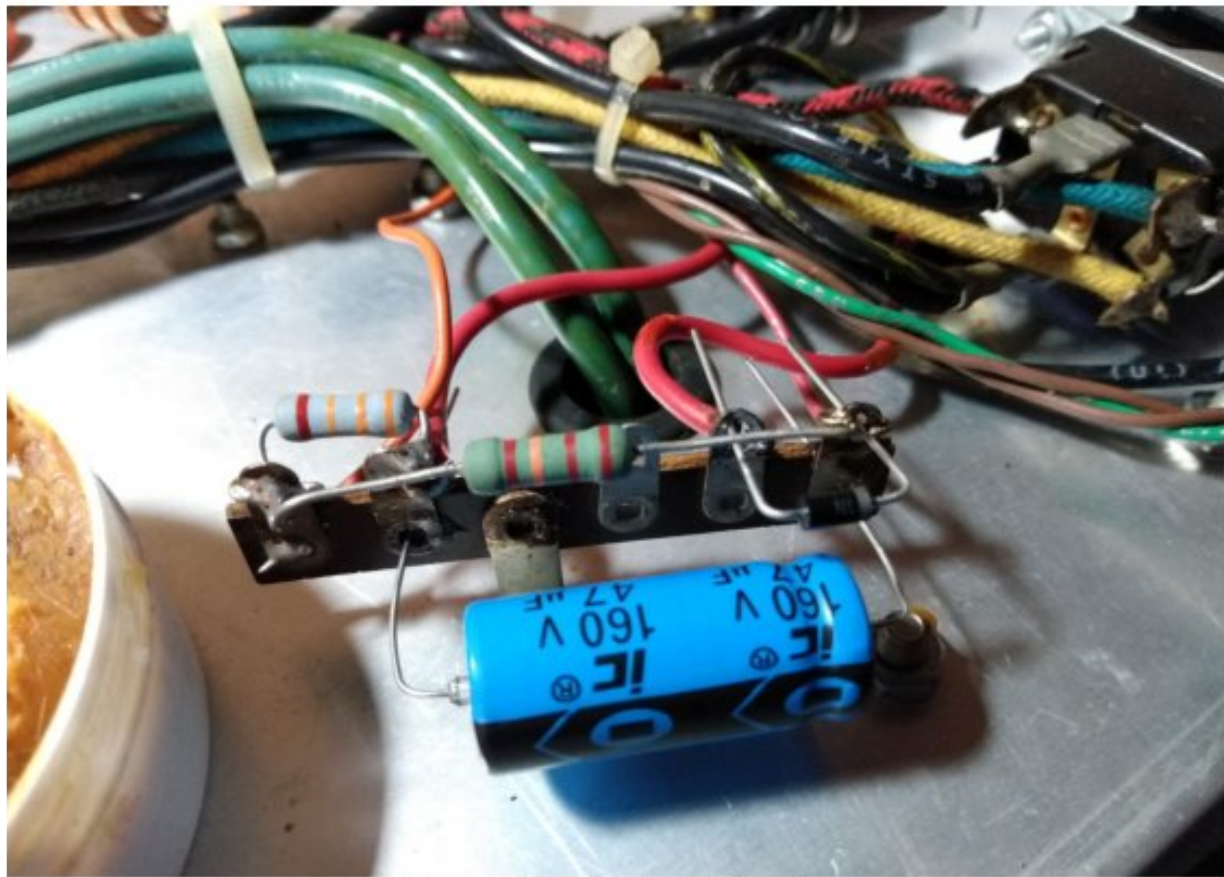
Non-original capacitor (suspect)



Leaky capacitor



Removed



New capacitor and diode ready for solder

With the problem areas of the SB-220 taken care of, it was time to focus my efforts on the upgrades and modifications necessary to modernize this amplifier.

SB-220 Upgrades and Modifications

DON'T KEY LIKE A PHONE MAN



SLOW SPEED CW QSO NET

Monday's - 8:00 PM - WB0AFB Repeater 147.045 + 127.3 Tone

CW Practice

One of the best and maybe the only way to get better at CW is practice. Having someone else who also wants to practice also helps. Just makes it more fun.

The West Allis Radio Club is going to try to help. We are running a CW practice net on Monday at 8pm The repeater is 147.045+ 127.3 the CW portion is on HF

Mike WO9B has been joining me and setting up some practice but we are open for suggestions on where to go with this. Come join us.

Officers and Board
President

Vice President
Feeroz Ghose WU9N

Secretary
Dave Garnier WB9OWN

Treasurer
Bill Reed N9KPH

Directors
Tom Macon K9BTQ

Phil Tollefson, WA9AQL

Newsletter Editor
Frank Humpal, KA9FZR
fhump@milwpc.com

past president
Frank Humpal KA9FZR

West Allis Radio Amateur Club
P. O. box 511381
New Berlin, WI 53151-1381

West Allis Radio Club
PO Box 511381
New Berlin, WI 53151-1381