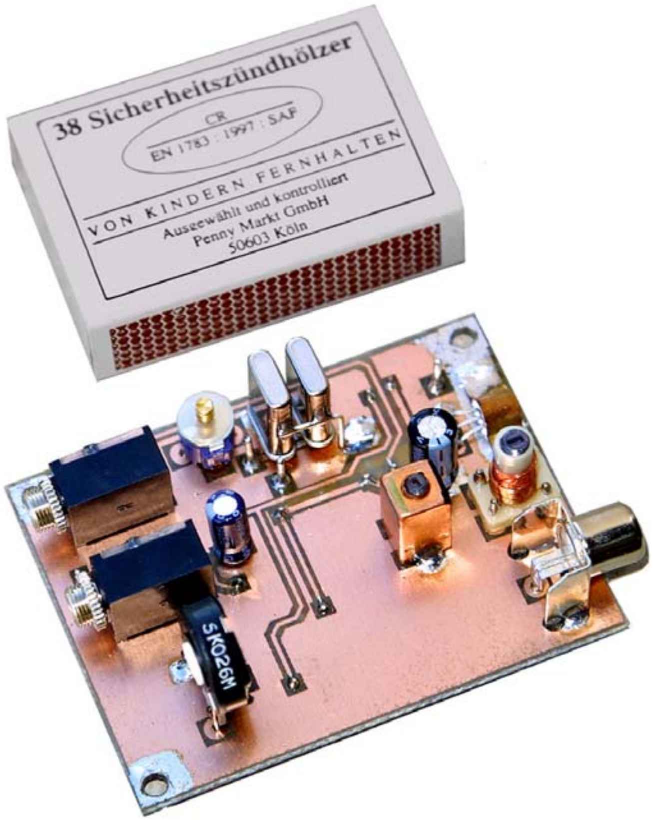
QRP project
Amateur Radio

DL-QRP-AG



Hegau 40m Transceiver

Developed as a training kit for SMTby Peter, DK1HE on behalf of the German QRP Club
DL–QRP–AG Arbeitsgemeinschaft für QRP und Selbstbau im Amateurfunk

Revision: September 13 2005

manual by : fiservice Peter Zenker DL2FI email:info@qrpidee.de

Homebrewing today

Homebrewing of amateur radio equipment is still one of the most interesting areas of our hobby. More than ever the rule is: You have to build really good gear for amateur radio yourself. Due to the near full automatization of the manufacturing of electronic equipment, there is a strong tendency towards surface mounted devices (SMD components). New components with leads are rare and more and more components previously popular are discontinued. Those wanting to build themselves have to learn SMD techniques.

The first thing to you notice is the size of the components. Some call them – rather irreverent – „mouse shit“, and that is about their size. It worries many, not only the older home builders, that the components are difficult to see. This is a relative problem, as you try working with them, using good lighting and a loupe. SMD needs different techniques than leaded components, but so did the change from vacuum tubes to transistors and IC’s.

We have developed the Hegau SMD primarily to train the necessary techniques. Most of the components are SMD. Resistors, capacitors, transistors and IC’s are all very tiny. Only the coils, crystals and a few other components looks like before. The result should be stimulating and rewarding: A small 40 meter transceiver with specs, seldom found in gear this small.

As the main goal with this project is getting accustomed to SMD, we won’t begin with a circuit description, but with a general introduction to working with SMD.

Have lots of fun, BCNU with the HegauSMD

Peter, DL2FI

Revision:September 13. 2005

The DK1HE SMD QRP Transceiver „ Hegau „
By Peter Solf, DK1HE
English translation by Peter Raabye, OZ5DW

Preface

Beginning with washing machine controllers, via entertainment electronics, SMD techniques have hit the high tech transceivers. Originally constructed for thick film techniques, the „mini chips“ have won the race in the complete range of electronics. The primary reason for the increasing use of these components lie in the dramatic cost reductions through the automatic mounting and soldering of printed circuit boards. Due to their small size, the components also have excellent RF specs into the microwave range. Most UHF/SHF applications would be impossible without them. These indisputable qualities will mean the gradual extinction of leaded components within a reasonably short span of time. For the home brewers, this means learning SMD techniques as soon as possible. The following project is meant as an SMD soldering course, resulting in a good quality 40 meter transceiver. In the development a weighted imperative was followed, in that further component reductions would have jeopardized the final specs. A „fun transceiver“ should really be fun, and not be another frustrating piece of gear sitting in a shelf in the shack. The SMD transceiver has the following specs:

- simple direct conversion without expensive spezial parts.
- Potentiometer tuning of the VXO (to increase the pulling range of the crystal)
- Electronic T/R switching to give true BK
- CW side tone
- Optimized selective RF input filtering (no attenuator potentiometer necessary)
- Frequency characteristics of the AF chain optimized for CW (400-1000Hz)
- Good receiver sensitivity with low internal noise
- 1 Watt MOSFET PA (at 12V)
- Supply voltage in the range 8 to 14 volts.
- Minimum of external wiring, as all connectors and the volume potentiometer is on the pc board.

Circuit description

Revision: September 13 2005

1. RF generation

The heart of the circuit is the 7 MHz Colpitts VXO, built around the CMOS gate G1. The series coupling of C10-C11 together with the variable coil L1 is a series resonant circuit which tunes the parallel coupled crystals Q1/Q2. Q1/Q2 work at series resonance. The number of turns of L1 is calculated so that the tuning core only dips into the single layer coil to achieve the necessary frequency. If the core is turned further into the coil, the inductive part of the series resonant circuit increases, tuning the crystal frequency downwards. The tuning range obtained in this way is greater than possible with varicaps at the 5 V nominal supply voltage. In the prototype, 12 kHz was achieved! R4 serves to reduce the load on the crystals. The switching transistor T2 together with the trimmer C20 gives about 700 Hz of downward shift on transmission (nearly constant over the whole of tuning range of L1). This gives a transceiver concept instead of separate transmitter and receiver.

1. Transmitter

The 7 MHz VXO is followed by a keying stage based on the gate G2. If the transmitter is keyed over the key input, G4 goes high and activates G2 to let the oscillator signal pass through to G3. G3 works as an inverter and serves to block the following transmitter stages during the keying pauses. The PA is built around a low cost MOSFET, T1. The gate resistor R2 blocks VHF parasitics in the stage. The coupling coil in the drain circuit of T1 transforms the low output impedance to the high resonant impedance of the output circuit L2. The series connection C3-C2 constitutes the parallel capacity. At the same time, this divider serves as impedance match for the 50 Ohm output of the transmitter. The following low pass filter Dr1-C1 dampens the first harmonic with about 18 dB. R1 leads the statics from the antenna to ground, and thus protects the sensitive capacitors C1, C2 and C3 against too high voltages. At a supply voltage of 12 Volts, the transmitter gives an output of about 1 Watt.

2. Receiver

The reciever signal goes from the antenna via the transmitter output filter to the parallel resonant circuit of L2-C3-C2, which now works as input filter.

As T1 is blocked on reception, it won't attenuate the signal, thus helping to lower the bandwidth. The signal is loosely coupled via C5 to the second high Q input resonant circuit of L3-C6. The following direct conversion mixer IC2 is coupled inductively to L3 with a high transforming rate of 1:8. The resulting selectivity is so good, that even with a broad band antenna like the FD-5, G5RV or W3DZZ you won't experience much AM interference from strong broadcast stations out of band. No attenuator is necessary. The receiver sensitivity is thus sufficient in practice. The double Schottky diode D1 protects the input of IC2 against to high RF voltages on transmission.

The local oscillator signal from the VXO reaches IC2 via the RF voltage divider C8-C9. After the direct conversion, the demodulated receiver signal will be found on pin 4 and 5 of IC2 in push pull, for leading on to the following AF amplifier. The AF amplifier consists of two identical blocks with each 30 dB of voltage amplification, in IC4 (a walkman type stereo amplifier). The frequency characteristics of the amplifier is then optimized for CW. C16-C17 together with the output resistances of IC2 , and R15-C27, forms low pass filters with a cut off of 1 kHz. The coupling capacitors C18-C19 together with R6-R7 works as high pass filters with a cut off of 400 Hz, together with C26-P1. The resulting steepness of the filter is around 12 dB/octave. The MOSFET T3 serves to mute the AF section during keying, to reduce key clicks. The side tone is supplied via the voltage divider R17-R10.

Voltage controller

To be able to use varied voltage supplies, the transciever contains a voltage regulator built around IC3. The PA is run directly from the unstabilized supply voltage. The RF output is thus depending on the supply voltage. The transceiver can be run from supplies in the range 8 to 14 Volts.
Developer Peter Solf DK1HE

SMD components
Within the last years it has become increasingly difficult to get leaded components. Some aren't produced in unleaded versions anymore, but are only produced as surface mounted devices (SMDs). This stems from SMD parts being machine mountable, and also being smaller, increasing the tendency to minituriazing. For us as home brewers SMD has a great advantage, as they have better RF characteristics than previous components. Stray inductances and capacitances are greatly reduced by the lack of leads. Components can be placed closer and wiring is all over shorter. There is one disadvantage: Many hams believe it impossible to work with these small parts. One thing is at all seeing these small parts, the other that you will need a steady hand to put them in place. I had the same worries. My first mishaps increased the worries, and I only had success after having help from professionals, giving me the tricks they used. Working with SMD has no secrets, just tricks, leaving room for lots of fun.

The first main error is wrong choice of soldering equipment. My experiments with an SMD soldering needle gave experts a good laugh. These can only be used, when the entire pc board is placed on a ceramic heating plate at at temperature just below the melting point of the used solder. The heat of the needle is insufficient for free hand soldering. The best to use is a standard 50-80 W soldering iron with a 0.4 or 0.8 mm pencil tip. I set my LS50 soldering station to 400 degrees centigrade for SMD work, appreciably higher than the melting point of my solder. The other main error is having too little light. SMD work needs lots of light. Now and then I think light more important than a loupe.

Without a loupe, you won't succeed. Which loupe is up for debate. I prefer loupe glasses, which leaves me a lot of working freedom. For very small parts, I use an additional loupe on an arm, fixed with a ring light.

Good tools are important too. A cheap pair of tweezers saves money, but strains the nerves by pointing across and leaving the flea sized parts flying ballistic in the room. Don't save on this, but use e.g. a pair of 12-15 cm anatomical tweezers from a medical supply company (NOT surgical tweezers, - they have little sharp hooks and are no good for this!).

The work space should be clean, light and orderly, so that you can locate parts you drop. I use a dinner tray. Falling parts lands on the tray and are easier to find, because of the raised edges. But it has an additional advantage: When I have to break off work, I can put the entire tray aside. The edges also helps to support your wrists, making work less shaky. Arm rests can be of considerable use, too!

Revision:September 13. 2005

I usually use 0.5 mm electronics solder with 2% copper or silver. As soldering bridges are a real nuisance with closely spaced leads on SMD Ics, I have stopped worrying about them. I solder in the IC without worrying about bridges, and remove the excess solder afterwards with solder wick.

FIs approved technique for low error soldering of SMD parts.

1. parts with two contacts (Resistors, capacitors and RFC's)

The picture shows the way for right handed people, if you are left handed, please mirror the process! On the pc board, you will find to soldering points. Touch the right hand soldering pad with the soldering iron and put on solder after 1-2 seconds, to leave a small blob of solder on the pad. It seems most logical to prepare for several parts at a time. When you have prepared a sufficient number of pads, you take the tweezers with your left hand, and the soldering iron with your right. Pick up the first part with the tweezers. Put the part on the pc board in contact with the solder blob. Hand jitter is reduced this way, as you put a little pressure on the part. Now touch the solder blob shortly with the soldering iron and push the part into the melted solder. The pc board friction will help in reducing jitter. When the part is in its final position, remove the soldering iron, but keep a good grip on the part for another few seconds till the solder has cooled a little. The result is usually a perfect, concave soldering point between the component and the pc board. Remember to solder the other lead too, by heating the component and pc board and adding a little solder there too.

2. parts with more than two contacts. (Transistors, ICs etc.).

These parts aren't more difficult to solder. They have three or more contacts, which of course have to be at the right place on the pc board. The most important thing is to get the part into the right place from the beginning. Solder a small blob on on pc board soldering pad for the part and remove it immediately with solder wick. Then hold the part so that all its contacts are on the appropriate soldering pads on the pc board. Now solder directly from above on the pad you presoldered. You won't need any extra solder for now, there will be sufficient to fix the part.
Check the position with the loupe. Small shifts can be achieved by light pressure, larger shifts need reheating the solder point.
When the part is in place, solder a point diagonal to the first with fresh solder. Don't worry about solder bridges yet. We will take care of those later.
Check once again with the loupe. Is the part on its pads? If yes, solder the rest of the contacts with 0.5 solder. Don't solder for more than 2 seconds on each pad. Solder will often cover two or more contacts. Don't worry!
When all contacts are soldered, you take a solder wick with suffienct resin and put an end over the contacts on one side of the component. It has to be wick without solder, - cut off used ends!
Place the solder iron tip obliquely on the wick and pressure for 1-2 seconds on the wick. See the solder flow into the wick. Lift the soldering iron and wick away at a right angle to the board surface. Repeat the procedure, till all contacts on the part are free, and there are no solder bridges left. Check your work with the loupe. If necessary, repeat the procedure, even though it will most often succeed the first time around.

Contruction of the Hegau SMD

As with other kits, you will start with the components having the lowest profile and lowest complexity. IC's and transistors are left till the end, even if the are very small. The reason is that some of the semiconductors are somewhat sensitive to static, and will be less easily damaged, when the resistors and capacitors gives the pc board a little lower resistances.

You will find all of the SMD parts on the two A4 pages with the printed table. Every component will be in a small container and fixed with tape. This not only looks complicated, but is complicated and takes lots of time on compiling the kits. This way of doing things is necessary, as e.g. the SMD capacitors aren't marked with their values. Only the proper ordering will give the builder a chance to find the right components.

So: Only take the component you actually need now from the respective container. And leave the rest in place!

Please only take the needed part from the container. If two components are in a container, you should lay the other part aside, solder in the first and then recover the second.

Now how do you do?

Solder one of the pads for the component very thinly. Hold the component with a pair of tweezers, as close to centered over the relevant pads. Now solder – without supplying any further solder! – the angle between component and pad from above. One, max. two, seconds is sufficient to melt the solder. Check if the component is stuck. If all is OK, solder the other side of the component. Once more check if the component is stuck.Then resolder the first soldering pad.

I begin with resistors.

The resistors are marked as follows:

R is for Ohm, **k** is for kiloOhm and **M** is for MegaOhm, the letters working as decimal sign:

1R0	= 1,0 Ohm
120R	= 120 Ohm
1k7	= 1700 Ohm, 1,7 kOhm

SMD resistors ar mostly marked in a decimal system.

103	= 10 000 Ohm = 10 kOhm
101	= 10 0 Ohm
472	= 47 00 Ohm = 4k7
473	= 47 000 Ohm = 47k

Those who don't want to worry about power of ten will note, that the last figure gives the number of zeros to append. E.g. 105 means five zeros after the 10, giving 10 00000, 1 with 6 zeros = 1 million = 1 MegaOhm.

The 805 after the value gives the size of the component. Very logically in a metric world, this is in inches. 0505 = 0,0805 inch.

[ ]	R9	100K	0805
[ ]	R10	100R	0805
[ ]	R1	10K	0805
[ ]	R15	10K	0805
[ ]	R16	120K	0805
[ ]	R6	18K	0805
[ ]	R7	18K	0805
[ ]	R13	18R	0805
[ ]	R4	1K	0805
[ ]	R11	1K	0805
[ ]	R3	1M	0805
[ ]	R12	1M	0805
[ ]	R17	220K	0805
[ ]	R2	22R	0805
[ ]	R5	27K	0805
[ ]	R8	33K	0805
[ ]	R14	47K	0805

Are all resistors well fixed?
Then we proceed with the capacitors:

[ ]	C13	0,01yF	0805
[ ]	C21	0,01yF	0805
[ ]	C28	0,01yF	0805
[ ]	C18	0,022yF	0805
[ ]	C19	0,022yF	0805
[ ]	C4	0,047yF	0805
[ ]	C7	0,047yF	0805
[ ]	C24	0,047yF	0805
[ ]	C26	0,068yF	0805
[ ]	C12	0,1yF	1206
[ ]	C16	0,1yF	1206
[ ]	C17	0,1yF	1206
[ ]	C22	0,1yF	1206
[ ]	C10	100pF	0805
[ ]	C11	100pF	0805
[ ]	C3	100pF	0805
[ ]	C8	10pF	0805
[ ]	C9	120pF	0805

C14 /C15 nay be polarized or not If polarized they are marked with a white bar. The bar is the PLUS side! At the PCB PLUS is marked with an + sign.

[ ]	C14	1yF/16V/Foil	1206
[ ]	C15	1yF/16V/Foil	1206
[ ]	C27	2700pF	0805

Revision:September 13. 2005

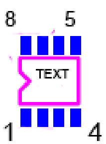
[ ]	C1	470pF	0805
[ ]	C2	470pF	0805
[ ]	C6	68pF	0805
[ ]	C5	8,2pF	0805

The PCP now is nearly completed. Next part is a choke DR1. This one is a little bigger then the parts before, it is a 1210 part. Handle the choke very carefully. It is made from ferrite and can easy be broken.

[ ] DR1 2,2yH 1210

Did you mention that it is much easier to solder parts now? It is because you are well trained now :-). However, you should have a little break now. Smokers eventually eat an apple now, nonsmokers do a little run around the house. Much better for smokers would be to eat their apple whilst running arround the house.
Fit again? Then go on with Semiconductors and IC´s ! Dont be afraid, it will not be more difficult then before.
SOT23 doesn’t mean, that the component has 23 leads. Lots of diodes and transistors are in SOT23 casings, which have three leads even when only two are used as with diodes.
SO8 and SO14 are with 8 and 14 leads respectively. The pins are counted as in larger IC’s from 1 to 8 or 14 clockwise. Pin 1 is where you find the point or notch. When you don’t find any point or notch or bar, hold the IC so that you can read the marking. In this position, pin 1 is lower left. In the Placement plan you find the PIN one side marked with a triangular notch.

[ ]	D1	BAR43S	SOT23
[ ]	D2	BAS19	SOT23
[ ]	T2	BFS20	SOT23
[ ]	T3	2N7002	SOT23
[ ]	IC1	74HC00	SO14
[ ]	IC2	NE612	SO8
[ ]	IC3	78L05	SO8
[ ]	IC4	TDA7050	SO8
[ ]	IC5	NE555	SO8



Now for the large parts

[ ]	C25	10yF 16V rad.
[ ]	C23	100yF 16V rad

these are electrolytic capacitors. These will be the first on the TOP of the pc board. Mind polarity!

And now for the crystals:

[ ]	Q1	Crystal 7035KHz series resonant
[ ]	Q2	Crystal 7035KHz series resonant

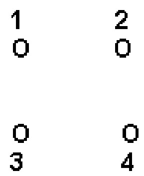
And the potentiometer for the volume control. Don’t fix the shaft yet, - that will come later!

[ ]	P1	5K Piher PT15 vertical
[ ]	C20	Variable foil Cap

C20 will be adjusted later on.

Read the Attacheent „How to wind these Coils, before you start here!
I’d rather have mounted these firs to make the soldering of the SMD look like childs play, but for technical reasons this won’t do. The coils are in the way because of their height, if you mount them too early.

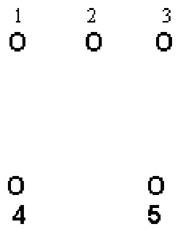
As the first
PA-coil: L2:
L2 Conrad coil 516651-88 **DON’T** solder it in yet. The coil has to be wound! **Look at the coil form from below and mark the plastic body at pin 1 with a felt tipped pen.**



First put on the primary of 35 turns lacquered copper wire. The wire should be fixed to pin 1 and you wind upwards, closely and in one layer. When you’re through with the 35 turns, fix them with a drop of glue. Wait till the glue is dry and then cut the wire so that some 5 cm is left. Let the end of the wire hang freely. Now the secondary. Solder the wire to pin 2 and once more wind the 9 turns upwards with 0,3 mm lacquer isolated copper wire.
After putting on the 9 turns, once more fix with glue. When the glue is dry,

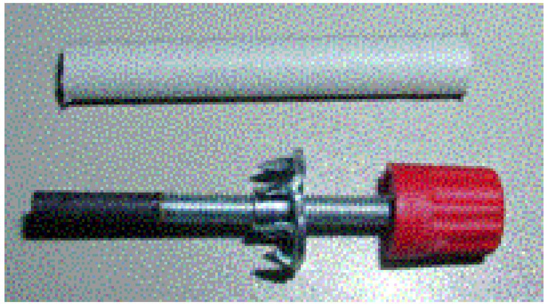
solder the end to pin 4. Now solder the free end of the primary to pin 3.

Now put the pc board in front of you, so that DK1HE is readable. The place for L2 is above this. Pin 1 of the coil goes to the top right hole. Solder in all 4 pins, turn in the core carefully and your'e done with L2.
Next do the RF input coil on a Neosid 7S Filter kit: Cover core and tapped core of F10b material. Look at the coil form from below! This is a bit more clumsy, but not a catastrophe. Read the attachement „how to wind neosid coils“ first!S tart with the Primary (resonate) winding: Use the 0,1mm wire, do abt 3 turns around PIN 3 to fasten the starting point, go up to the form through the notch and wind 32 turns close from the lower end to the upper end. If the 32 turns are on the form, use a drop of glue to fasten it, lead the wire down to PIN 1 through the notch and wind 3 turns around Pin 1 to hold it in place. Now the Secondary (coupling) Again use 0,1mm wire. Start with 3 turns around PIN 4, go up through the notch to the form an wind 4 turns as a second layer over the primary. The secondary should be place symetrically in the middle of the Primary. fasten it with a drop of glue, go down to the notch and wind 3 turns around PIN 6. Now solder the wires to the pins as shown in the attachement. Place the form above its place on the PCP. Put the complete coil into it´s place at the PCB. The form shoud flush with the pc board with its socket. When the position is correct, solder the pins to the board. The soldering time per pin should not exceed 2-3 seconds. Don't put the shield can on yet, this must await the functional test.



Now the last „fat“ parts:
12V connector
Cynch-Jack.CBP-5
3,5 mm jack NA-35
3,5 mm jack NA-35
Transistor BS170. The transistor will lie belly up, with the flat side against the pc board. Then put on a thin piece of sheet metal, bent as a U. The sheet metal will work as a heat sink, and should be soldered to ground on both the left and right sides of the transistor.

Now build the variometer. In the kit you will find a large dowel, a nut and an M4 screw. From these, you will make the variometer. First saw off the neck of the dowel and shorten to some 5 cm. The head of the M4 screw must also be sawed off. Glue the straight end of the screw to the ferrite tubing, so that it is as flush as possible with the screw.



Small inaccuracies are OK, but the overall picture should be rather straight. When the glue is hardened, you can test the mounting of the variometer: The bore of the tube is a little smaller than the outer diameter of the nut. With a light pressure, the nut will fit in the tube (see the following picture).

Not much more left to do. To get enough weight, the pc board is now put in the enclosure. All holes in the enclosure should be measured and marked. The connectors aren't screwed onto the enclosure. This would be too much trouble with a simple apparatus as the Hegau. When everything is in place, the place for the variometer is marked and you make a 6 mm hole for it. The screw is soldered to a piece of pc board. The strips sitting on the main pc board on delivery will do well (will have to be broken off at the edge even so). Naturally you will have to make 6 mm holes in the strips prior to soldering. The strips will then have to be fixed to the front plate with to screws hole to hole. The variometer tube can now be fitted to the screw

Here you see the ready wound VFO coil. Solder the ends of the wire after installation to their solderpoints at the PCB.

from the inside for testing. Before winding the coil, you must decide its place. To do this, hold the M4 screw with the ferrite tubing below the assembled variometer and mark the place on the tube, where the end of the ferrite tubing is shortly before its is fully inserted. This marking shows the upper end of the winding. Now wind 45 turns of 0,2 mm lacquer isolated copper wire on the tube. Fix the turns with nail lacquer, glue or wax and let to sufficiently long end of wire free. Assemble the variometer and solder both wire ends to the correct spots on the pc board.

Done!

Check all solderings very carefully with a large loupe. If you find any bridges, not belonging there, remove them very carefully with solder wick.

Now connect the power. If no smoke rises, it's a half success. If you hear anything, you can do the trimming.
At first you must trim the RX/TX shift Cap C20. Because Hegau is a direct conversion, you can do this with an receicer: Listen to the signal in receive mode and adjust your transceiver to a note of abt 600 to 700 Hz. Then in receive mode, adjust the cap to zerobeat (600-700 Hz below). Because the Hegau is a very simple design which originaly was designed as a training kit for SMT, the shift will not be the same at all frequencies. It will differ by abt 50-70 Hz over the VFO range, but if you remember how seldom CW stn are optimal transceive, this disadvantage is not that bad ;-)

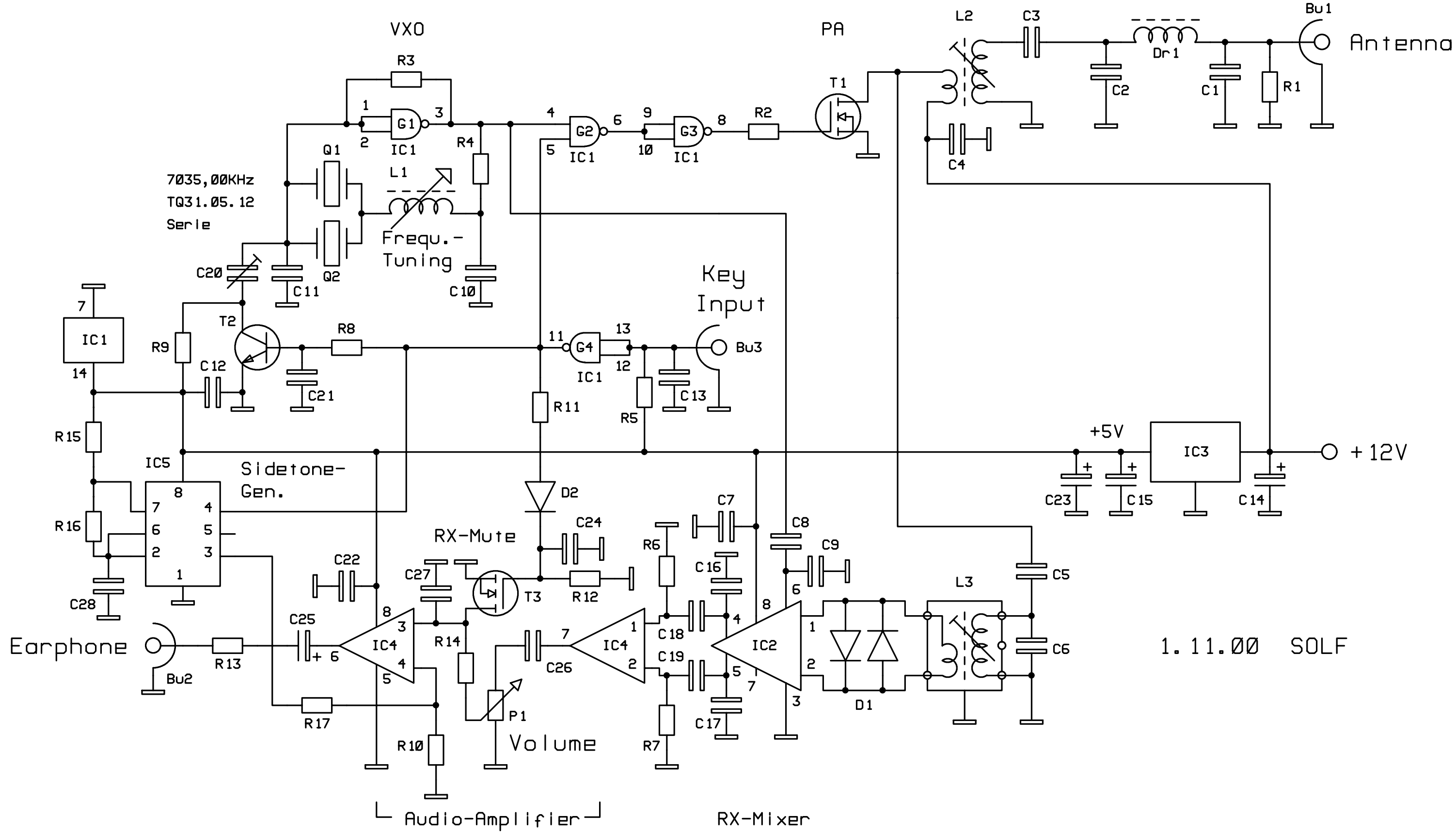
This only consists of tuning both coils to a maximum with a weak 40 meter signal. When this works for the Neosid coil, you haven't made any errors and can glue the covering core and solder the shield can. When the can is in place, you will have to retrim the coil.

If you don't hear a thing, start looking for errors. If you don't find any, turn to the QRPProject support, that is me (support@qrpproject.de).

I am certain, that you enjoyed building the Hegau. If you are less scared by SMD, the goal of the kit is achieved.

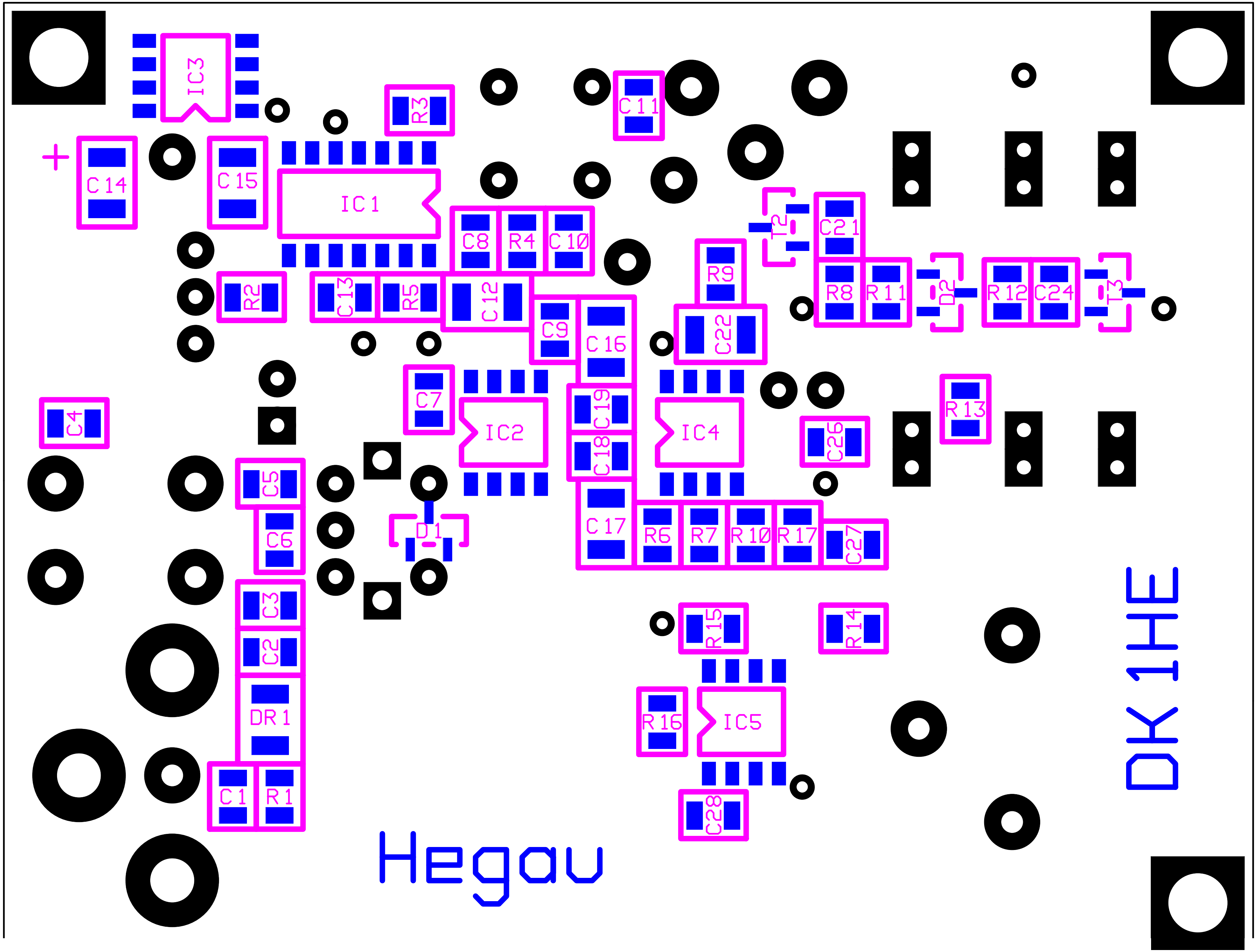
Have lots of fun with your Hegau

72 de Peter, DL2FI



DK1HE-QRP-Fun-Transceiver " Hegau " (40m)

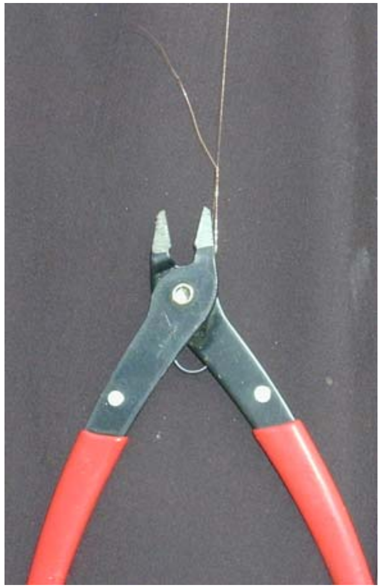
Revision:September 13. 2005



Revision: September 13 2005

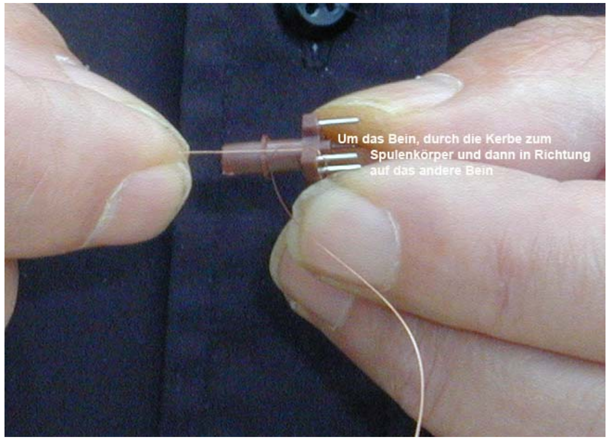
Attachement: Ingo´s (DK3RED) wonderful maschine to make little coils.

All over the world winding coils seems to be the absolute horror scenario for HAMs are, lots of kits have been unbuilt only because Hams are afraid in windink coils. In But actually it´s an absolute easy Job, you only have to know the trick. We recommend a little maschine introduced by Ingo, DK3RED. NO, it is not expensive, it cost you nothing. You only temporary change the functionality of a standard tool.

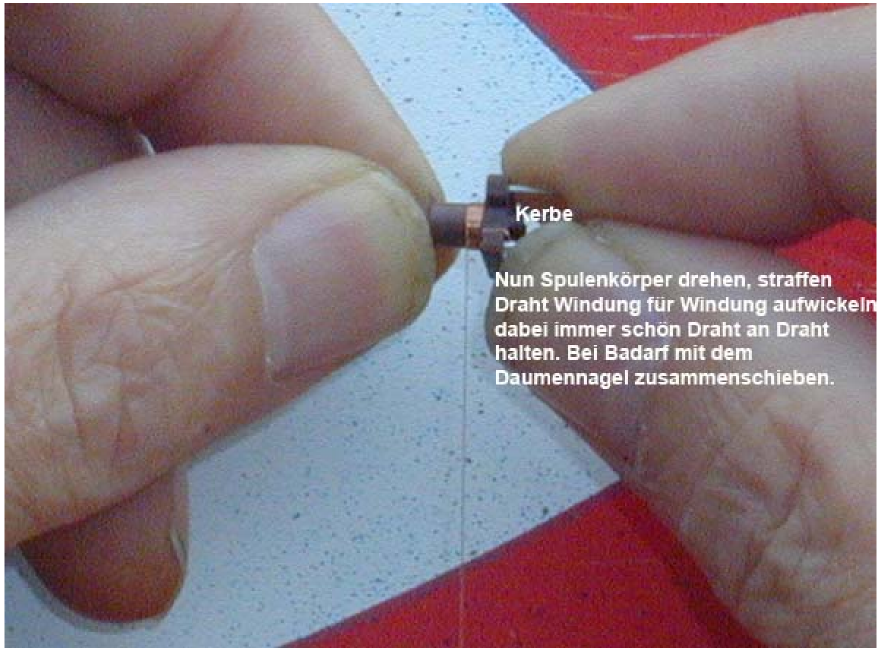


How to do it:

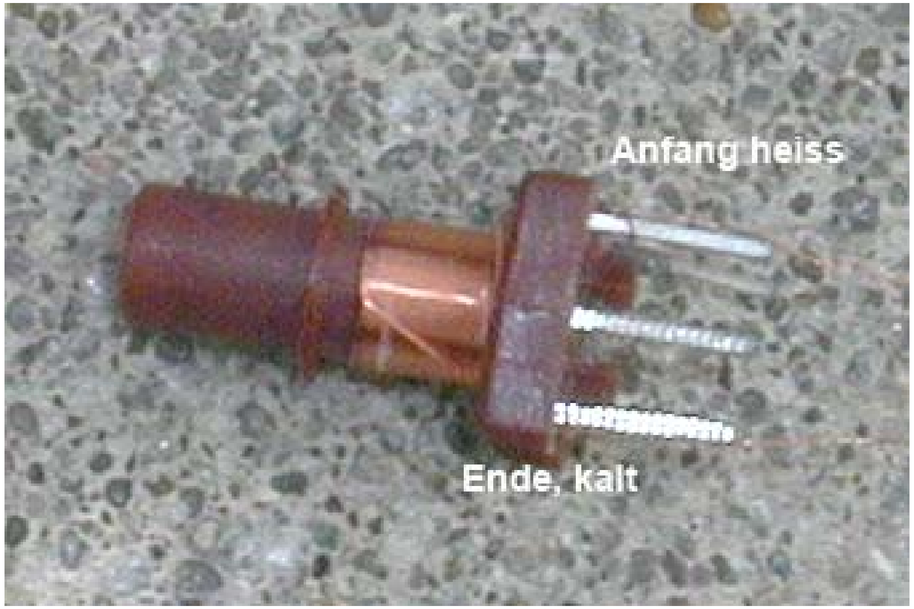
Take the required length of wire and fasten it with a knot to a medium weighted tool like in the picture.

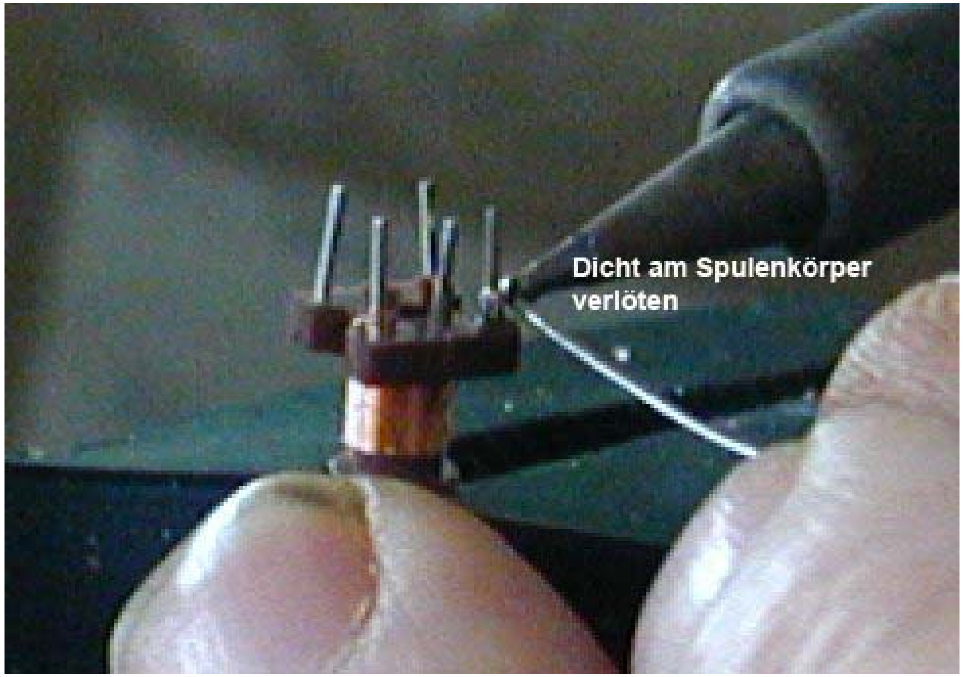


Sling the other end of the wire 3 times around the soldering PIN of the coil. Start with the PIND the manual marks as the starting PIN. The PINs of the Neosid Coil forms are extra roughly, so the wire will sit at its place without problems.



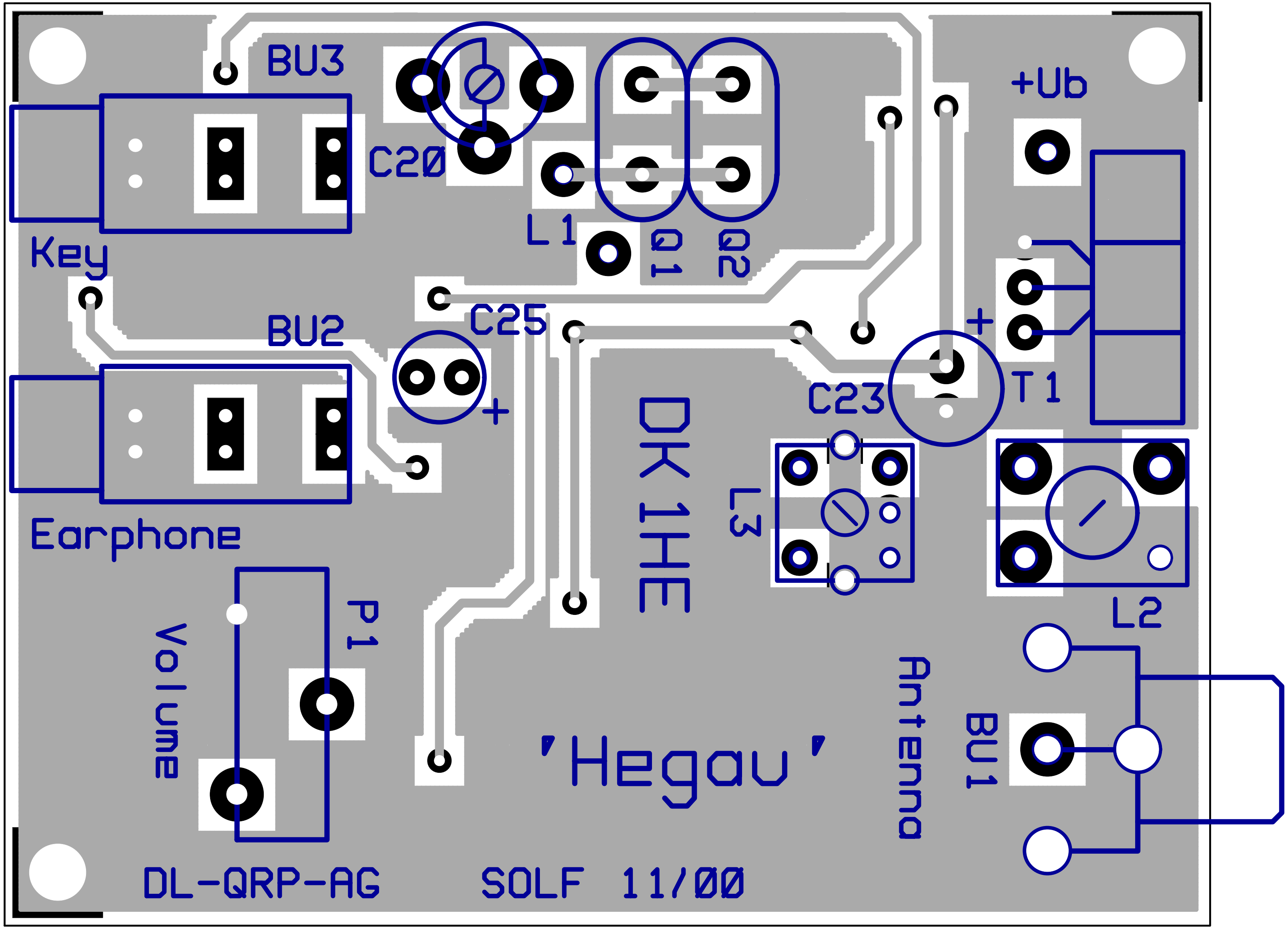
Pulled by the weight of the tool, the wire now is streched tautly downwards. Feed the wire through the notch in the coil form lower plate up to the cylinder. Now turn the Coilform between your thumb and the finger, The wire will follow turn by turn



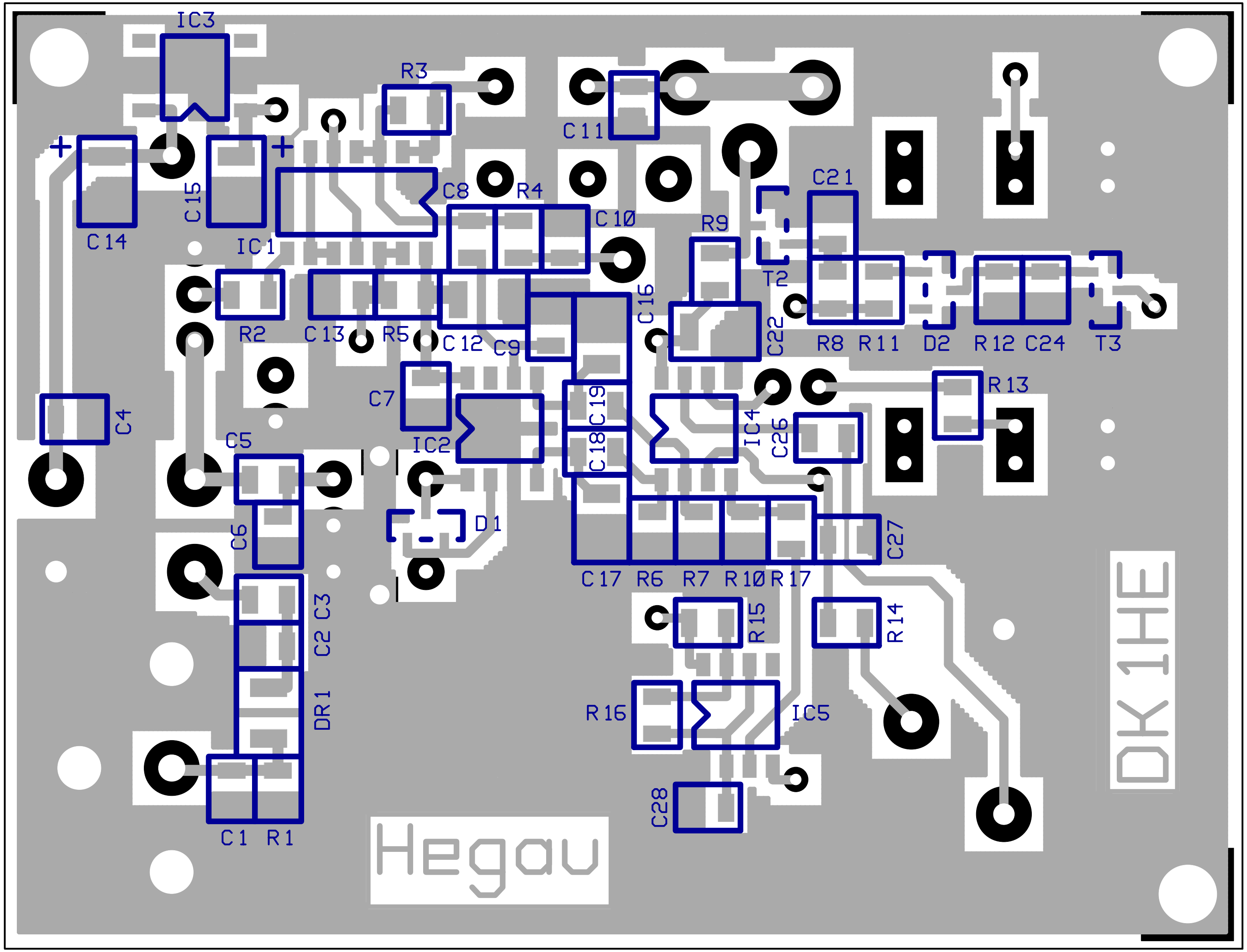


under the direct controll of your eyes and you can lay one turn next to the other without difficulties. Do not forget to count the turns :-)

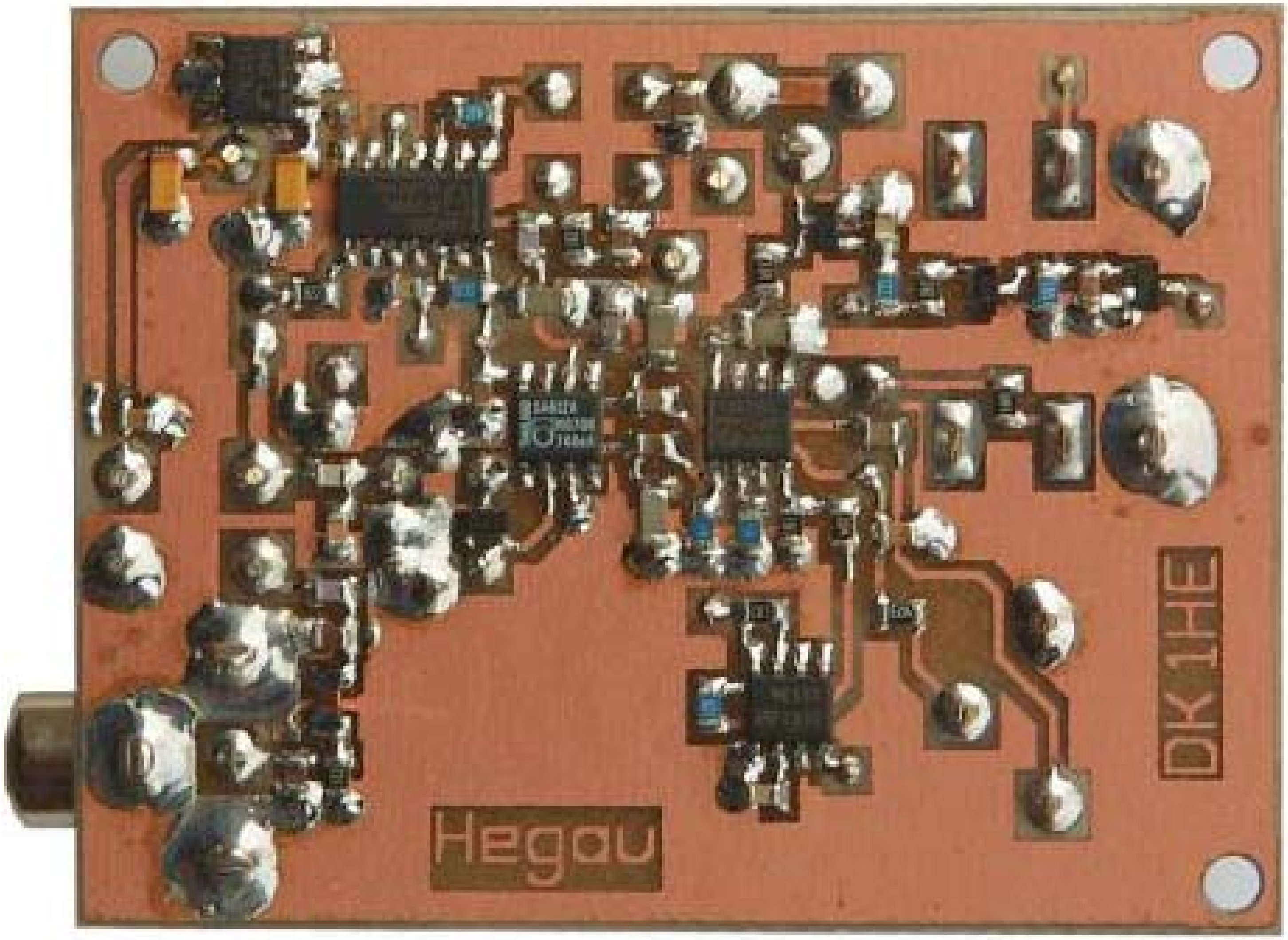
The upper end of the windings now will be feeded down through the noth to the other PIN. Again sling 3 turns around the PIN.
With your thumbnail press the 3 turns on each Pin slightly together towards the body of the coil form.
Hold the form in a vice or a similar tool. With the tip of your soldering iron and with electronic solder touch the 3 turns of wire for a short time. You will see the solder melting around the wire. The wire we use will loose it´s lacquer at solder temperature immideate as long it is only 0,1mm or 0,2mm in diameter.
Check the result by measuring the resistance between the two Pins, it should be near zero OHM.
be carefull not to overheat the PIN, it will melt out of the body. If it´s looking like the tower of Pisa in Italy (inclined) that´s not really a problem Just bent it back to an right angle.
After installing the Coil into the PCB, you must set on the ferrite´s If the coil uses a ferrite Cap, glue this one after you are sure that the coil realy works. When installing the copper shield cap, don´t press it down totaly to the PCB because this could eventually short the solderpads. Do not solder the Copper cap befor you are not sure the coil is working as it should do.



Revision:September 13. 2005



Revision: September 13 2005


Hegau
DK 1HE