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NKARC
NORTHERN KENTUCKY AMATEUR RADIO CLUB

BUSINESS NAME

The Feedline

Kit-building 101!

By Mark Volstad, AI4BJ

As the club gets ready to begin its first kit-building project, I thought that it would be appropriate to provide some pointers to members who may be picking up a soldering iron for the first time. I've had a look at the instructions that come with the KD1JV SWR/PWR Meter kit, and although they are quite clear, they do assume some previous experience with electronics on the part of the builder. Fortunately, the kit is quite simple, and as long as the builder is careful during construction, there should be no problems.

Tools/Materials Required

For this kit, a bare minimum of tools and materials are required:

- A low-wattage (20-30 watt) soldering iron. This should be a pencil-style iron, *not* one of those heavy-duty pistol-style soldering guns like the one Alfred E. Neuman is holding above!
- .031" Solder (Kester 44 or equivalent). I will be bringing some extra solder to the Oct 8 meeting for those who need any.
- Side cutters for cutting component leads after soldering
- Wire strippers or sharp knife for removing insulation from wires.
- Magnifying lens for reading component markings.

The Two Keys to Success

When you get right down to it, there are really just two things you need to do to be ensured of a working kit at the end of construction: 1) Install the correct components in the correct locations, and 2) Make good solder connections. Just as with the carpenter's adage of "measure twice, cut once", you want to check placement twice, and solder once.

Mistakes Happen!

What do you do if you discover that you've installed a component incorrectly?

See "Kit-Building", page 5

Inside this issue:

Dates to Remember:

Oct 8– Membership Meeting

Oct 27,28–CQ World Wide DX Contest (SSB)

Nov 12 – Membership Meeting

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Repeaters — K4CO

147.255+ and 444.350+ Edgewood (PL 123.0), 147.375+ Walton, 146.895+ Highland Heights
The 147.255 repeater is a linked Echolink node, accessible via N4IJS-R.

Nets

N. KY. Amateur Club Net: Tuesdays, 7:30 PM on the 147.255 repeater

—WEB Site—

http://www.k4co.org

Membership meetings on the **2nd Monday** at 7:30 PM, Turkeyfoot Middle School, 3230 Turkeyfoot Rd in Edgewood

Board meetings: TBA

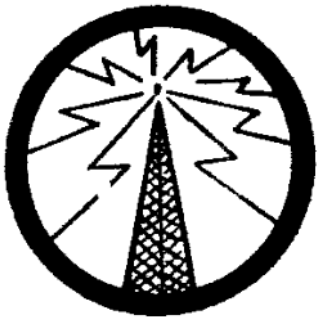
The Feedline is published monthly by and for the members
of the Northern Kentucky Amateur Radio Club.

Submissions to The Feedline must be received no later than the last Monday of the month prior to publication. Submissions, address or call changes and circulation problems may be sent to The Feedline Editor: Mark Volstad AI4BJ: 6098 Tosha Dr., Burlington, KY 41005 — Email: mvolstad@fuse.net

Top of the Tower

Hi Fellow Hams,

The leaves are turning, nights are becoming cooler and we move our clocks back later this month. It is October. This is the month we typically bring before you a slate of candidates to serve as our corporate officers. These are the folks who will lead you forward into the next year at the helm of your club. Have you given it some thought? Are you one of the candidates? I look forward to seeing someone new at the helm!



Mark Volstad, AI4BJ, informs me the kits are ordered and he has been notified they have been shipped. Hopefully we will have them for our October meeting. This is the first time our club has undertaken a fun project like this in years. I often hear some one say something like "you need to check the components", "check the capacitor", or I see an article that has a "uF" as a symbol. This kit building project will help us to more fully understand why and how these various words of wisdom and symbols can lead us to more fully understand our hobby.

We'll be having a joint Christmas meeting with our sister organization KY7ET. Final details have not been made. If you have some input please let me or Dann Fox know so we can plan with your desires in mind.

A few meetings back we discussed and agreed to have an antenna building contest. I would like to ask if anyone wants to head up this project. If no one steps forward by the end of the year I'll get it going after the first of the year when I'm no longer fulfilling the President's duties.

Thanks for being a club member. See you Monday the 8th.

73, Tony AI4IP

September Net Report

DATE	NCS	CHECKINS	TIME (MINS)	TRAFFIC
9/04/07	No net			
9/11/07	KB4VKS (Mike)	8	27	0
9/18/07	N4IJS (Robert)	6	23	0
9/25/07	KG4SBG (Dennis)	8	25	0
TOTALS		**22**	**75**	**0**

September Meeting Minutes

The meeting was called to order by Dann Fox at 7:31 p.m. at the Turkey Foot Middle School. The pledge to the flag followed.

The motion made to accept the treasurer's report as presented by Dann Fox passed.

Self introductions were made.

The motion made to accept the August minutes as presented in the Feedline passed.

Lyle Hamilton announced that Robert Ziegler upgraded to general, Don King upgraded to extra, and K. Lowery passed the tech exam in tonight's VE session.

Mark Volstad reported that 17 votes were cast for the kit building project. The QRP Power/ SWR meter received the most votes. Members wishing to build the kit must have their payment in by September 21 to the club P. O. Box. Members may pay a reduced rate of $20 or pay the full price of $30, and donate the $10 back to the club.

Robert Kluck is looking into the possibility of club members having a club email address such as ######@NKARC.COM

Lynn Ernst reported that Dixie Heights High School is offering a for-credit class on Amateur Radio under the direction of Jim Hicks. VEs will be needed to help with the testing. The schedule is: Wednesday, November 7, have students fill out the paperwork, Thursday, November 8, administer the test, and Friday, November 9, hand out certificates of successful completion. Six VEs will be required. KD7ARET has pledged $70 to help to pay the test fee for students unable to afford this cost. NKARC is going to be asked to match this amount. Also, it was suggested that NKARC award free club membership for one year to the newly elected hams. KD7ARET is also donating an HT to be awarded to a worthy student.

Robert Kluck presented a program on Echolink.

Split the pot was won by Robert Ziegler.

The meeting was adjourned at 8:39 p.m.

Respectfully submitted

Bob Burns, AB4BK

The digital QRP Power/SWR meter kits be distributed to those who ordered one, at the October NKARC meeting, Monday, October 8th.

Most components can be salvaged if they are *carefully* desoldered. If you are not careful, though, you risk damaging or removing solder pads from the PC board. Sometimes it is safer (and certainly easier!) to clip off the component from the top of the board and then desolder the remaining leads. Of course, this means that you'll need to acquire a replacement part. When in doubt about what to do, ask an experienced builder for help.

Static Precautions

Components that are susceptible to damage from static electricity are usually packaged in black or pink anti-static foam or pink or gunmetal-blue anti-static bags. Leave the components here until you are ready to install them. Before handling static-sensitive parts, I usually touch something on my workbench that is grounded, like my big Astron power supply. I also try to refrain from sliding around on my chair.

I love the smell of solder fumes in the morning!

It smells like — victory! Well, with apologies to Robert Duvall, I do find soldering to be a very relaxing activity. I have a very good memory for smells (they are about the only thing I *can* remember!), and whenever I smell burning rosin, it always brings back vivid memories of assembling my first Heathkit when I was 11 years old.

Rather than attempt to explain how to make a good solder connection, I am going to direct you to this excellent tutorial on the subject by Tom Hammond, N0SS.

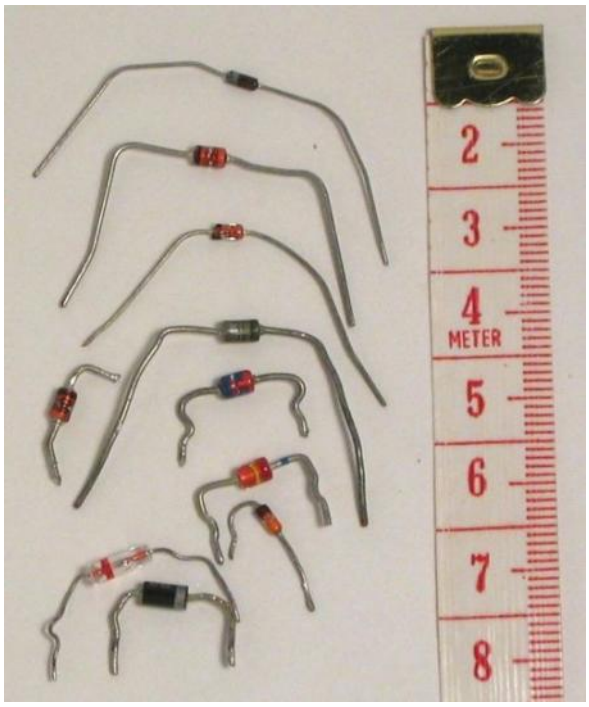
Component Identification

Let's look at the actual parts list from the kit we will be building. The first column in the list is the component designator. In a high-quality kit, these designators will be silk-screened on the printed circuit board, making parts placement much easier. If the board is not silk-screened, you will usually have to refer to a parts placement diagram to find out which holes on the PC board belong to which component. Most components will usually be installed on the top (silk-screened side) of the board, though it is not unheard of for some parts to be installed on the bottom — this will be noted in the instructions.

	D1-4	SD103	SHOTTKY
	R5	51 K	GRN-BRN-ORG
	R6	51 K	GRN-BRN-ORG
	R7	100 K	BRN-BLK-YEL
	R8	100 K	BRN-BLK-YEL
	R9	22 K	RED-RED-ORG
	R10	22 K	RED-RED-ORG
	C1	.01 µF	MONO 103
	C2	.01 µF	MONO 103
	C3	.001 µF	DISK 102
	C4	.001 µF	DISK 102
	C5	.01 µF	MONO 103
	C6	.01 µF	MONO 103
	C7	.01 µF	MONO 103
	L1	12µH	BRN-RED-BLK-GOLD
	RP1	150 Ω	10 SIP PACK
	RV , FW	5 K Ω	TRIMMER
	20 PIN	SOCKET	
	8 PIN	SOCKET	
	(4)	BATTERY	CLIPS
	C8	47 µF	electrolytic
	D5-14	RED LEDS	RECTANGLER
	S1	PB SWCH	6mm TACT
	U1	TS942	op-amp
	U2	ATTINY26L	processor
	* DO	METER	CAL *
	R1-4	100 Ω	BRN-BLK-BRN
	WIND	XFORMER	
	MOUNT	XFORMER	

The first components in the list are four diodes designated D1-D4. Since these are the only diodes in this kit, you don't need to be too concerned about identifying the type of diode. The type of diode (in this case, SD103) is generally printed on the body of the diode. Diodes are polarity-sensitive, so there is a right way and a wrong way to install them. Look for the band at one end of the diode (the cathode), and make

sure that it matches up with the band that is silk-screened on the PC board. Here are some typical diodes:



At best, a diode that is installed backwards will simply prevent the kit from working; at worst, it may go up in smoke the first time that you apply power to the circuit. Which brings me to *the* most important thing to know about kit-building: Don't release the smoke!! It is common knowledge among experienced kit builders that most electronic components have a small amount of smoke encapsulated within them at the factory. The purpose of this smoke is not entirely understood, but what *is* known is that if you somehow manage to release the smoke, either by installing the component incorrectly or by applying reverse or excessive voltage to the circuit, it is very likely that that component will never work again and will need to be replaced!

It is not necessary to solder each component as you install it. When working with a larger kit, I find it more efficient to install several components at a time before soldering them. You can bend the leads slightly under the board to prevent the part from falling out before you solder it. After soldering them, cut off the leads flush with the solder joints.

Next Up: the Resistors

The next component in the parts list is R5, a 51K (kilohm) resistor. Small, low-wattage resistors usually have their values color-coded via a set of colored bands, while physically larger resistors may have their values printed right on them. The parts list tells us to look for a GRN-BRN-ORG resistor. Green is 5, brown is 1, and orange is the 1000s multiplier. There will usually be a fourth color band to indicate tolerance: silver for 10%, and gold for 5%. Resistors are not polarity-sensitive, so orientation is not important.

Here Come the Capacitors

After the resistors, the next component you will install is C1, a .01 uF (micro-Farad) monolithic capacitor. Capacitors come in many shapes and sizes, but monolithic ceramics generally look something like this:

When the capacitor is very small physically, the value will be printed in shorthand. The parts list tells us to look for a capacitor with "103" printed on it. To learn more about identifying capacitor values, check out this web site. C3 and C4 are identified as disk ceramics. Disk ceramics

are usually flatter and rounder than monolithics, and are often brown in color.

Looking ahead on the parts list, we see C8, a 47 uF electrolytic capacitor. Electrolytics are generally used where a larger amount of capacitance is required. They generally look like a small aluminum can wrapped in insulating plastic. Unlike most other types of capacitors, electrolytics are polarity-sensitive, so unless you are keen on releasing their abundance of fishy-smelling smoke, make sure you orient them correctly before installing them. The positive lead is usually longer than the negative lead, and the negative lead is usually labeled with a (-) sign.

"L" Stands for Inductor, Really

Inductors also come in many shapes and sizes. Some, like L1 in this kit, can be easily confused with a resistor. One way to confirm that it is an inductor is to measure its resistance with a multimeter. An inductor will usually have negligible resistance, so it will measure near zero ohms. The parts list tells you to look for BRN-RED-BLK-GOLD in the color bands. Like a resistor, orientation is not important.

Variations on a Resistor

RP1 consists of 9 150-ohm resistors in a single, 10-pin package. Because pin 1 is common, it is critical that you orient this correctly on the PC board. Pin 1 is usually identified both on the package and on the PC board with a dot or similar marking.

RV and FW are trim pots (potentiometers), or variable resistors. Pots usually have 3 leads, and because the leads are spaced asymmetrically, can usually only be installed one way on the PC board.

The Brains of the Outfit

U1 and U2 are integrated circuits, or ICs. U1 is an amplifier, and U2 is a micro-controller. Both are mounted in sockets which must first be soldered to the board. A dot or notch indicates the end of the IC where pin 1 is located. IC pins are numbered sequentially, in counter-clockwise fashion when looking down from the top of the IC. Before you plug the ICs into the sockets, you will usually have to squeeze the pins inward a bit. The easiest way to do this is to press the sides of the IC gently against a hard surface such as a table-top, one side at a time.

Battery Clips

Before you solder the battery clips to the board, you should decide how you are going to package your meter. The instruction manual discusses several options, as does the 4SQRP web site. Some options call for installing the battery clips on the bottom of the board instead of the top.

LEDs

D5-D14 are the LEDs (light-emitting diodes) that provide the power or SWR readout from the meter. Orientation is important, as is the height that you mount them above the board. Please read the installation instructions carefully.

Odds and Ends

After S1 — a pushbutton switch — is installed, the instructions indicate that you should perform the meter calibration. Following calibration, the four remaining resistors (R1-R4) should be installed and the transformer should be wound and installed according to the instructions in the manual.

The Future of Ham Radio

By James E. Brooks, KY4Z

ARRL Kentucky Section Manager

ky4z@arrl.net

(Excerpted from August section report, ARRL web site)

For those of us who may have the notion that Amateur Radio is declining, I can assure you that — thanks to the work of a number of hams and the support of their clubs — the future of ham radio is indeed bright in Kentucky.

Jim Hicks, WB4CTX, a science teacher at Dixie Heights High School in Edgewood, Ky., is currently teaching what is believed to be the only Amateur Radio class in the U.S. that offers high school credit. Because the class meets for 70 minutes five times a week, Hicks has the luxury of being able to cover radio topics in depth, including operating courtesy and procedures. Hicks' efforts have the full support of the local ham clubs, the Kentucky District 7 Amateur Radio Emergency Team (KD7ART) and the Northern Kentucky ARC. The KD7ART board has offered to help pay the VE testing fees for up to five students who can't afford to pay the fee. The club is also awarding a new 2-meter HT to the student with the highest grade in the class. Additionally, the NKARC is providing free club membership to every student who receives his or her ham ticket. With a testing date set for early November, I predict we'll see great things coming from Northern Kentucky.

St. Aloysius Gonzaga Academy in Shepherdsville, Ky., has been a very active and successful ARRL "Big Project" school for a number of years. Buddy Sohl, KC4WQ, is the program's primary contact and instructor. The school's radio club stays active on-the-air, and you'll find the club listed among the top scorers in the ARRL Club Roundup contest (they were the "top of their class" in the 2006 Roundup). The St. A club is supported by the Bullitt Amateur Radio Society. Buddy reports he's also working to introduce Amateur Radio at De-Sales High School in Louisville, where he's a part-time teacher.

Both of these programs deserve our encouragement and support. For more information on how you or your club can help, contact WB4CTX or KC4WQ directly.

Only Two VE Sessions Remaining in 2007!

The two final exam sessions of 2007 will be held on October 8 and November 12 at Turkeyfoot Middle School at 6:00 PM. Please contact Lyle Hamilton at 513-315-4032 or ab8sh@arrl.net to reserve a place. (No walk-ins)

QSL Card of the Month

Submitted by:

Mark Volstad, AI4BJ

Comments:

On rare occasions, I've received a QSL card from a shortwave listener, such as this one from an SWL in Germany. In this instance, Dieter monitored a 15M QSO between myself and SZ5Z in Greece. I was a shortwave listener myself long before I earned my ham ticket, so I am always happy to provide a QSL card upon request.

If you have a special QSL card you would like to share, submit it to the Feedline editor, along with any comments you would like included.

GERMAN SWL STATION
DE3CDE

TO RADIO AI 4 BJ

VIA

DATE D	DATE M	DATE Y	UNIVERSAL TIME UTC	FREQUENCY MHz	2-WAY QSO IN	SIGNAL REPORT R	SIGNAL REPORT S	SIGNAL REPORT T	QSL MIT QSL WITH
31	10	04	1241	21	SSB	5	8		SZ5Z

LOC: JO6ØRX
DOK: S19
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