NVARC
Nashoba Valley
Amateur Radio Club

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IN THIS ISSUE:

From The President

de BRUCE K1BG

The weather has finally turned and Spring is here! Amateur radio activities now expand beyond what happens purely inside the shack, and more outdoor activities are on the horizon. Personally, I'm working with Nathan, KC1RFE, on making end-fed-half-wave antennas of the design described by John, KK1X, in the July 2022 issue of the Signal. While Nathan is looking for a stealthy antenna to install at his home, I'm looking forward to using it for some Parks-On-The-Air activations. I'll let you know when I do this – everyone will be welcome to participate with me.

Traditionally, NVARC members have helped provide communications for the annual Groton Road Race. Ralph, KD1SM, has traditionally coordinated this. The event takes place the first weekend in May, which this year is Sunday May 7th. Please mark it in your calendar if you would like to help out. More info will be coming.

K1BG: "This is not a goodbye!"

During a recent meeting, I conducted a straw poll among club members to determine whether NVARC should partake in the ARDC/DLARC program, and the overwhelming response was in favor of participation. Interested parties can explore the program further by visiting this link.

Anyone who knows me knows that I am a strong advocate of individual (or family) membership in the ARRL. As an affiliated club, NVARC receives a number of benefits, including the "Club Commission Program". While Ralph, KD1SM has

done a great job over the years encouraging people to participate, the league made the program really attractive! Here's the way it works: If you renew (or extend) your league membership (currently $49 for one year) through NVARC, the commission the club gets is now $5. If you sign up as a new league member (meaning, never been a member or not recently expired), the club gets a whopping $15. You might say: "That doesn't sound like much!", but NVARC membership has stayed at $15 per year for the last 30+ years! Active participation will help pad the club treasury. It's a win-win situation for everybody. I'll present the details at the April meeting, and perhaps consider coordinating this at future club meetings.

Field Day is just around the corner (June 24th and 25th), and I'm still looking for a Field Day Chair. If no-one steps forward (and I suspect no-one will), then Field Day will once again be run by committee. As of today, the committee consists of myself, Bruce – K1BG, Skip – K1NKR, John – KK1X, and Jim – N8VIM. If you would like to be on the committee, please let me know. These individuals have all held individual leadership roles at previous Field Days and "know how to get things done", meaning they contribute to a specific facet of Field Day and know that subject well. We do, however, need a Field Day Chair to coordinate all the pieces and focus on the details. Any volunteers?

Elections will happen at the April meeting, and NVARC is seeking candidates to run for all positions. This meeting is a Special Meeting as detailed in the club by-laws. The nominations committee has reached out to every club member to gauge their interest in running for office or one of the open board positions, with the hope that more than one person would be interested in running for each office. That being said, the nominations committee has come up with the following slate of officers: President – OPEN, Vice President – Phil Erickson, W1PJE (returning), Secretary – John, K1JEB (returning), Treasurer – Ralph, KD1SM (returning), 2022 – 2025 Board Member - Bruce, K1BG (replacing Sean, KC1ONO who has resigned), and 2023 – 2026 Board Member - Bob, K1QT. Jim, N8VIM, will begin his final year of the three year board position he was elected for. If YOU have an interest in any of these positions, please let me know. The board meets once a month on Zoom and it's pretty easy to do.

Additionally, there is one glaring opening that needs to be filled – that of club president. The club may be able to limp along without a president, but it is not a healthy sign. I'm volunteering for one of the board positions in order to help with the transition to a new president. Again, I encourage you to volunteer and help take NVARC to the next level. With that being said, I ran for election two years ago with the promise of doing this for two years and ONLY two years. Otherwise, membership seems content to let one person have all the fun, year after year. With that in mind, I will fulfill my promise.

I want to thank everyone who has contributed to making NVARC successful over the last year – Our 2022 – 23 Officers: Phil, W1PJE, John, K1JEB, Ralph, KD1SM, Jim, N8VIM, and Sean, KC1ONO. I'd also like to thank Vlad, W1MTI, for publishing the Signal month-after-month, and Jim, N8VIM, for taking it upon himself to create the club's YouTube page and to edit and publish videos every month. I'd like to thank everyone who comes to our meetings, participates in Field Day, checks into the weekly 2 meter net, those who have

helped with the N1MNX repeater maintenance, and those who come to the Saturday morning breakfast. You've all helped make NVARC a better club. The last two years has been one of the most gratifying periods in the 50+ years I've been a ham. This is not a goodbye! I think of it more like moving from the driver's seat to the back seat. Someone else will be driving now, and I will do everything I can to help that person make NVARC more successful. Thanks again, and 73.

de Bruce, K1BG

Message from the Editor

Greetings NVARC Members and Friends,

I would like to express my gratitude to each and every one of you who took part in the Signal Readership Survey. Based on the results, it appears that the "Homebrew/DIY" topic received the highest level of interest, closely followed by "Technical" and "SOTA/POTA/ Field Operations". Your feedback has been carefully considered, and as a result, the current issue includes the first part of an article on constructing an HF power amplifier.

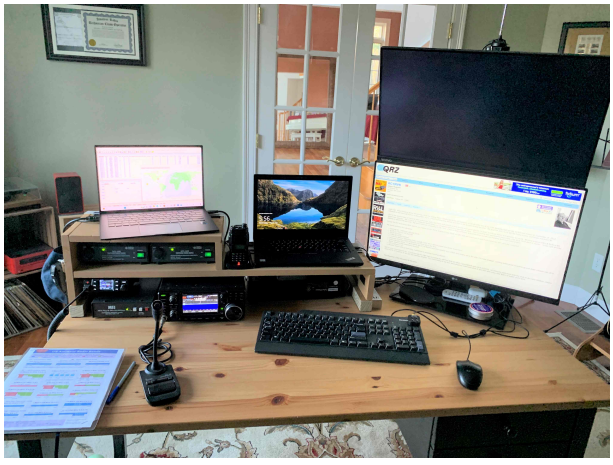
Furthermore, I received a suggestion about featuring informal profiles of our members in the publication. In this issue, we will be shining a spotlight on Adam, KC1RVK.

de Vlad, W1MTI

Member Profile: Adam, KC1RVK

How did you get interested in ham radio?

My journey into ham radio may be slightly different than that of others. Growing up, there was no one in my life that was a ham and no first experience in a neighbor or family member's shack. During my college years I had a CB radio in my beat-up Buick that I really enjoyed and made many contacts with others, mostly truckers passing through the area. As the years progressed, I remembered how much fun CB was and occasionally researched and considered Amateur Radio.



KC1RVK's radio station.

This fascinating hobby was on the back of my mind for many years. With

my 50th birthday in the not-too-distant future (joined the semi-centenarian club in March 23), I finally went for it and achieved my Tech in Sept 2022 and my General in Nov. My only regret is that I waited so long!

What parts of the hobby most interest you?

The simple fact that this is such a multi-faceted hobby makes it very exciting. I love to learn new things and consider myself a curious tinkerer. Since there are an endless number of ways to 'play radio', the hobby suits me perfectly. I enjoy building antennas (an EFHW and a dipole), assembling kits (uBitX), tinkering with the shack setup to get better results and on and on. CW is very interesting to me and hope to start that learning journey this year. My on-the-air passion of late is POTA Hunting and I hope to do some activations, likely QRP, soon. I even built a battery box to power the radio during POTA activations. Oh yeah, and I hope to get my Extra license this year. Yes, I am having too much fun!

How did you first find out about NVARC?

Having no idea where to start I thought I would see if there were any locals that could educate me. A good friend in town who has his Tech license encouraged me to reach out to Bruce Blain, K1BG. Bruce and I met for coffee one morning and had a wonderful conversation. He was very encouraging, knowledgeable and even lent me a keyer to start learning CW (it's collecting some dust right now). He also invited me to join the NVARC, an opportunity that I jumped on and I am glad that I did.

What are your impressions of the club?

Our little club in this wonderful corner of the world is very welcoming. Everyone I have met is very friendly and willing to give advice and offer help. I look forward to every meeting and Monday night net! I do wish we had more people join the Monday night net on a more consistent basis. When we do have a small crowd, it is much more fun, and someone always brings up an interesting topic to discuss.

Adam Rypinski, KC1RVK

What else can you tell the club about yourself and/or ham radio?

I'm one of those people who can't sit idle for too long. Just ask my XYL! I'm always working on something, often more than one project at a time. I think that's why I have so many hobbies. In addition to ham radio, I enjoy model trains (I am a managing member of an on-line model train forum), 3D Printing, vinyl record collecting/listening, guitar playing, gardening, reading, and hiking/walking. I

am blessed with a beautiful wife, two wonderful daughters and two fluffy pups. Finally, I teach a Confirmation class at our church.

Fun Fact about you.

I was born and raised in NJ, but prior to living in MA, we lived in Silicon Valley where I started my career in high tech, computer networking to be specific. Work transferred me back to the East Coast and landed in this beautiful part of the country. My interest in communication technology is, I believe, one of the reasons I was drawn to this hobby. Coincidentally, while my career was made in digital communications, I have little interest in digital modes (for now). Maybe because it reminds me of work!

What is your favorite expression or quote?

"Even if you're on the right track, you'll get run over if you just sit there." -Will Rogers

Letters From Our Members

Ken, K1JKR

Hi Bruce[1]. Just finished reading the latest newsletter and found very interesting the article on the Old Callbooks. I could only go back to the Winter of 1968 and found my call sign. At that time I was a General Class Licensee, going to Mass. RAdio School and starting to work in broadcasting as a Fledging broadcast engineer. Had my First Class Commercial License as well as that time.

I was originally licensed as KN1JKR in November 1958 when I passed my Novice test and the start of my Commercial FCC Licenses while attending radio school.

I must say how the technology has changed from the good old glowing tube days. Still very intrigued by today's technoogy and trying to stay abreast of it. Thoroughly enjoyed my time in Commercial Radio as well as with the hobby.

Thanks for article and the memories of looking at some of my old friend's call signs.

73 de Ken, K1JKR

NVARC DX QSL Service

One of the benefits of being an NVARC member is the forwarding of DX QSL cards to the ARRL's Outgoing QSL Service. NVARC collects members cards over a number of months and forwards them to the League at club expense. Rod Hersh, WA1TAC, is preparing to send out a batch of cards shortly and asks members to bring them to the April club meeting. The cards should be arranged in proper order, numbered prefixes in ascending order followed by alphabetical prefixes from A to Z. Proof of current ARRL membership (e.g., QST mailing label) is required.

de Rod, WA1TAC

[1]This letter originally was received by Bruce, K1BG, who, with consent of the author kindly forwarded it to the Signal.

The Cost of Living

de BRUCE, K1BG

As I was preparing this month's President's Corner, I started looking at the cost of NVARC and ARRL membership. Inflation is a crazy thing – the cost of things goes up, but the value of the money buying those things goes down. The question is: Are we getting a good deal?

There are lots of inflation calculators out there. I picked one at random, the one at the U.S. Bureau of Labor Statistics and started running some numbers. BTW, the last time I tried this was in 2015, and the results were pretty much the same.

Today, the cost of ARRL membership is $49 for one year. Here are some price points I took, and then using the inflation calculator, calculated what that means in today's dollars. To keep things simple and consistent, I calculated using January of the year in question. It's possible that the price I used was from later in the year (after a price increase). But here are some price points:

Year	ARRL Dues	Cost in 2023
1941	$2.50	$53.04
1950	$4.00	$50.92
1960	$5.00	$51.05
1970	$6.50	$51.44
1980	$8.00	$69.22
1990	$30.00	$70.45
2000	$34.00	$60.25
2010	$39.00	$53.85
2020	$49.00	$56.83
2023	$49.00	$49.00

Obviously, this is not an exact science. For instance, in 2001, dues went up to $39 ($66.63 in 2023) making 2000 a pretty good deal! But on the looks of it, the cost of ARRL membership is not keeping up with inflation.

My understanding is that the ARRL lost money last year, making up the difference by dipping into funds reserved for a rainy day (donations, etc). Nobody likes dues going up, but no business can lose money long term and survive. One of three things must take place. Either the league does away with benefits they provide members (publications, spectrum defense, representation in Washington, IEEE representation, etc), increase membership, or increase dues. Of the three options, increasing membership is the only option that won't result in cries of FOWL! from the peanut gallery.

What about NVARC? According to the contents of the first newsletter published in July of 1992, dues were $12 ($25.55 in January 2023). I haven't done enough research to find out exactly when the dues went to $15, but the June 2001 revision of the Bylaws has the dues at $15 ($25.21 in January 2023). Over the years, the board has worked to keep expenses in check. The major expenses were postage (for the Signal), Field Day, and club insurance. We moved to email distribution of the Signal a number of years ago and eliminated a significant expense.

Still, 15 bucks is a pretty good deal! For how long? Time will tell . . . .

HF Power Amplifier

Part 1.

de VLAD, W1MTI

Introduction: What is it, Why to build it, and Tube vs. Solid State.

For an experienced radio amateur operator, RF power amplifiers (RF PA) need no introduction. Anyone seriously interested in DX-ing on 160 or 80 meters, EME, 2 meter Auroral propagation or 6 meters Sporadic-E has an amplifier, and likely more than one, since no PA will cover all of the amateur bands at once.

FIG 1. A pair of metallo-ceramic VHF triodes GI-7B. These work at HF frequencies as well.

Amplifiers may be classified according to several parameters: frequency range, class of operation, elemental base, type of cooling etc.. Most common are air cooled HF PAs covering 1.8 to 30 MHz, or more recently 1.8 to 54MHz ranges in frequency, and delivering 600 to 1500 watts of power.

There are several commercial manufacturers that specialize in making HF PA for radio amateurs. Surprisingly, I have not seen Yaesu or ICOM amplifiers in the Ham retail stores for a while, at least not since 2018. And those that are on the shelves of DX Engineering or HRO are either pricey, or made by MFJ. The high power PAs for 144MHz and higher frequency are (practically) absent from Ham retail stores. This leaves three choices for a ham looking to acquire a HF PA: hunt for a used PA on an auction or online fraud store, "hambrew" one, or look for a custom made by those few Hams that know how to make one.

Since I have a low noise, low angle radiation, but inefficient vertical that can benefit greatly from a PA, I naturally come to a conclusion that I need HF PA. After looking at the prices of new PAs, and examining a couple of species of the used ones, I gravitated toward the "hambrew". Further examining my minimum requirements, I realized that I really only need an amplifier for 160 to 20 meters. That has solidified my initial decision.

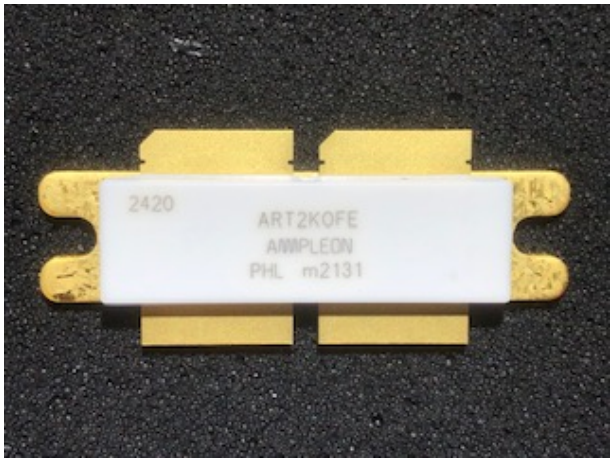


FIG 2. LDMOS ART2KOFE. It hosts two matched transistos. Good from HF to 0.4GHz.

The first design question I had is what type of amplifier designs to use. HF power amplifiers typically use one of two types of amplifier designs: vacuum tube (also known as a valve) or solid-state. While vacuum tube HF power amplifiers have been used in radio communication applications for many years and are known for their high output power, reliability, and durability, they do have some disadvantages when compared to solid-state HF power amplifiers:

- Vacuum tube HF power amplifiers typically require tuning when changing the frequency of operation. This is because vacuum tube amplifiers use resonant circuits to match the amplifier to the input and output impedance of the system, which must be tuned to the specific frequency of operation. Some vacuum tube amplifiers may have automatic tuning circuits that adjust the resonant circuit based on the frequency of the input signal, but this feature is expensive.

- Limited lifespan: Vacuum tubes have a limited lifespan, and their performance can degrade over time, leading to reduced output power and increased distortion. With sharply reduced availability of good quality high power vacuum tubes, the replacement of the "finals" becomes an important consideration.

- High voltage requirements: Vacuum tube amplifiers require high voltage power transformers, which can be expensive and hard to find in case a replacement is needed.

- Heat generation: Vacuum tubes generate a lot of heat during operation, which requires well designed temperature regulation and cooling system with custom, hard to find parts. And, the high air flow brings issues of noise and amplifier placement.

- Size and weight: Vacuum tube amplifiers are typically larger and heavier than solid-state amplifiers, making them more difficult to transport and install. This says no to mobile installation, at least no to a bicycle mobile installation.

In contrast, solid-state amplifiers could be made more efficient, smaller, lighter, and require less maintenance. They also have a longer lifespan and are less susceptible to wear and tear than vacuum tube amplifiers. Solid-state amplifiers can achieve efficiency levels of 70% to 90%, with some high-end models achieving efficiencies of over 95%. This means that the amplifier can convert 70% to 95% of the input power into useful output power, with the remainder being dissipated as heat. Vacuum tube amplifiers have lower efficiencies, typically ranging from 40% to 60%. This is due to the fact that vacuum tubes generate more heat during operation, which leads to higher power dissipation. Good to heat up your shack in winter, but is truly terrible in the hot summer!

On the other hand, solid-state PA have a much greater Inter Modulation Distortion (IMD) and generate very high level of harmonics in the output that must be filtered in order to satisfy FCC requirements. This calls for a robust, properly designed Low Pass Filter (LPF) that can handle at least a kilowatt of RF without overheating. More importantly this changes the efficiency equation somewhat, because 15-25% of RF power emitted in the forms of harmonics has to be absorbed by PA.

When there are design alternatives that require compromises, availability of parts and materials as well as complexity and cost of the design frequently break the tie. This is not always true in case of "homebrew", yet after researching the cost and availability of power RF vacuum tubes, one may safely opt for the solid state, mainly because of aboubdance of reasonably priced LDMOS transistors. For those who are not familiar with terminology: LDMOS (Laterally Diffused Metal Oxide Semiconductor) transistor is a type of power transistor that is commonly used in high-power RF applications. It is a variation of the MOSFET (Metal Oxide Semiconductor Field-Effect Transistor) that has been optimized for high-power RF applications.

State of the PA "hambrew" art.

There are many radio amateurs who have built HF power amplifiers and published their designs online. Here are two, whom I turned to for design plans and ideas:

FIG 3. Jim, W6PQL.

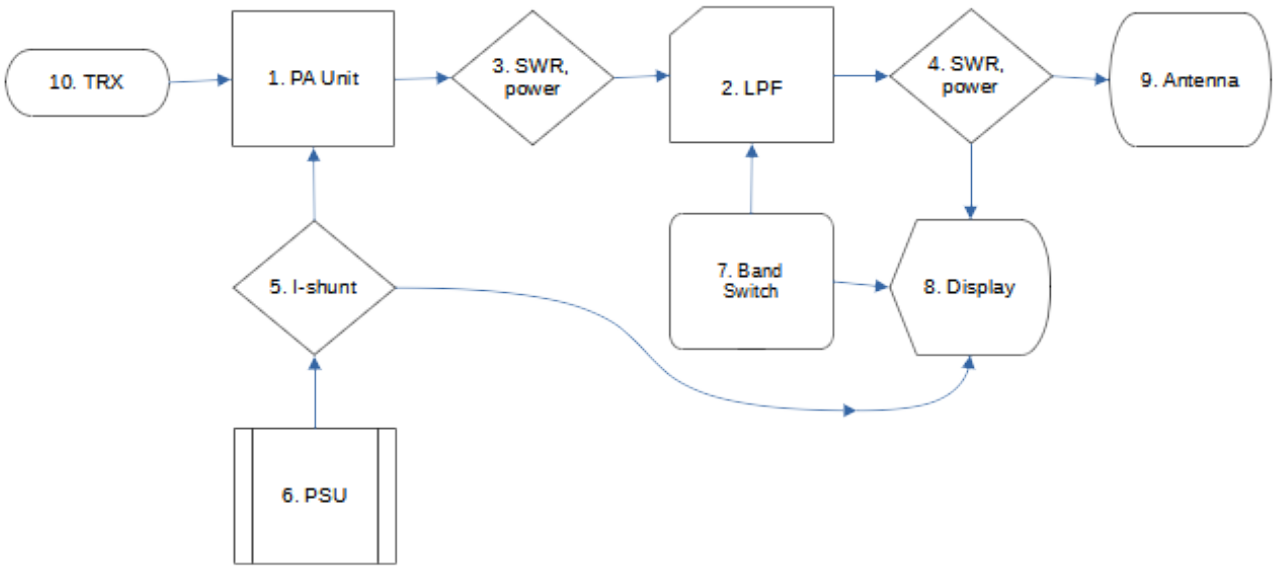
W6PQL: James Klitzing (W6PQL) is a well-known amateur radio operator and experimenter who has designed and built many RF circuits, including a number of high-power HF power amplifiers. His website, w6pql.com, includes detailed schematics and construction notes for his amplifier designs, as well as other RF projects. W6PQL's most popular HF amplifier design is a 1.2 kW solid-state amplifier based on LDMOS RF power transistors, which has been widely used by hams and is known for its excellent performance and reliability. His "chapter" in the 100th ARRL Handbook is a must read for anyone contemplating building HF PA.

FIG 4. Kurt, DJ0ABR.

DJ0ABR: Kurt Moraw (DJ0ABR) is a German ham who has built a number of high-power HF power amplifiers using a variety of RF power devices. He is particularly known for his innovative amplifier designs that incorporate features such as automatic multiple transceiver control and liquid cooling. DJ0ABR's website, dj0abr.de, includes schematics, construction details, and performance data for his amplifier designs, as well as other RF projects and resources for hams. Check out his "YoTube" channel for a wealth of information.

Both James Klitzing (W6PQL) and Kurt Moraw (DJ0ABR) have made significant contributions to the field of amateur radio through their amplifier designs and other RF projects, and their work has inspired many hams, including me to pursue their own homebrewing projects.

HF PA block diagram



1. The heart of the amplifier - PA Unit, aka “PA pallet” with a LDMOS transistor attached to a cooling device.
2. Low pass filter unit (LPF). This is mandatory. More on LPF in the second part of the article.
3. SWR/Power bridge connected to a protection unit that will cut off power to LDMOS transistor in case of LPF failure or incorrect band choice. More on it in the next issue.
4. SWR/Power bridge capable of accurate measurements of output RF power and antenna’s SWR.
5. Current shunt that is needed for measuring performance as well as protection and tuning PA.
6. Power supply, capable of 50V and 20-30A DC.
7. At least a manual, preferably automatic band switch.
8. A display or some type or an indicator to inform operator about the state of PA.
9. Antenna connector with an optional switch.
10. Transceiver interface that besides RF input, provides PTT, operating band data, ALC and may have an input attenuator.

This is a “minimal” design, without a central control unit, which this days is typically designed around of at least one MCU.

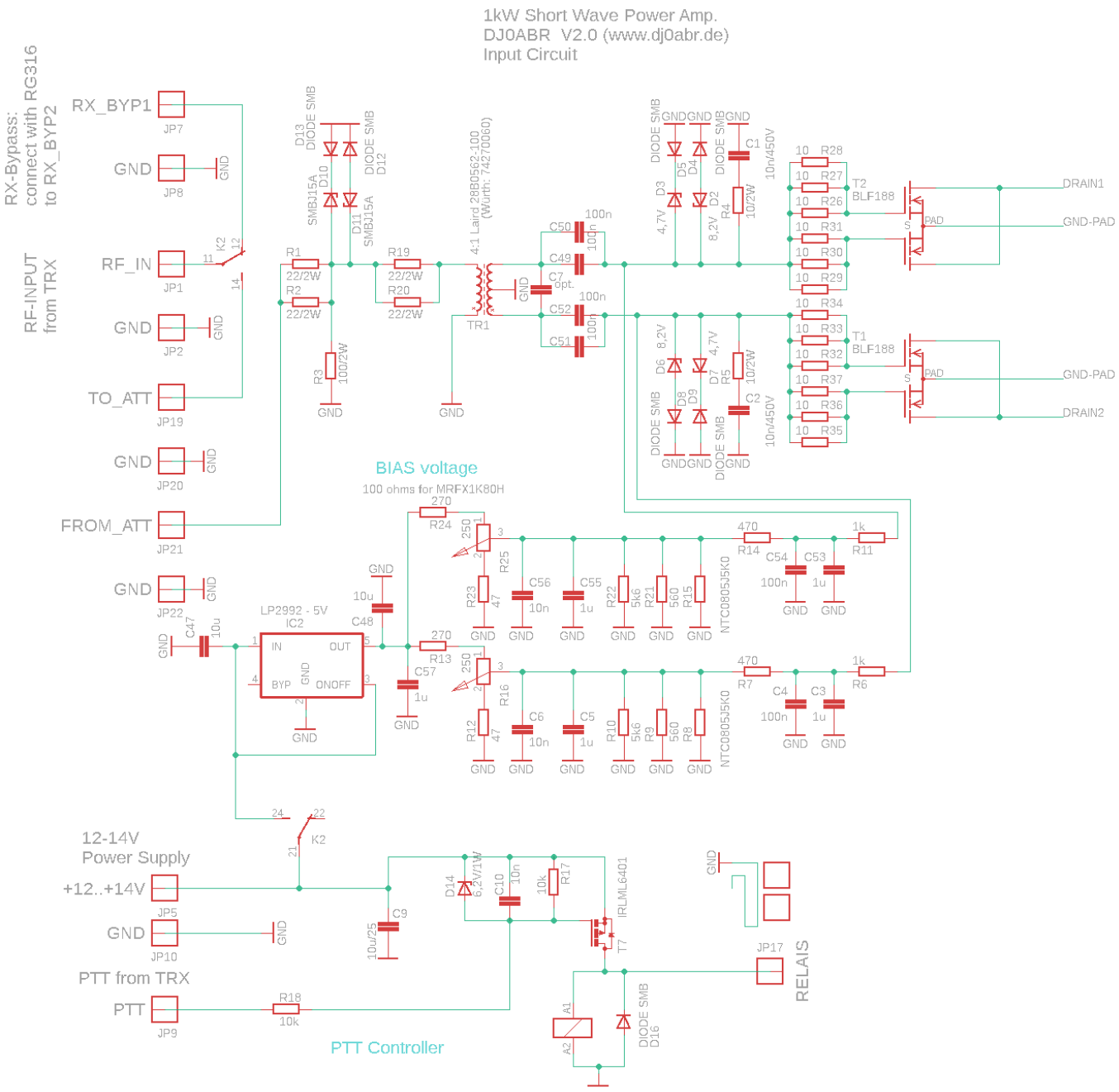


FIG 5. Input matching circuit of AB-class HF PA unit. R16, R25 set bias voltage. R8, R15 provide temperature compensation by increasingly shunting bias voltage as temperature rises. R1-R3, R19, R20, D10-D13 form an input attenuator and voltage limiter at the input transformer TR1. The input transfromer is a transmission line type wound on Laird 28B0562-100 core with RG316 coaxial cable. D3-D8 provide overvoltage protection at LDMOS gates . The purpose of R26-R37 is to spread RF signal along the gates of LDMOS. IC2 is a low noise, low dropout bias voltage regulator. The signal relay is TAKAMISAWA RY12W-K.

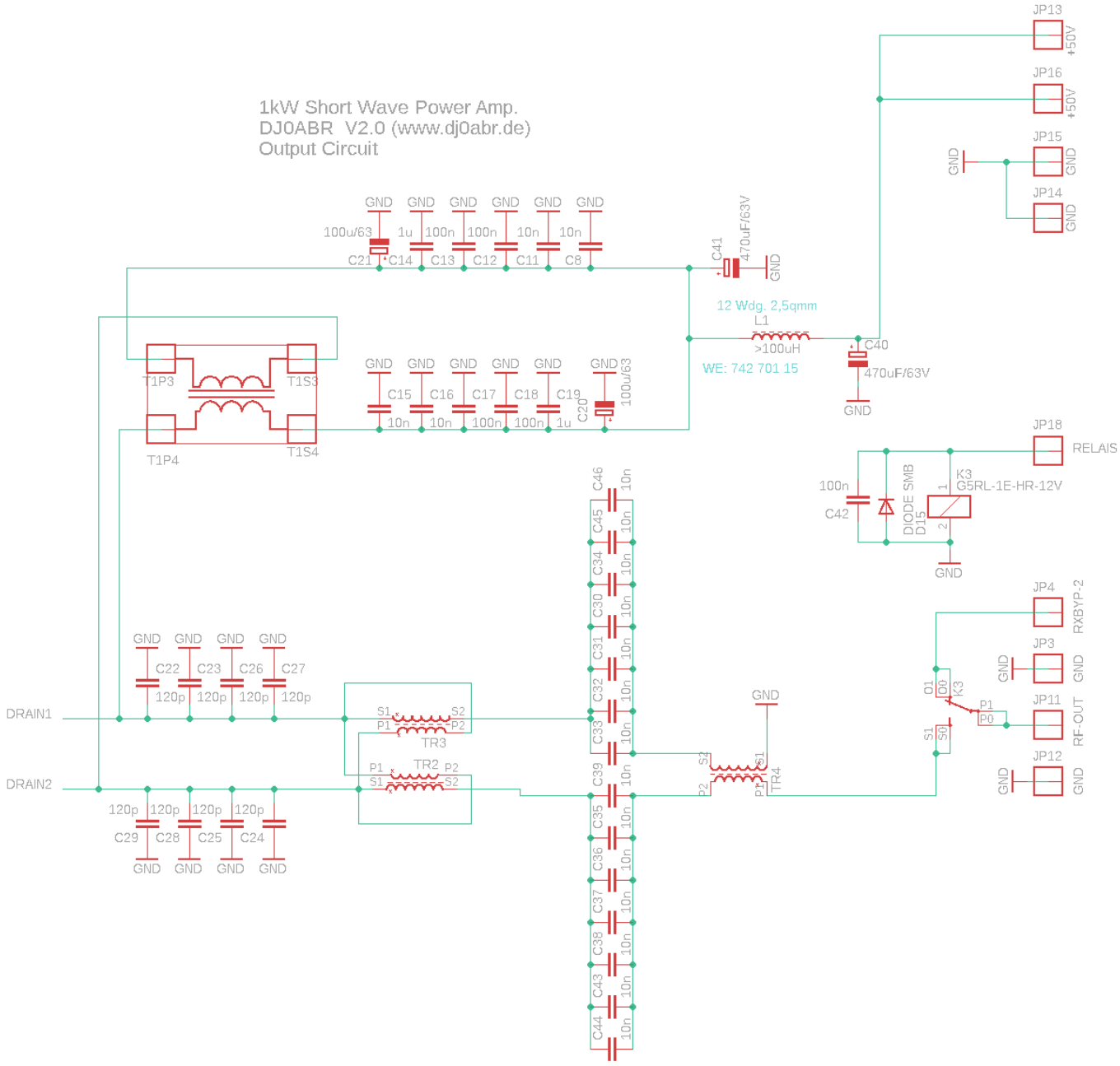


FIG 6. Output matching circuit of the PA unit. TR3 and TR2 form 9:1 transformer. The transformer is transmission line type wound with RG405 coaxial cable on four Laird 28B1020-100 ferrite cores. TR4 is 1:1 output balun wound with RG402 cable on a two Laird 28B1020-100 ferrite cores. T1 is a bifilar choke wound with PTFE insulated silver plated 16AWG wire on a Laird 28B1020-100 ferrite core. L1 is monofilar choke wound with 14AWG magnet wire on a high permittivity ferrite ring of 3cm diameter. The capacitance is spread among multilpe ceramic capacitors to facilitate large RF displacement currens. All ceramic capacitors are RF grade and at least of a kilovolt rating. The power relay is TE OZ-SS112L1.

The PA unit, aka "pallet".

The function of the PA Unit is to take a low-power input signal from the transceiver and amplify it to a higher power output signal while maintaining the signal's integrity. The "pallet" is AB-class push-pull amplifier. Electrically, PA Unit has 4:1 input matching network with bias controller, 1:9 output matching network with 1:1 balun and a choke and input/output switching relays.

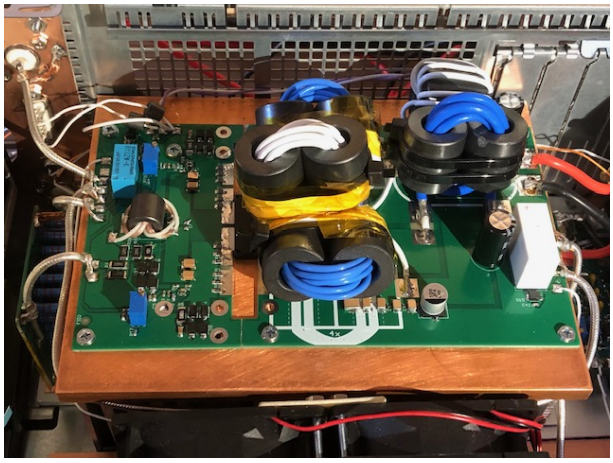


FIG 7. AB-class, "1kW" [2] PA unit with Ampleon ART1K6PHZ transistor.

Input matching network also has TVS diodes for protection and an attenuator. The bias controller has a voltage regulator and negative bias temperature compensation. Two independent bias voltage outputs allow to control two gates of the double MOSFET or two separate transistors. The input and output transformers as well as balun are wound on Laird ferrite cores with a RG316, RG405 and RG402 coaxial cable respectively. PCB was manufactured using DJ0ABR EAGLE files. It is FR4, 1.6mm with 25 micron copper. DPDT signal relay in the input circuit controls RF input bypass and turns on and off bias controller. SPDT relay in the output circuit complements the RF bypass as well as connects RF output to the next stage. Both relays are turned on by PTT " low" signal from transceiver.

The PCB accommodates a wide range of LDMOS transistors that are currently available, such as BLF188, ART1K6, ART2K0 and others. The transistor has to be soldered to a copper spreader. I have used 0.375 inch thick 6 inch by 8 inch copper plate from McMaster-Carr, but substantially smaller size copper bar could be used. About 3.5 inch by 5 inch will work for a single transistor with 1.2 – 1.7 kW output. The key here is to solder transistor in place. W6PQL has a video on how to do it. I have followed it with exception that I did not machined the spreader, only drilled the mounting holes that will be used for attaching PCB to the spreader and the spreader to the heat sink, drilled the blind holes for the relay pins and polished the spreader with 340, 400 and 600 grit sanding paper. If you don't machine the trench for the transistor, you must make sure that the spreader is leveled when you heat it up, otherwise the solder will run off from under the transistor as soon as it melts. I had used 75 mm of Kester 44 Sn63Pb37 0.031 inch diameter rosin core solder with melting temperature of 183C. The estimated maximum soldering temperature in this case was around 230C.

"Pallet" assembly. First, I have soldered all SMD parts and relays. Then I wounded an input transformer and soldered it to PCB. Next I cut the PCB and separated it into input and output sections. The sections are slid under the gates and drain of the LDMOS. After that I have soldered the drains and gates to the PCB. The next step is to wound the out-

[2] Actual output power is limited by output matching transformer, LPF and thermal stability. The current design produces up to 800W, that is half of nominal power of ART1K6PHZ transistor.

put transformer, balun and DC chokes. I used 16 AWG PTFE/silver plated wire to wound the chokes. Ideally the output transformer should be wound with 25 Ohm coaxial cable. But I used two RG405 cables in parallel. The transformer and the bifillar choke are secured by plastic cable ties and soldered to PCB.

The flat side of the aluminum sink[3] is covered by AAVID THERMALLOY "Thermalcote I" thermal joint compound. The assembled PCB/copper spreader is bolted to the aluminum heat sink forming a "sandwich".

After the "pallet" has been constructed, the operating point of the amplifier has to be set. This is done by adjusting bias voltage on the drains of the transistor. The bias voltage determines quiscent drain current of the transistor I_{d_q}. The datasheet for ART1K6PHZ has data for 50mA to 600mA. I started with 300mA. After checking for shorts, I connected 24V power supply and run preliminary test. Next I connected Eltek flatpack2 2kW PSU delivering 53.6V, and used Yaesu FT-891 in FM mode as exciter. There was an additional 7dB input attenuator emplyed. The data for various power levels at 10.1 MHz is in Table 1. The effect of variation of I_{d_q} on output power is shown in Table 2. The output at $I_{d_q} = 1A$ at various frequencies is shown in Table 3. The output power was measured with DAIWA CN-901 HP type SWR/Power meter in averaging mode. Low Pass Filters[4] with appropriate cut-offs was inserted between the output of the PA unit and the CN-901. The "Cantenna" was used as a dummy load.

Table 1: Input power test

$P_{in}(W)$	$I_d(A)$	$P_{out}(W)$	$f(MHz)$	$I_{d_q}(A)$
5	11.1	150	10.1	0.6
7	13.5	230	10.1	0.6
10	15.8	330	10.1	0.6
15	18.3	470	10.1	0.6
20	20	550	10.1	0.6

Table 2: Drain quiscent current test

$P_{in}(W)$	$I_d(A)$	$P_{out}(W)$	$f(MHz)$	$I_{d_q}(A)$
5	16.5	380	10.1	0.6
5	16.8	390	10.1	0.8
5	17.1	410	10.1	1.0
7	20.2	560	10.1	1.0

Table 3: Frequency test

$P_{in}(W)$	$I_d(A)$	$P_{out}(W)$	$f(MHz)$	$I_{d_q}(A)$
5	18.5	560	1.879	1.0
5	16	350	3.851	1.0
5	16.4	375	7.119	1.0
5	15,4	400	14.215	1.0

References:

1. DJ0ABR EAGLE files.
2. DJ0ABR Construction Manual.
3. ART1K6PHZ datasheet.
4. Heat sink

[3]HeatSink USA, 8 inch long, 5 inch wide with serrated fins and .375 inch flat base.
[4]Description of the Low Pass filters will be published in the near future.

Next General Meeting

The next General meeting will be held in person at the Pepperell Community Center, 2 Hollis St, Pepperell, MA 01463 on April 20, 2023 at 7:30pm. The doors will open at 7pm for socializing. This will be the Special Meeting. The speaker for the meeting is Tom Frenaye. The tenative title is "The New England QSO Party". See the calendar section for more information.

The Treasurer's Report

Income for March 2023 was $115 in membership fees. Expenses were $3.45 for PayPal fees, leaving a net income of $111.55.

Current balances:

General fund	$3,132.08
Community fund	$6,628.25

Welcome to new member John Watson N2XIO of Hollis NH.

As of 6 April we have 53 members who are current with their dues and 28 renewals outstanding. Renewal months are in the member list on www.n1nc.org in the Member's area; check yours on https://www.n1nc.org/Members/Roster or you may also email me.

Thank you to those of you who mail your renewals or use PayPal without a reminder. To pay membership dues via PayPal see the instructions in the same Members area.

If you are joining ARRL or renewing your membership please consider letting Ralph send in the paperwork for you. The Club will buy the stamp and will get a commission from ARRL. As a Special Service Club, the ARRL expects a majority of Club members to also be ARRL members. Contact Ralph for further information if you need it.

de Ralph, KD1SM

NVARC Board Meeting

April 6, 2023

Attendees:

Bruce, K1BG, John, K1JEB, Ralph, KD1SM, Vlad, W1MTI, Skip, K1NKR, Bill, K1NS, Jim, N8VIM, Rob Durst George, K1HBT,

Call to Order: 7:30pm

Ralph, KD1SM presented Treasurer's report (see above). He also welcomed the new member John Watson N2XIO of Hollis NH.

The election committee has not found any club members willing to run for President to date..

Secretary John K1JEB will bring to the next club meeting some new badge samples.

Jim N8VIM introduced an easier Club YouTube web page link to use: https://www.youtube.com/@nvarc

Bruce K1BG is asking for help with future club meeting guest speakers.

Jim N8VIM has checked the batteries on the club repeater and the batteries are doing well.

Ralph KD1SM notes the date for the Groton Road Race is Sunday May 7th, 2023.The central location for the road race has been relocated to the Groton Music Center.

Adjournment: 8:20pm

de John, K1JEB

NVARC's 2 meter Net

The NVARC Information Net is held Monday nights at 7:30pm, Eastern time on the 2m Pepperell repeater, N1MNX: 147.345MHz +100.

NVARC General Meetings

NVARC General Meetings are scheduled for the third Thursday of the month at 2430 UTC (7:30pm, Eastern Time), except for July and August, when no General Meetings are held. When held, meetings are at the Pepperell Community center.

Strays

From QST, May 1958.

Contest Calendar

APRIL

15/16 Worked All Provinces of China DX Contest

15/16 YU DX Contest

18 222 MHz Spring Sprint

22 QRP to the Field

22 YOTA Contest

22/23 SP DX RTTY Contest

23 International Vintage Contest HF

24/25 ANZAC Day Contest

26 432 MHz Spring Sprint

29/30 10-10 Int. Spring Contest, Digital

29/30 Helvetia Contest

MAY

1 AGCW QRP/QRP Party

4/5 MIE 33 Contest

6 Microwave Spring Sprint

6/7 SBMS 2.3 GHz and Up Contest and Club Challenge

6/7 New England QSO Party

13/14 Portuguese Navy Day Contest - CT1DBS Memorial

13/14 VOLTA WW RTTY Contest

13/14 50 MHz Spring Sprint

PO Box 900
Pepperell Mass 01463-0900
http://www.n1nc.org/
www.youtube.com/@nvarc

Join NVARC! Annual membership dues are $15; $20 for a family.

NVARC general meetings are scheduled for the third Thursday of the month at 7:30pm, Eastern Time. NVARC thanks Medtronic, Inc for providing the teleconferencing services under their employee volunteer support program for non-profit organizations.

Contact us on the N1MNX repeater.
$442.900(+), 100Hz$
$147.345(+), 100Hz$
$53.890(-), 100Hz$

This newsletter is published monthly. Submissions, corrections and inquiries should be directed to the newsletter editor: `editor@n1nc.org`

Articles and graphics in most PC-compatible formats are OK.

Editor: Vladimir A. Goncharov, W1MTI

Have YOU Paid Your NVARC Dues?

See: http://www.n1nc.org/MembersRoste for your reneval month.

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