The LongPath

June 2021 — Volume 45 Issue 6 A North Alabama DX Club Publication

Contents:

From the President

By Bob DePierre, K8KI

A month ago, I was all set for our May meeting, and then I had a little problem… which left me in the hospital for 12 of the longest days you can imagine. I was having heart problems, and thought it was no big deal. Not so. Triple bypass surgery happened and I got knocked down for the count. Actually, I'm not quite back up yet. I'm not yet able to stay in the game very long (like the length of a club meeting), and my left arm doesn't work (nerve problem). So, I have asked our VP, Steve Molo, to run our June meeting for me, and find a program. I'll plan to attend, if I can, and will get the zoom program running.

We've got the DX schedule in the Long Path again, as well as a good number of tuner stories. Many thanks to all of the authors. Later this month we have the ARRL Field Day, which will be back at the Rocket Center. The DX Club has been integral to us winning this contest for years. But most of us are getting old and it's time, actually past time, for new ops to step forward. At any rate, come on out to the party and let's have a good time!

So, let's meet at the next NADX club meeting on Tuesday, June 8th, at Newk's Eatery on University. I hope we can get the meeting up on Zoom. If so, the sign-on will be exactly the same as in the past. I'll send members the Zoom invitation on Sunday just before the meeting. We'll also go back to the old schedule: dinner sometime around 5:30, meeting starting at 6:00, and the program a little before 6:30.

Unstable Rig Computer, Anyone?

By Bob DePierre, K8KI

For years I'd been buying/using what I had thought was the best possible control computer for my rig, which had been a Flex for this entire time. The three computers, now all condemned i7's, were all pretty nice ones. I moved all of them to Win10 over the last couple of years. But no sooner would I get one of them stable and working right with my Flex than something would go out of whack, and I would often have to call Flex, and have them take control remotely and fix it. But they were always "fixing" the computer, and never the radio. All this time I had to take a lot of heat from my neighbors, who were using other brands, and were adamant that the Flex was the problem.

Unstable Rig Computer, Anyone? (continued)

Well, in turn about a year ago, I chained each of those computers to the bumper of my truck and dragged them to the curb. I talked to a few IT guys, including the one at the emporium where I sometimes work. The drumbeat was constant: get a new Dell laptop. My ultimate answer was a bit surprising.

This time I got a Dell XPS13 with another i7 processor. But this time I got it with a docking station, and connectors I had never heard of. The computer has no USB-A or HDMI connectors. The docking station is loaded with them and sits several feet away. I now have a single wire connecting the laptop to the world – yes, just ONE. That wire goes from the dock to a connector on the laptop called: Thunderbolt USB Type-C with Power Share. All my peripherals, plus power, are on that one wire: 2 external monitors, the Flex Control, mouse, and RJ45 ethernet to the radio. That wire is as far from the amp as I can get it. And of course It has some ferrites on it.

For the first time in 9 years, I have a computer that works ALL of the time. Not a single glitch in the year I've had it. I haven't had to call Flex, no calls to IT, no endless swapping of peripheral boards. Ham radio is a lot more fun when you're not fixing your equipment all of the time. If anyone else has a similar problem, here is a solution that is strong and elegant, although not cheap.

DXpeditions in June/July 2021

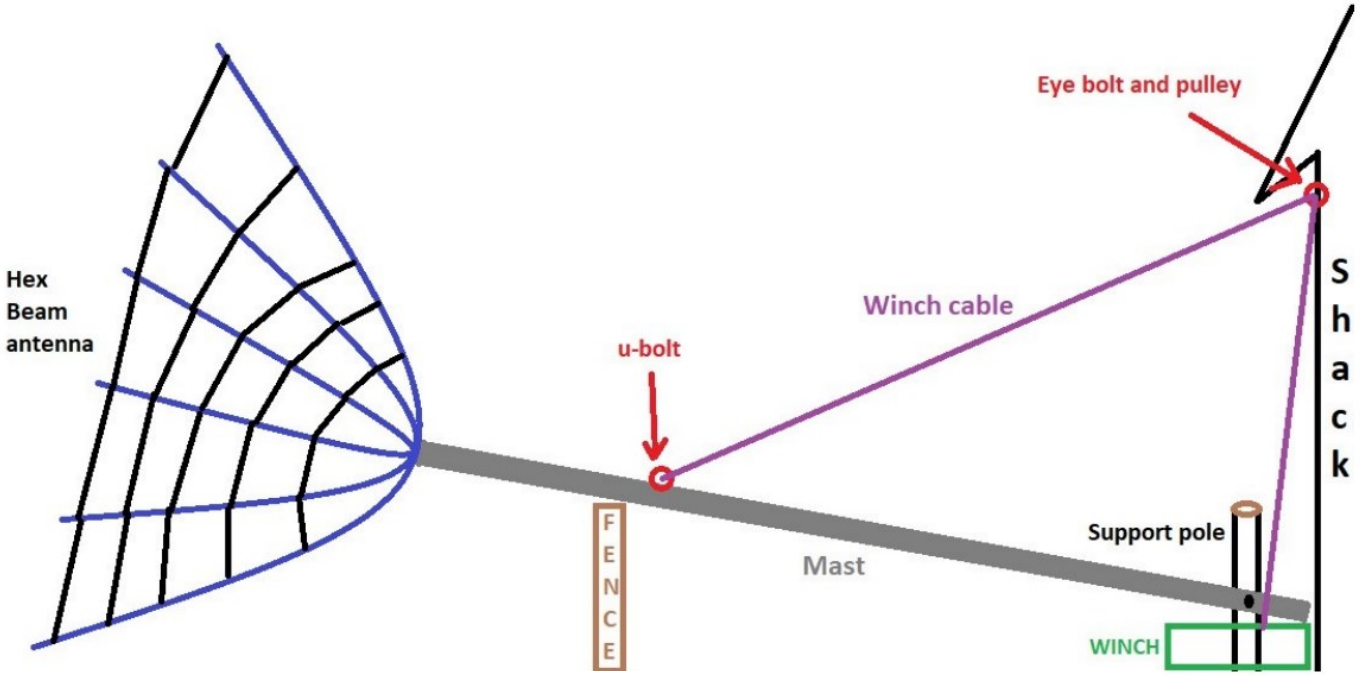
Reprinted by permission of Bill Feidt, NG3K

Start Date	End Date	DXCC Entity	Call	QSL via	Reported by	Info
2021 Jun03	2021 Jun14	**British Virgin Is**	**VP2V**	LoTW	TDDX 20210517	By NC3Z as VP2V/NC3Z
2021 Jun08	2021 Jul10	**Greenland**	**OX3LX**	LoTW	TDDX 20210521	By OZ1DJJ fm IOTA NA-018, NA-220, NA151; HF + 6 4m; spare time operation; QSL also OK via OZ0J and Club Log OQRS
2021 Jun10	2021 Jun12	**Ogasawara**	JD1BLY	JI5RPT	JI5RPT 20210422	By JI5RPT fm Chichijima I (IOTA AS-031); 40-6m; FT8 CW SSB; QSL OK B/d; COVID permitting
2021 Jun30	2021 Jul03	**Alaska**	KL7RRC	N7RO	TDDX 20210420	By N7QT W8HC NL8F N3QQ fm Adak I (IOTA NA-039); 40-6m; CW SSB FT8 (f/h)
2021 Jun30	2021 Jul04	**Liechtenstein**	**HB0**	EB7DX	TDDX 20210518	By HB9HBY as HB0/HB9HBY fm Steg; FT8 CW SSB; 160-10m; G5RV
July						
2021 Jul07	2021 Jul12	**Alaska**	KL7RRC	N7RO	TDDX 20210420	By N7QT W8HC NL8F N3QQ fm Kiska I (IOTA NA-070); 40-6m; CW SSB FT8 (f/h)
2021 Jul07	2021 Jul14	**Aruba**	P4	ND7J	ND7J 20190722	By ND7J as P4/ND7J and N4IQ as P4/N4IQ; QRV for IARU Contest
2021 Jul14	2021 Jul16	**Alaska**	KL7RRC	N7RO	TDDX 20210420	By N7QT W8HC NL8F N3QQ fm Adak I (IOTA NA-039); 40-6m; CW SSB FT8 (f/h)
2021 Jul14	2021 Jul21	**Bahamas**	C6AHA	LoTW	DXW.Net 20210305	By N4RRR K4KSW N4QBS NN2T fm Bimini I (IOTA NA-048); HF FT8 SSB CW; QSL via Club Log OQRS
2021 Jul23	2021 Aug03	**St Vincent**	J88PI	GW4DVB Direct	DXW.Net 20200727	By GW4DVB fm Palm I (IOTA NA-025, FK92ho); 40-6m; SSB FT8
2021 Jul21	2021 Jul26	**Svalbard**	JW0W	LoTW	DXW.Net 20210422	By LB1QI LB2HG LA7GIA LA7QIA LA8OM fm Prins Karls Forland I (IOTA EU-063); focus on 40 30 20m; focus on NA and Asia; 1kw; VDAs and verticals nr salt water; QSL via M0OXO; QRV for RSGB IOTA

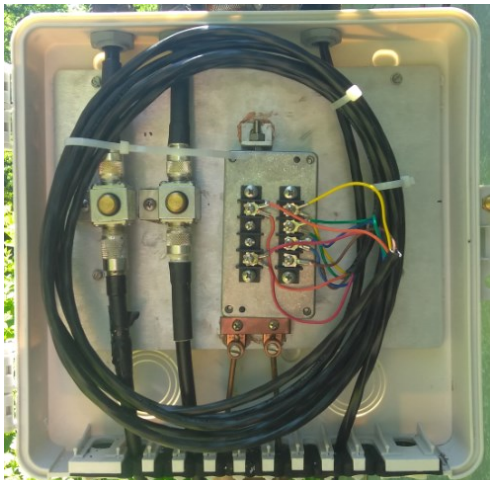
Update: Homebrew Mast Lowering/Raising System

By Fred Kepner, K3FRK

I wrote an article for the December 2020 issue of the LongPath describing a system I designed to make working on my antenna a little bit easier. "A Safer Method for Working on My Antenna" appeared on page 3 of that issue, if you are interested in seeing photos of the individual components of the system. Although I built the system in the fall, I did not get around to testing it until recently. I am planning an antenna upgrade in the next few weeks and needed to install a new rotator that can handle the larger antenna. I also wanted to replace the rotator controller cable and took the opportunity to install a DX Engineering controller cable surge protector (DXE-IS-RCT). I was a little nervous to lower the antenna on my untested system but, fortunately, it worked as designed and without issue. I am now confident that I can proceed with installing my new antenna when it arrives. Below is my initial sketch of the planned install and a photo of the successful test.



K3FRK's original system design sketch



Controller cable surge protector

K3FRK's antenna in the lowered position

Analysis and Performance of Automatic Antenna Tuners

By "Kai" Siwiak, KE4PT

I analyzed the Icom AH-4 using the reversible L network tuner circuit shown in **Figure 1**. I then analytically placed a 50 W resistor on the "Radio side" and calculated the impedances on the "Antenna side" while stepping through the allowed component values for the two reversible L cases (0 to 2400 pF capacitor bank on the output, then on the input), and across ham bands from 1.8 to 54 MHz. I used *MathCAD* for analysis.

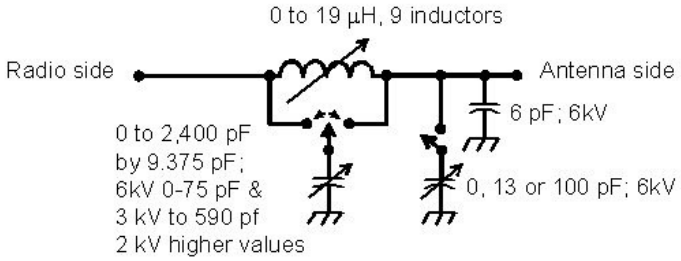


Figure 1 – The AH-4 circuit allows for 1,048,576 tuning combinations.

Next, I reported on a Smith chart the complex conjugate of the calculated impedances on the "Antenna side". This maps the impedances that the AH-4 can match, given the range of component values and steps in **Figure 1**. **Figure 2** shows the range of impedances the AH-4 can match plotted on a Smith chart.

Notice how the coverage on the Smith chart gets whittled away as the frequency decreases. It indicates that the component values, especially the inductances, do not have sufficient range to cover the whole chart at those lower frequencies! Impedance coverage is not continuous, but depends on the step size of the components, and that granularity is implied here by the inductor and capacitor steps in **Figure 1**. For example, high end of the spectrum, 6 m band tuning points are spread out (not shown) more than at lower frequencies on the Smith chart. The tuner range of matching is completely specified by:

(1) the tuner topology, here in **Figure 1**, a reversible L network with additional switched capacitance on the antenna side

(2) the range of component values and the component step size; usually the minimum value of the inductor and minimum value of the capacitor in the capacitor bank.

Also, what is not revealed here is the tuning algorithm and tuning strategy. These are typically proprietary features. Given estimates of the inductor Q it would be possible to calculate the tuner losses across the Smith chart at various frequencies. The AH-4 inductors are all air-wound, so will be lower loss than ferrite inductors.

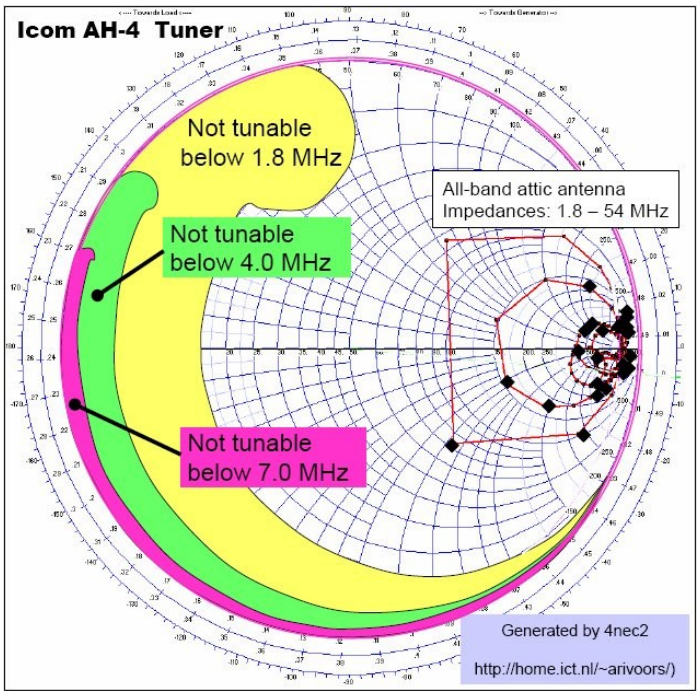


Figure 2 – The range of impedances that the AH-4 can match between 1.8 and 54 MHz.

On tuning strategy, the AH-4 initially sets the connected compatible radio RF power to about 10 W, and switches in a 10 dB attenuator between the radio and the tuner. Thus no more than 1 W is every supplied to the antenna during tuning, and the radio transmitter always "sees" more than 20 dB return loss (SWR < 1.2:1) during the tuning process, ensuring a valid tuning solution, and a safe condition for the transmitter.

I have similarly analyzed the Elecraft T1

Analysis and Performance of Automatic Antenna Tuners (cont.)

miniature ATU, which also uses a reversible L network with 0 to 1300 pF by 10 pF and 0 to 7.5 mH by 0.055 mH (32,768 combinations). Its range of component values is smaller than that of the AH-4, so it covers less of the Smith chart. Its inductors are ferrites so losses will be higher than with the AH-4 which uses air wound coils. The T1 uses latching relays (the AH-4 does not) it so draws no power once tuning is complete – a valuable attribute to its QRP target audience.

SAVE THE DATE
NADXC Banquet

Saturday, August 21st, 2021

Keynote Speaker:
Adrian Ciuperca, KO8SCA

Tickets are on sale on the NADXC website

https://www.nadxc.org/nadxc-dinner-banquet-details/

Are Magnetic Loop Antennas as Good as a Dipole, Vertical, or Quad Antenna?

By Barry Johnson, W4WB

Recently, there seems to be a resurgent interest in magnetic loop antennas for various reasons such as having (i) a "stealth" antenna for those living in an apartment or restricted neighborhood, (ii) a portable and backpackable antenna for POTA, SOTA, or (iii) just fun, and so on. Most antennas of this type were homebrew until MFJ introduced their two magnetic loop antennas some years ago. A bit over a decade ago, Alex PY1AHD introduced into the marketplace the backpackable AlexLoop. I have had an AlexLoop for over 12 years and have used it on a number of outing in the past with my old FT-817. In the past few years, several others have started offering backpackable magnetic loop antennas such as the ICOM AL-705, the Chameleon Antenna CHA F-LOOP 2.0, Alpha Antenna MagLoop, Ciro Mazzoni MIDI Automatic Magnetic Loop Antennas (not backpackable), PreciseRF, and others (some of which have come and gone). Prices vary from a few hundred dollars to over two thousand dollars in part due to being manual or remote tuned, construction, power handling capability, and frequency coverage. Some of these antennas have transmitter power limits of typically 20 W, 150 W, 300 W, and even 800 W.

My MFJ-1786 SUPER HI-Q LOOP, having a 36" diameter, antenna covers 10 m to 30 m. This antenna is well made and has a very nice remote tune controller that makes tuning very easy. Under today's propagation conditions, I would prefer to have the MFJ-1788 that covers 15 m to 40 m. It is worth noting that when tuned the useable bandwidth becomes less as the tuned frequency decreases.

Mostly I used the MFJ-1786 on 30 m and found it worked quite well mounted on a BlueSky Lite mast at 35 feet as shown in Figure 1. I could A/B it with my five-band 10 m to 20 m Hex-Beam at 42 feet and found that, as you would expect, the Hex-Beam performed much better.

Figure 1. MFJ-1786 magnetic loop antenna, covering 10 m to 30 m, mounted on a BlueSky Lite mast at 35 feet.

So, what about the title of this article, viz., Are Magnetic Loop Antennas as Good as a Dipole, Vertical, or Quad Antenna? I have referenced to interesting articles on small magnetic loop antennas that you may find

Are Magnetic Loop Antennas as Good as a Dipole, Vertical, or Quad Antenna? (continued)

interesting reading and you might agree or disagree with statements or approaches. Mike Underhill (G3LHZ) prepared a slide presentation entitled "Small Loop Antenna Efficiency" that can be viewed at https://www.nonstopsystems.com/radio/pdf-ant/antenna-article-Mag-Loop-Efficiency.pdf. Leigh Turner (VK5KLT) wrote a quite long 33-page article entitled "The Underestimated Magnetic Loop HF Antenna" from which I have extracted some material on page 17. I underlined some text in the last paragraph that forms the basis of the question posed. The article can be found at https://www.nonstopsystems.com/radio/pdf-ant/article-antenna-mag-loop-2.pdf. I suggest that you read the entirety of page 17 to understand the full context.

"Significantly, a small loop antenna will typically produce a SNR that is some 10 to 20 dB greater than a horizontal dipole in a noisy urban environment and an even greater improvement in SNR when compared to a vertical antenna as a result of the man-made noise comprising a strong electric field component and being largely vertically polarized. The SNR determines readability, not the received signal strength per se. The missing strength can be returned noiselessly by the receiver's AGC system.

The most important criterion for reception is the SNR and not antenna gain or efficiency. In the HF band, particularly at the low-mid frequency portion, external man-made, seasonally and solar cycle variable galactic / atmospheric noise is dominant."

Unquoted text not included between the above and following paragraphs. Read page 17.

"It is these collective characteristics of small loop antennas that enable then to often very significantly outperform their large dipole, Yagi or Quad beam counterparts during direct A/B comparative testing. Conversely in Tx mode the antenna's inherent filter action selectivity causes any transmitter harmonics to be greatly attenuated and not radiated. This can help with eliminating some forms of TVI and BCI."

So, do you agree or disagree with VK5KLT or don't care?

Elecraft KPA500

By Rob Suggs, NN4NT

The KPA500 is my first QRO amp but not my first HF amp. In the late 70's I built a 100W amp for my Ten Tec Argonaut 509. I purchased the solid state RF module and designed and built the 5 pole Chebyshev filters and TR relay. I had no way to test the filters but I guess they worked OK. I got no notes from the FCC or Official Observers.

Fast forward to 2020. I had been having a great time with 100W which netted some contest certificates and over 200 entities for DXCC. But I had always wanted some extra punch to get through the pile a little quicker. I seriously considered the ACOM 1010 and didn't mind dealing with some tuning since I use a manual tuner most of the time anyway. But its lack of 6m meant that I couldn't get the extra power for meteor scatter where it really helps. We had purchased a KPA500 for the NASA MSFC club station a couple of years ago and I really enjoyed using it. We figured it would be a good choice for a club with numerous inexperienced hams since the amp has been battle-proven in numerous DXpeditions. It has plenty of protections to keep mistakes from doing any damage. So, I ordered the KPA500 kit from Elecraft last summer. The kit price is about $2400. You only save $100 over the assembled price but I wanted to have the fun of assembly. It took a few weeks to get it, with the supply chain disruption due to COVID, but once I did, I thoroughly enjoyed assembling the amp. There is no soldering. It is mostly mechanical assembly with a multitude of "almost the same size but different" screws and plugging in various ribbon cables and

Elecraft KPA500 (continued)

Wires. I completed assembly one enjoyable Saturday.

It worked great on first power-up but there was and still is a loud hum in the shack on key down. I contacted Elecraft and they finally sent some additional rubber disks to mount the toroidal AC transformer. It is already sitting on some but more is better to reduce coupling with the steel case. After installing them it certainly reduced the hum but not to a low enough level. I even asked K6XX, the lead Elecraft engineer for the amps, about this at the QSO Today Virtual Expo after his presentation on the amp. He said that some transformers are noisier than others due to impurities in the core material. That's not what I wanted to hear and am pursuing a replacement transformer with tech support. I'll let you know how that comes out. Tech support has been slow in responding generally and I'm sure they'd rather not start replacing transformers.

Other than the hum, which isn't a problem during phone and CW operations since I use a headset for that, the amp is great. Elecraft claims you can key down full power for 5 minutes with no problems. Depending on the band, 25 – 30 W drive gets 500+ W out. The fan adjusts its speed with temperature and is completely quiet when not transmitting. I didn't spring for the KAT500 autotuner for it since I use a manual tuner with built-in balun for my ladder line fed dipoles. I just got the less expensive LDG AT-1000 ProII and Palomar 4:1 balun for my ladder line-fed dipoles which I have just started using. I did buy the Elecraft interface cable for my Yaesu FTDX-101D so the amp would know the band and switch automatically. That isn't absolutely necessary since the amp can sense the frequency and do the band switching but I prefer that to happen prior to transmitting. I also installed the free Elecraft control software and an old serial cable for that. It isn't fancy but lets me switch between operate and standby with a mouse rather than reaching for the button. It also displays temperature, power, current, SWR and such simultaneously without switching the display on the amp. I'm pursuing a Node Red "flow" for amp control to make that a little jazzier.

Aside from the hum, the amp is great. I get good signal reports and seem to get through the pileups much easier than barefoot. I also seem to get better rates when running in contests. It really helped with meteor scatter during the Geminids in December. It certainly isn't legal limit but it does provide better than 1 S-unit of signal improvement. And it runs fine from the 115V AC. You can't get another S-unit with legal power. BTW the one at the NASA club station is very quiet so the hum isn't a design problem.

Elecraft KPA500

NADXC Officers and Directors

President	Bob De Pierre, K8KI
Vice-President	Steve Molo, KI4KWR
Secretary/ Treasurer	Chris Reed, AI4U
At-Large	Kevin Hibbs, KG4TEI
Directors:	Tom Duncan, KG4CUY (SK)
(Ex-Officio)	Steve Werner, AG4W

How to Join

Come to a club meeting or send in an application by mail (form on www.NADXC.org)

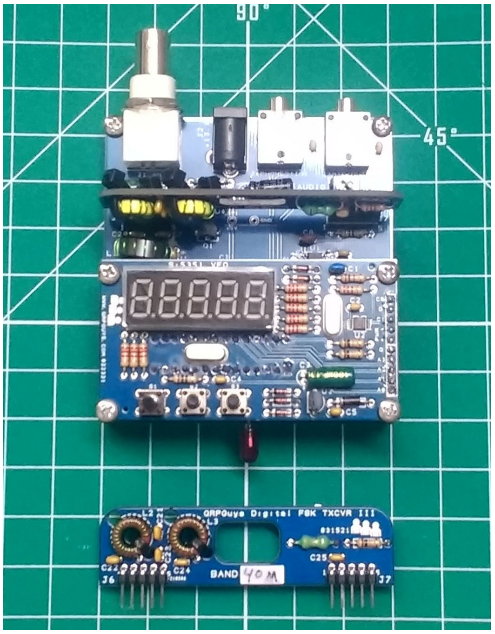
This edition of The LongPath published by: Fred Kepner, K3FRK

The Casual DXer

By Kevin Hibbs, KG4TEI

In last month's article I wrote about my portable QRO setup with the Yaesu FT-891. Having 100 watts available sure does make adding contacts to the log easier. The problem is, this setup takes up a lot of room. I have to carry two totes. One for the radio and all the gear, and one for the antenna and accessories. This usually isn't a big deal, but sometimes it is nice to travel light.

I have been keeping my eyes open for a truly small radio. Something that is more of a computer to RF interface than a radio with lots of options. I've looked at conversions of the QCX mini which has an interesting software defined radio option, the uBitX, QRPver, and some commercial offerings from Xiegu. All of them had pros and cons, but none were really what I was looking for. I had considered a Double Side Band (DSB) option from the QRPGuys, but didn't want to waste the extra power in the unused side band. At QRP power levels every dB counts. I then saw an email that the QRPGuys had released a new Single Side Band version of their DSB radio, the Digital AFP-FSK Transceiver III. The radio was designed to do exactly what I was looking for – FT8, JS8 Call, and WSPR. It is on the complete opposite end of the spectrum from the FT-891. This little QRP radio has direct conversion receive, no DSP filtering, no CW, no SSB, and only 5 watts of output power. It is about as minimal as it gets.



QRPGuys FSK TRXIII

The radio, while based on the original DSB transceiver, uses a novel method to create a FSK signal. From the assembly manual:

> *Thanks to an innovative method developed by Kazuhisa "Kazu" Terasaki (AG6NS), audio tones generated by the sound card are applied to the VFO's processor. The audio frequency is determined by measuring the time between zero crossings and then added to the VFO base frequency to generate the required offset. Generating the transmit frequencies directly by the VFO eliminates the "Double Side Band" problem of designs*

For those interested, the Arduino code that performs the FSK VFO shift is open sourced and available on their website. This leaves open options to customize the programming and update the radio should new features become available.

The radio comes as a kit. I found the kit easy to assemble and completed it in a few hours one evening. Having a good magnifying glass is a must because reading the values on the small capacitors would be difficult without it. There are three surface mount ICs to solder down. These have a large enough pin pitch to do by hand with a small tipped soldering iron. There are also a few toroids to wind. The radio comes with three band modules to swap out for 40, 30, and 20 meters. There is also an option to buy unpopulated boards to add extra bands. Overall, a good kit and easy build experience with good instructions.

So, how well does it work? I've only had the kit a few days, but so far so good. All it requires is audio cables connected to the rig and a computer running digital software such as WSJT-X. On receive the radio performs well, and honestly better than I expected for a direct conversion receiver. Connected to my large antenna I have received signals from all over the world without a problem. I haven't had time to make many QSOs yet, but using an indoor homebrew magnetic loop on 20m I have been heard all over the US and

The Casual DXer (continued)

even managed a contact with Puerto Rico. Maybe this weekend I will be able to take some time and really see what it can do.

This radio fits the niche I was looking for. Something that puts out a few watts, fits in the palm of my hand, and connects directly to a computer to do digital modes. Time will tell if this radio will become my constant travel companion, but I look forward to finding out.

Website: https://qrpguys.com/qrpguys-digital-fsk-transceiver-iii

Assembly Manual: https://qrpguys.com/wp-content/uploads/2021/06/digital_III_assy_053021.pdf

Treasurer's Report

By Chris Reed, AI4U

April 2021

Beginning Balance	$8,324.91
Deposits	$970.96
Expenses	$0.00
Ending Balance	$9,295.87

May 2021

Beginning Balance	$9,295.87
Deposits	$0.00
Expenses	$0.00
Ending Balance	$9,295.87

Huntsville Hamfest Info

August 21 & 22, 2021

Von Braun Center South Hall

700 Monroe St. SW
Huntsville, AL 35801

https://hamfest.org/

- **Hamfest Hours:** We will be open to the public **Sat, 9:00–4:30 PM** and **Sun, 9:00–3:00 PM**.
- Move-in hours for dealers and flea market are **Fri, 10:00 AM–8:00 PM** and **Sat, 7:00–8:30 AM.**
- **Grand Prize drawing – Saturday @ 4:00 PM** (need not be present to win)
- **Main Prize drawing – Sunday @ 2:00 PM** (must be present to win).
- **Admission:** is $10, ages 12 and under free.
- **Talk-in:** Will be on the 146.94 repeater, 100Hz tone, and the backup in case of failure will be on the 145.33-, 100Hz tone, repeater
- **Huntsville's Wide Coverage D-STAR System is W4WBC:** 145.36-, 443.425+, 1285+ and 1251 DD
- **Yaesu Digital Fusion Users**: Use 147.14+, 100 Hz PL
- DMR Users: DMR Networked System 442.275+. For Talk Group info, go to www.N4HSV.net for more info and code plugs.

DX'er of the Year

By Mark Brown, N4BCD

After a year of meeting via Zoom due to COVID-19, on May 11th, the Club returned to in-person meetings at Newk's. Keeping the Zoom format available for those not able to attend allowed Bob K8KI (on screen) to participate from his hospital bed as he recovered from surgery. Treasurer Chris AI4U conducted the meeting and used the opportunity to present the DX'er of the Year plaque to Bruce AC4G who won it for 2020.

Right: Presentation of the 2020 DX'er of the Year plaque to Bruce AC4G

DX Contests for June 2021

By Chuck Lewis, N4NM

Asia-Pacific Sprint, (**SSB**), 20-15 meters
June 12, 1100Z to June 12, 1300Z
Exchange: RS, Serial #
See page 72, June QST and
www.jsfc.org/apsprint/aprule.txt

GACW WWSA CW DX Contest, (**CW**), 80-10 meters
June 12, 1500Z to June 13, 1500Z
Exchange: RST, CQ zone
See page 72, June QST and
contest.com.ar/gacw-wwsa

Portugal Day Contest, (**SSB/CW**), 80-10 meters
June 12, 1200Z to June 13, 1200Z
Exchange: RS(T) and Serial or district code
See page 72, June QST, and
http://www.rep.pt/

All Asian DX Contest (**CW**), 160-10M
June 19, 0000Z to June 20, 2359Z
Exchange: RST plus age; YLs send 00
See page 72, June QST and
www.jarl.org/English

Stew Perry Topband Challenge (**CW**), 160 meters
June 19, 1500Z to June 20, 1500Z
Exchange: 4-character grid square
See page 72, June QST and
http://www.kkn.net/stew/

IARU HF World Championships (**SSB/CW**), 160-10M
July 10, 1200Z to July 11, 1200Z
Exchange: RS(T) plus ITU zone; IARU HQ stations send HQ abbrev. See
http://www.arrl.org/iaru-hf-championship

OTHERS:

Ukrainian DX Classic DIGI Contest, 1200Z, Jun 19 to 1159Z, Jun 20

Ukrainian DX DIGI Contest, 1200Z, Jun 26 to 1159Z, Jun 27

His Maj. King of Spain Contest, SSB, 1200Z, Jun 26 to 1200Z, Jun 27

Marconi Memorial HF Contest (CW), 1400Z July 3 to 1400Z, July 4

Note: Beware, dates & times often change or are misprinted in the journals.

Antenna Tuner Special Edition: Member Reviews and Opinions

Introduction

By Fred Kepner, K3FRK

It seems there are quite a few things that divide ham radio operators. VHF vs. HF, contesting vs. ragchewing, and DXing vs. working repeaters to name just a few. Tuners also bring out strong opinions. Whether you love them or hate them, I hope you enjoy the reviews and opinions submitted this month by our members.

Palstar AT1500DT

By Steve Werner, AG4W

I have used antenna tuners for over 35 years. All of them have matching and power limitations. I started out with a MFJ 300 watt model and graduated to the MFJ-989 1500 watt model. After replacing the roller inductor once and developing problems again I decided it was time for a better solution. I was typically using the tuner at 650-850 watts with my SB-220 amplifier. Instead of having 2 capacitors like the MFJ-989, I decided on the Palstar model AT1500DT that uses a differential capacitor. I like this because it is quicker to adjust 2 controls than 3 and there is just one solution. It also includes an antenna switch and a 3000/300 watt peak or average reading wattmeter. It uses a 385-0-385 pF 5KV capacitor and a 26uH roller inductor wound with 12 ga wire on a ceramic core. It also includes a 4:1 Ruthroff voltage type balun for balanced outputs. The tuner works over an impedance range of 20 to 1500 ohms. The saying goes with Palstar that they are "built like a tank". I absolutely agree.

Can you destroy this tuner? Absolutely. I did in 2012 when I had a direct lightning strike on my 80 meter delta loop. It destroyed the antenna switch and power meter in the tuner. I sent it back to Palstar and it was repaired quickly in less than 2 weeks and sent back in like new condition. I now use the tuner with my Ameritron AL-1200 and usually run 800-1200 watts on 80- 10 meters and have had no problems.

I do use it at 600-800 watts on 160 meters in the phone band with my top loaded vertical. With low impedance loads it is best to run lower power.

The AT1500DT was replaced by Palstar with the 2000 watt AT2KD model. Spending a little more money on a tuner is definitely worth it in the long run.

AG4W's AT1500DT

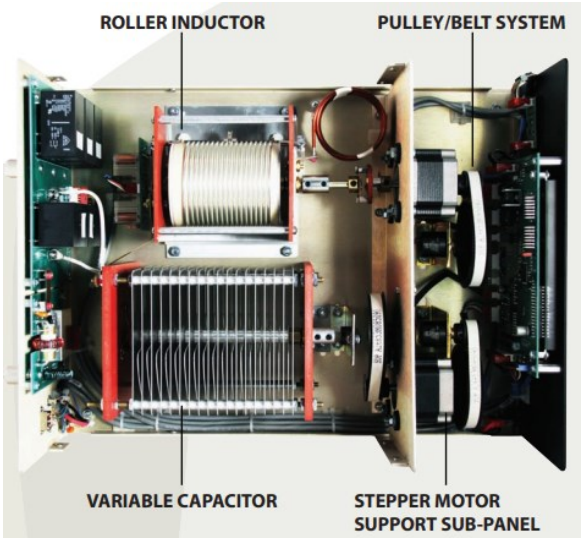
Palstar HF-Auto

By Fred Kepner, K3FRK

I purchased my HF-Auto tuner in January of 2019, when I upgraded my amp to the matching Palstar LA-1K. I previously ran an LDG AT-1000ProII tuner. The HF-Auto is the exact same size/shape as the LA-1K. Beyond the appearance, I chose to go with it because of the increased ability to handle digital and high duty-cycle modes. Upon installing it, I was pleasantly surprised to find that it matched to a lower SWR on most bands, but especially on 6m.

The design of the HF-Auto is rather unique. Instead of utilizing switching between various capacitors and inductors to find a good match, the HF-Auto contains stepper motors that spin the roller inductor and variable capacitor. It sounds quite different than a typical autotuner. When switching from bands that are on different ends of the spectrum, it can take a little while to make the adjustment. This system also necessitates the large case of the HF-Auto.

Palstar HF-Auto (continued)



Internal view of the HF-Auto

Operation of the HF-Auto is pretty straight forward. Antennas are connected to one of the three antenna ports on the rear of the tuner. The antenna port for each band is easily assigned by band within the settings menu. The unit is RF sensing so it automatically switches bands (and antennas) when a transmission is made, just remember to put the amp in standby. There is an RS-232 port on the back of the tuner. An RS-232 to USB cable can be used to upgrade the firmware, which is available to download on the Palstar website. The mode button can be used to bypass the tuner, go into the settings menu, or to enter manual mode. L and C values can be entered manually with the spinning selection wheel. The wheel is also a button so selections are made by clicking the wheel. The automatic antenna switching feature can also be turned off in the settings menu. If turned off, the antenna can be switched by pressing the "antenna" button on the front of the unit.

I have run this tuner daily for more than 2 years. It has generally performed very well for me but last summer I experienced a difficulty in getting certain bands to tune. After some much appreciated email support, I shipped it back to Palstar. They quickly found and replaced the bad circuit board. It was out of warranty but the cost was very reasonable. Upon receiving the tuner back, I immediately noticed that the spinning of the stepper motors was louder than it had been. My inquiries via email were met with skepticism until I provided a video. I was told to immediately send it back. After a nice phone conversation with the owner of the company, I learned that the gears that were initially used in the tuner were subpar and prone to cracking after a few years of use. They had since redesigned the gears and are including the new gears (different material and supplier) in the new units. Although I had to pay for the new gears, it was again a very reasonable cost.

Would I buy this tuner again? Yes, but I'd also look into other available tuners. My biggest complaint is the size. It takes up a bit of space on the desk of my station. One solution to the size issue, for those with limited space, is purchasing the optional HF-Auto-R Remote Control Unit. The remote unit is a miniature version of the tuner that connects to the tuner via a control cable. The tuner itself could be placed near the point where the coax comes into the shack and the much smaller remote unit could be located at the operating position. All controls and information on the tuner are also on the remote unit. The remote control unit sells for $499 plus the cost of the control cable. I have no plans to purchase the remote unit as I can afford the space on my desk, although I'd love to opportunity to check it out someday.

HF-Auto with optional remote tuning unit

Specifications:
Range: 1.8-54 MHz
Max Power: 1,800 watts (10m-160m), 800 watts (6m)
Size: 12.5 in W x 6.5 in H x 16.5 in D, Weight: 20 lbs.

Tuners I Have Known

By Rob Suggs, NN4NT

I'm a tuner junky. I've tried many and still have most of them. I know they are really antenna matching networks but let's stick with the term tuner for now. One of my ham buddies in grad school had a Johnson Matchbox which he used with a window-line fed dipole at his apartment. It worked great and I always wanted one. We used it with my Ten Tec Argonaut 509 for Field Days in the late '70s from an observatory in New Mexico. That 5W really got out even on phone! My first tuner was an ARC-5 transmitter I hacked up back in the early 80's. I frequently wish I had left it alone and refurbished the transmitter but the beautiful roller inductor and large ganged capacitors were just too attractive to a new ham and did make a nice tuner.

ARC-5 Transmitter

My next tuner was the MFJ-949 Versa Tuner II, the manual unit with the built-in dummy load and 4:1 balun. It served me well for over 30 years, especially with a fan dipole fed with ladder line I had in my attic in Houston. My first autotuner was an MFJ-929. It worked well and it is nice to have the analog and digital displays. It is now in my mobile station stashed away in the rear storage area of my SUV where I can't see those displays but I can hear it chattering when tuning up my hamsticks. Still my

MFJ-929 autotuner

MFJ Versa Tuner III

favorite to use is the MFJ Versa Tuner III which is a legal limit, manual roller inductor tuner which handles my window-line fed dipoles for 80, 40, and 30m.

LDG AT-1000ProII autotuner

I recently added an LDG AT-1000ProII, for use with my Elecraft KPA500 amplifier and hexbeam. I also have the LDG AT-200ProII in my go-kit/portable station for the IC-7300. If you do much digital operating you need to go for the next higher power units due to the greater duty cycle and possible heating; like a 200W unit for 100W RF and a 1000W unit for 500W RF. Carefully read the specs for the digital mode power limits. The LDG units work very nicely but they quit trying to tune at SWR of 1.7. They do have the buttons to tweak the L and C values to get closer to 1:1 which makes me more comfortable especially with the amplifier on.

But from my earliest days on HF I had always wanted a Johnson Matchbox like my buddy had. There were several available in the N4KG stash. Warren suggested I take them all home, 4 low power and 1 legal limit unit, and decide which I wanted to buy. I picked out and purchased 1 low power (275 W) and 1 legal limit (kW) unit and have thoroughly enjoyed them. Both are huge relative to their modern equivalents and I attribute that to the fact that they were designed for the AM era which is 100% duty cycle. I think the rest of the herd ended up in the Hamfest flea-market

Tuners I Have Known

(continued)

a couple of years ago. I use one for 40m and one for 80m so I don't have to mess with retuning them much. Tuning is a bit tedious and best done with an SWR analyzer. There is a good description of the Matchbox circuits at www.w8ji.com. Some of the N4KG units had contacts burned off but these two seem to be OK. The link-coupled design of the Matchboxes is naturally balanced which is great for the window-line fed doublets.

The Matchbox pair, Versa Tuner II, and go box with LDG AT-200ProII

Those ancient tuners, which are very likely older than I am (65) don't seem to mind having that new-fangled digital stuff flowing through their circuits. In fact, they do a great job making sure my jazzy SDR radio is happy with what it sees from the antenna farm.

Antenna Tuners

By Steve Molo, KI4KWR

One of the things in this hobby that I try, as much as possible, to stay away from is antenna tuners. This is mainly from when I was in New Jersey at the N2CW Contest Station, where all antennas (160/80/40/30/20/15/10m) were resonate. Soon a 6m beam will be added to one of the four towers.

With my current setup, I primarily use an ALS-600 amp through an LDG AT-600 autotuner, leading to a RadioWavz DX80. PROS: This unit pairs nicely with the amp to "electrically fake" the radio to think the antenna is 1:1. Did I leave the secret ingredient out on antenna tuners? Highly unlikely. All your automatic tuners just simply electrically tune the antenna to fake the radio into thinking it is 1:1 when it is not. The same is true with manual tuners; it is just inductors and rollers being used.

The internal tuners on all radios today are only good for 3:1. This is only helpful for a fairly resonate antenna. I will always suggest an external tuner if your antenna system has SWR's higher than normal. With all the options of external tuners out there, manual or auto, the most popular on the market for 1000W and below are the LDG automatic tuners and for 1500W and higher, Palstar and MFJ's. I mention MFJ because of their manual tuners, I rarely see them coming back. The Palstar versions I have used have been amazing and simple to use. But overall, to avoid using a tuner, have a resonate antenna for the bands that

Why I Dislike Antenna Tuners

By Bruce Smith, AC4G

Antenna tuners are a component in the ham radio operator's arsenal of weapons to allow an operator to tune a mismatched antenna to be able to get on the air on a particular band of choice even though the antenna may not be resonant at a broad band of frequencies. The tuner allows two devices (transceiver, antenna, amplifier, etc.) to be matched to the same impedance. Taking in mind the transceiver, the antenna, the feedline, and perhaps more devices may not be 50 Ohms as modern-day HF rigs are designed, the tuner may allow an antenna to be tuned that has an impedance far from 50 Ohms. The drawback is that the tuner can absorb energy (RF power) taking away from the final output power intended to be transmitted into the ionosphere; hence the main reason I do not own an external antenna tuner.

Now days, I try to design my antennas to be close to resonant on any of the amateur bands and particularly, the band of choice being used. I want most, if not all of my power, getting to the antenna and not across some component that may absorb most of my RF output power.

Why I Dislike Antenna Tuners
(continued)

Years ago, I used a dipole antenna fed with 450 Ohm Ladderline that would operate from 10m to 80m fairly efficiently. Yes, I owned and used an MFJ-989 high power antenna tuner at that time in my ham life. It was advertised to handle 1500 Watts. When some of the big DXpeditions were on the air, I tried everything I knew to tune 160m to work those countries with low power and high power from my kilowatt amplifiers used back in the "good ole days". I never was successful. Later and after much analysis, I measured and concluded that most of my RF power was across the tuner and not reaching the antenna. Needless to say, my 160m country count was very minimal. From that point, I removed my tuner and sold it at the Huntsville Hamfest for another radio amateur to use and figure out the same conclusion I had made. I switched my antenna concept from the previous idea of using an antenna tuner to using separate wire transmit/receive antennas and a tri-band antenna to tune and deliver most power outputted by the transceiver to cover the amateur bands.

I must add that today I do use a built-in antenna tuner to check into the emergency nets such as the Tennessee Phone Net and Tennessee CW Net. Since my antenna is low to the ground and uses ground waves to pass my signal to the regional net operators using low power (100 Watts), I do not care about how much power is not being transmitted. It would be different if I were requiring this setup for DXing, but it will never be used for DXing because an antenna of this sort will only frustrate the operator in a pileup and their DXCC count will be very low. This is why I dislike antenna tuners, but they can have their place in the amateur radio operator's arsenal of tools. Antenna tuners can be efficiently used for various applications such as regional emergency nets, but my experience with external tuners only caused me to dislike external antenna tuners for DXing.

In conclusion, even though I had a bad experience with an external antenna tuner in my early days of ham radio DXing, I have recently been reading about built-in antenna tuners for high power HF amplifiers such as the Alpha 9500, Elecraft KPA1500, and Expert Amps high power amplifiers. The more I read, the more I believe I would like to try one of these tuner/amps in my ham shack. So, the jury is still out and I do not want to pass judgement too soon, until the verdict is completely read. Stay tuned!

Upcoming NADXC meeting:

Tuesday June 8th, 2021

5:30 PM Dinner

6:00 PM Business Meeting

6:30 PM Program

Location: Newk's and via Zoom