



The Sudden Storm & Rexwood 1000W Kits from QRPme

Builder's Guide

Version 6.3

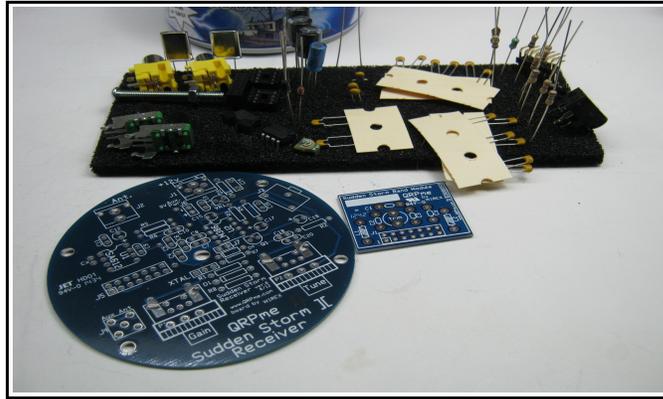
for

Sudden Storm][ver.6

Rexwood 1000W ver.6

Updated 12/6/2023

Open the can and the adventure begins...



Organize the parts and take an inventory...

Bill of Materials (BM= band module)

Resistors

R1 = 100K (BRN-BLK-YEL)
 R2 = 10 (BRN-BLK-BLK)
 R3 = 22 (RED-RED-BLK)
 R4 = 10K (BRN-BLK-ORG)
 R5 = 680 (BLU-GRY-BRN)
 R6 = 27K (RED-VIO-ORG)
 R7 = 100K (BRN-BLK-YEL)
 R8 = 1K (BRN-BLK-RED)

L1BM=10uh (BRN-BLK-BLK)
 L2BM=15uh (BRN-GRN-BLK)

Q1 = 2N7000
 D1 = 1N4005
 D2 = unused
 D3 = 1N5818
 D4 = 1N4148
 VR1 = 78L09

C1'
 trimBM = 9-50pf cap

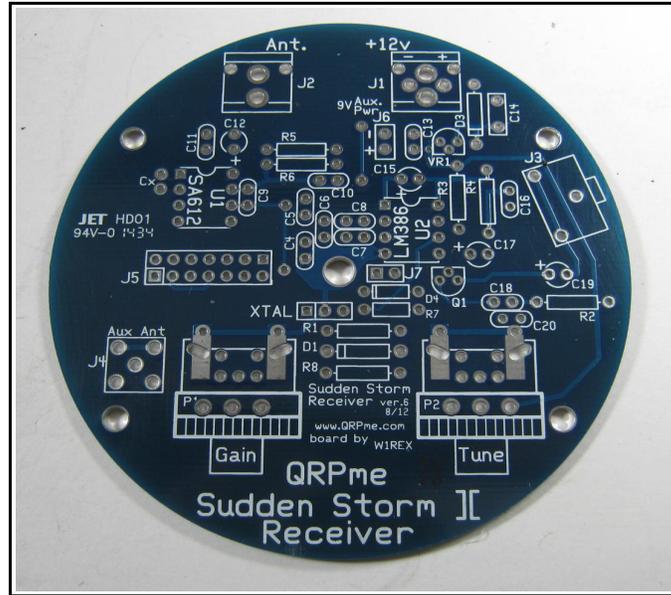
Capacitors

C1BM = 27pf (270)
 C2BM = 220pf (221)
 C3BM = .01uf (103)
 C4 = .01uf (103)
 C5 = .01uf (103)
 C6 = .033uf (333)
 C7 = .1uf (104)
 C8 = .1uf (104)
 C9 = 100pf (101)
 C10 = 100pf (101)
 C11 = .1uf (104)
 C12 = 100uf
 C13 = .1uf (104)
 C14 = .33uf (334)
 C15 = 10uf
 C16 = .01uf (103)
 C17 = 100uf
 C18 = .1uf (104)
 C19 = 100uf
 C20 = .01uf (103)
 CzBM = 33pf (330)

Miscellaneous

U1 = 8pin socket +SA612
 U2 = 8pin socket +LM386
 J1 = RCA jack
 J1BM = 2x7x.1" m. rt.ang.
 J2 = RCA jack
 J3 = Stereo jack
 J4 = unused
 J5 = 2x7x.1" f. header
 J6 = 1x2x.1" m. header
 J7 = 1x2x.1" m. header
 P1 = 10K linear pot
 P2 = 10K linear pot
 XTAL = 3pin SIP socket
ver. 6 round tuna can pcb
 band module pcb
 1.5" x 6-32 bolt
 6-32 nut
 7.030 crystal
 7.122 crystal
 (+7047.5 crystal
 in Rexwood 1000W kit)

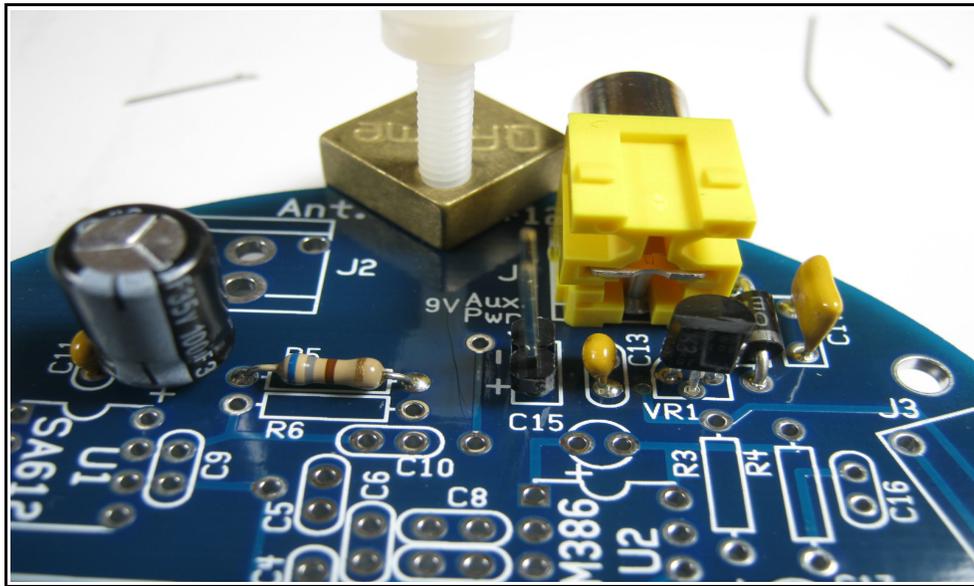
OK! Here is a close-up picture of an actual ver.6 board. It's back to the proper color...BLUE! I fixed all the little problems on the ver.4 (RED) boards and everything is now back in sync.



BOTH the Sudden Storm][and Rexwood 1000W kits use the same circuit board. Indeed, the kits are almost identical differing only in the addition of the 40m W1AW crystal and radio in the round label on the Rexwood 1000W kit.

You should review the following schematic and run through this builders guide a couple of times just to familiarize your self with the complete construction process. Experienced builders usually develop their own techniques in building projects. This guide takes a step by step approach to building the kit where all the parts are installed in functional stages. Within each stage, the parts are installed according to their profile; where the parts that hug the board closest are installed first and progressively taller parts are installed in order of height. This makes it easier to install successive parts. After completing each stage, it is either tested or inspected before moving on.

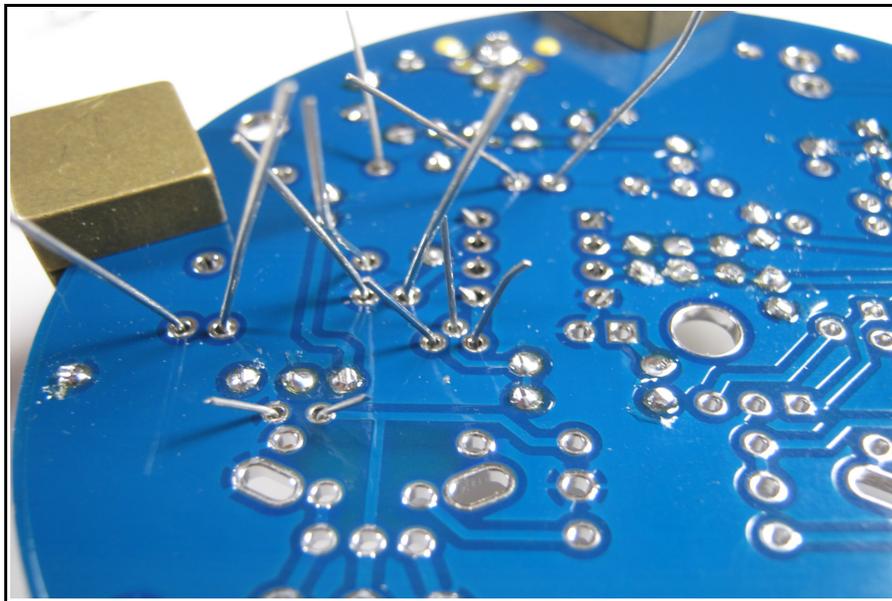
STAGE 1: THE POWER SUPPLY



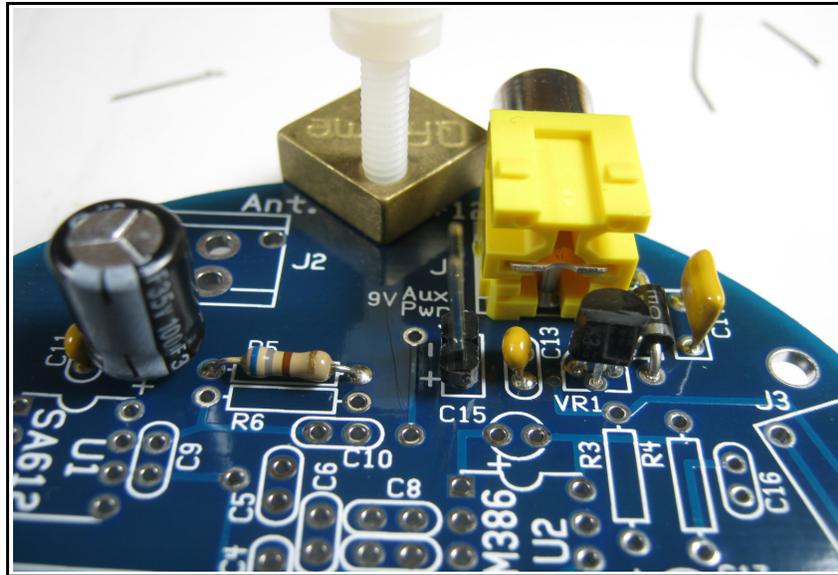
The first stage is the power supply stage. The first set of parts needed to install on the board for this stage are: J1, D3, C14, VR1, C13, R5, C12 and C13. Within each separate stage, the parts that lie closest to the board are installed first. So the suggested install sequence for this stage is: C11, C13, C14, D3, R5, VR1, C12 and J1. If you don't have a bench top vice or pc board holder, you can use the now empty can as a board holder when soldering. The only problem is that if you do install the RCA connectors and the stereo headphone jack early in the build, the board will no longer fit snug in the can due to the connectors sticking out over the edge of the can. I created a unique set of pcb holders that stand the pcb off the bench while soldering so I will show the connectors installed with the appropriate stage. You will see the 4 BRASS SET board holders clamped along the edge of the board. If you need to use the can as a board rest, you should delay installing connectors J1, J2 and J3 until the very end of the

build. You can tack in a couple of cut component leads at the J1 end of diode D3 and the ground side of either C13 or C14 to feed the 12 volts in for testing purposes.

- ✓ C11 .1uf = 104
- ✓ C12 100uf = 100uf 16 or 25 volt
- ✓ C14 .33uf = 334
- ✓ R5 680ohms = BLU-GRY-BRN
- ✓ D3 1N5818
- ✓ VR1 LM78L09
- ✓ C13 .1uf = 104
- ✓ J1 RCA connector



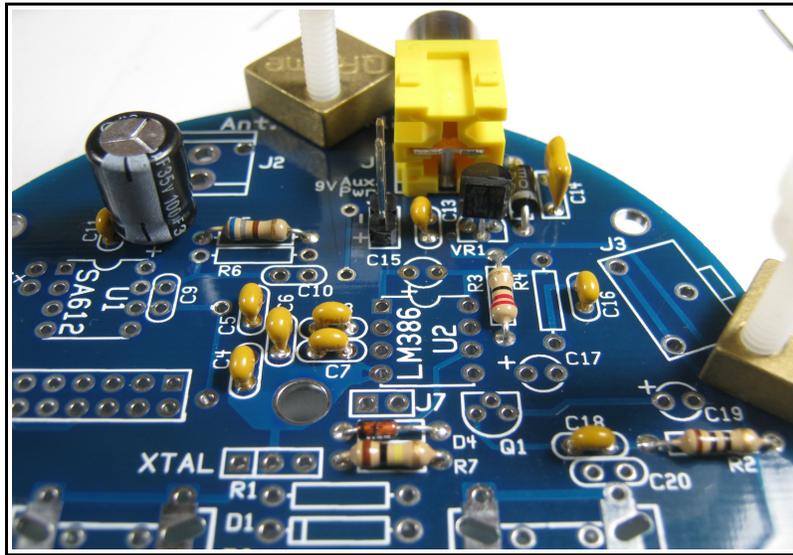
You can insert multiple parts bending the leads apart slightly to hold each part in place. Batching the parts in each step allows your build to go much faster, but you don't want to batch too many. You don't want to have a dense forest of leads to get in the way of your soldering iron.... In the example above, 6 parts are inserted and then soldered.



View of completed first stage

Now you can test your progress. First inspect all your solder points for good solder fillets and that they are not shorting to adjacent pads or ground. Retouching a soldered pad with a hot iron usually will cause a 'suspect' solder blob to reform into a nicely wicked connection. When you are happy with your soldering, you can then do a preliminary power up of the board. You can either bring in +12 volts to connector J1 using a power cable with a male RCA connector or use alligator clips to hook up +12 volts to the test points that you tack into the circuit using the component leads. You should be able to measure +9 volts between the right side of resistor R5 and ground. A convenient location for the ground connection is any of the 4 mounting holes at the 4 corners of the board. If you get +9 volts at the right side of resistor R5 then everything is normal and you can move on. Otherwise, you need to re-inspect the components, your soldering job or your +12 volt connection.

STAGE 2: THE AUDIO AMPLIFIER



Next we will tackle the audio circuit. The parts for this stage, in the order of installation are: C4, C5, C6, C7, C8, C16, C18, R2, R3, R7, D4, DIP socket U2, Q1, C15, C17, C19, J3, connector P1, and the LM386.

The tiny little yellow caps C4, C5, C6, C7, C8, C16 and C18 are the smallest and lowest parts so they are installed first.

- ✓ C4 .01uf = 103
- ✓ C5 .01uf = 103
- ✓ C6 .033uf = 333
- ✓ C7 .1uf = 104
- ✓ C8 .1uf = 104
- ✓ C16 .01uf = 103
- ✓ C18 .1uf = 104

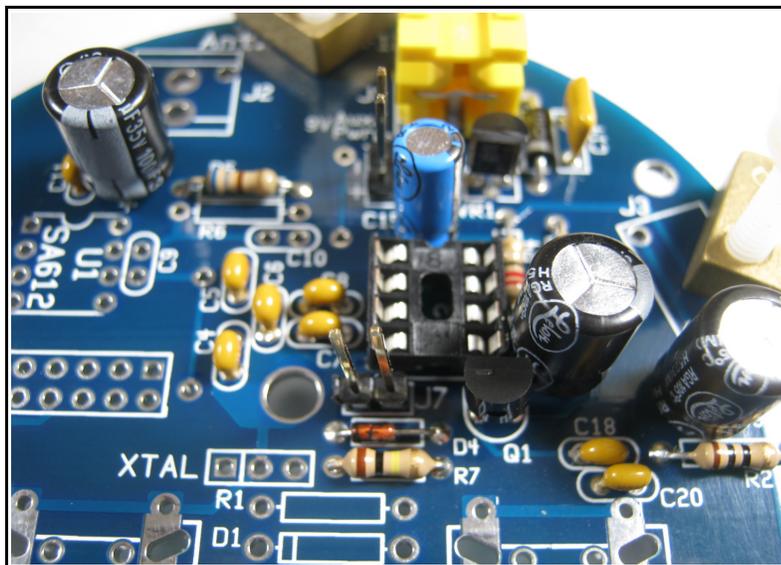
Then some resistors and a diode....

- ✓ R2 10 ohms BRN-BLK-BLK
- ✓ R3 22 ohms RED-RED-BLK
- ✓ R7 100K BRN-BLK-YEL
- ✓ D4 1N4148

Now install one of the DIP (Dual In-line Pin) 8 pin sockets. Make sure that the 'notch' on the socket lines up with the little 'notch' designator on the silk screen.

Install the transistor Q1 followed by the tall caps C15, C17 and C19.

- ✓ R4 10K = BRN-BLK-ORG
- ✓ C20 .01uf = 103
- ✓ Q1 2N7000
- ✓ C15 10uf = 10uf 25 volt
- ✓ C17 100uf = 100uf 25 volt
- ✓ C19 100uf = 100uf 25 volt



The last two parts to solder are the jack J3 and mute connector P1. J3 snaps in for easy soldering but I like to straighten the leads first. I find it easier to seat into position without the kinks in the legs.

The P1 connector is a little tricky. You need to hold the connector in place for soldering by some means.... I've been soldering those pesky 2 pin Molex connectors for well over 30 years using only my fingers. I mount the soldering iron in my vice or sitting & weighted on an empty tuna can with the tip facing me. I then bring the work to it now using 2 hands. My left hand is holding the board, upside down, with my forefinger holding the connector in place... TOUCHING ONLY 1 PIN OF THE CONNECTOR. I then position the board so I can solder in THE OTHER CONNECTOR PIN only. When the solder has cooled, I can remove my finger from the pin and then inspect the connector to see if it is positioned where I want it. If it is askew, I can hold that same pin again, then touch the iron to the single soldered connection and reposition the connector. When I have it right, I solder in the second pin, completing the installation of the connector. Soldering Molex connectors having 4, 6, 7 and 8 pins are pretty easy as there is plenty of spacing between the pin you are soldering and the pin you are holding. It is the 2 pin connectors that are tricky....because if you hit the wrong pin with the iron (50% chance of that), your finger will get very hot very quickly and you might end up saying a bad word or two.

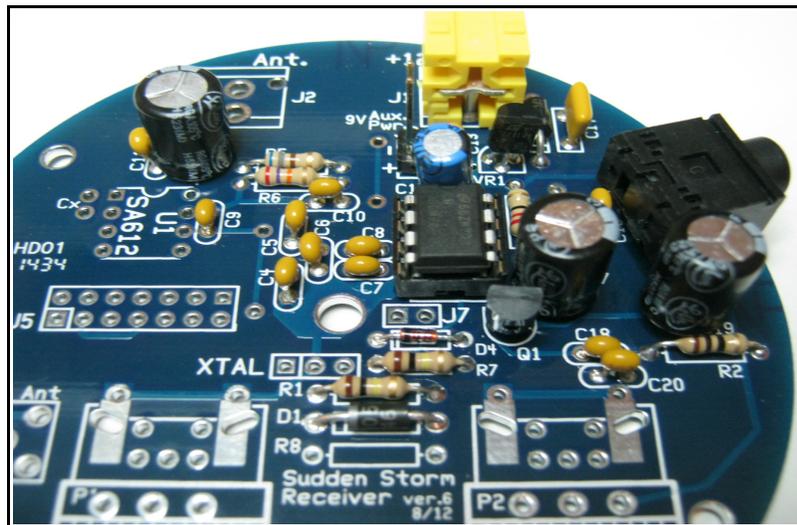
Now complete the audio section by installing:

- ✓ J3 stereo jack
- ✓ P1 1x2x.1" straight male header

Inspect all you soldering for this stage and make sure you have all the proper parts in the right places. If everything looks good, you can install the LM386 in the socket making sure the notch on the part lines up with the notch in the connector.

- ✓ LM386 at U2

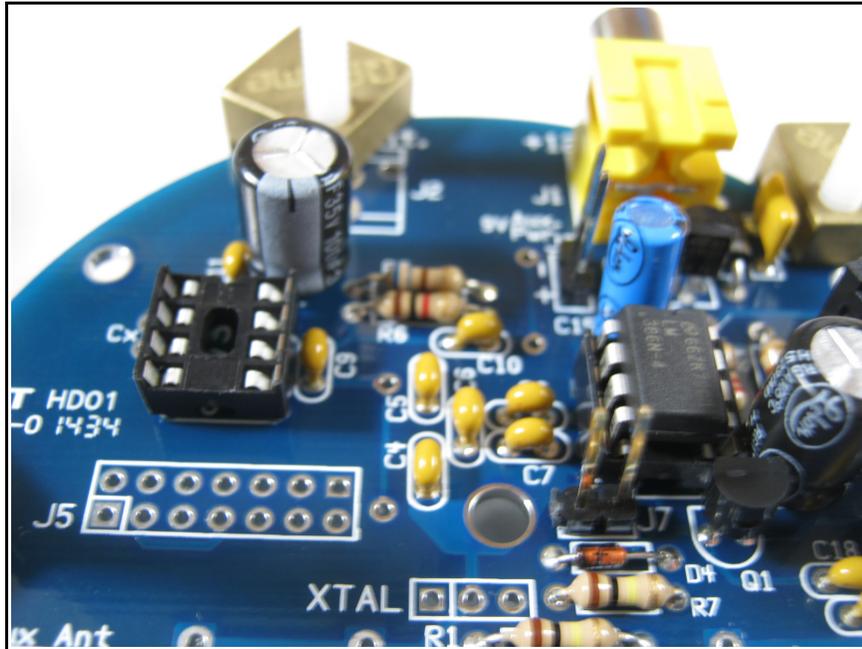
Now we can test the audio stage. If you are holding back the installation of the RCAs and headphone jack so that you can use the empty can as a board holder, you will have to tack in a test jack for your headphones. Don't use the holes for the J3 jack holes because you will then have to clean them up when you go to install the J3 jack later. Use already soldered pads like the test ground and the right side (top view) of cap C19 where it heads off to the stereo jack. With headphones in place and +12 volts applied to the power jack J1 or power test points, you should hear an audio pop when power is applied. When you touch any point around the tiny yellow caps to the left of the LM386, you should get loud hum in the headphones. Your audio stage is working! If you don't hear anything, you need to power down and go over your work for this stage. Check for proper parts in each location and all your soldering work. Look for cold solder joints, solder bridges to adjacent pads and such.



View of completed Stages 1 & 2

STAGE 3: THE MIXER/OSCILLATOR

Stage 3 parts in order of installation are: C9, C10, C20, D1, R1, R6, the 2nd DIP socket, the crystal socket and the SA612 mixer chip.



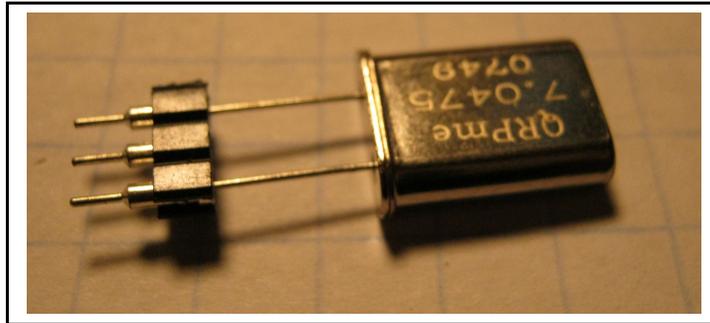
Again, the small yellow caps are installed first followed by the diode and resistors.

- ✓ C9 100pf = 101
- ✓ C10 100pf = 101
- ✓ D1 1N4005
- ✓ R1 100K = BRN-BLK-YEL
- ✓ R6 27K = RED-VIO-ORG

When installing the socket, orient the notch on the socket with the notch designator on the circuit board.

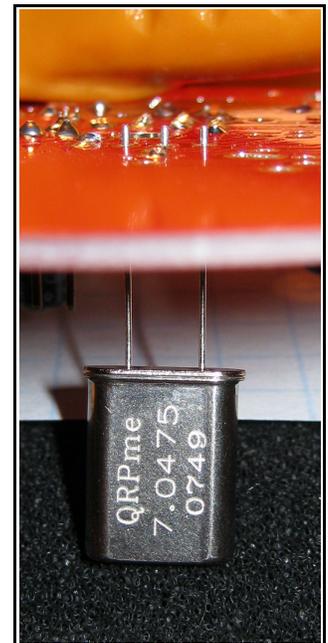
- ✓ IC socket at U1

The crystal socket is next. I usually insert a spare crystal into the socket to use as a handle for soldering.



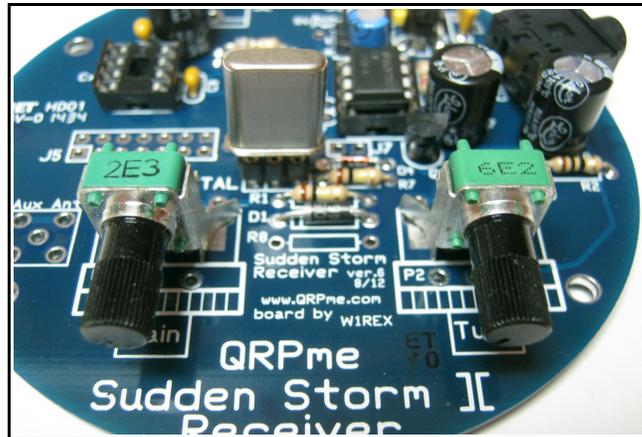
Crystal socket with resistor 'handle'.

Then I insert the socket into the board and rest the board on the resistor like a leg and solder 1 pin with your two free hands. Now that the pin is soldered, you can hold it in place while upside down with one hand, re-heat the SAME pin with the other hand while straightening the socket out at the same time. Now that 1 pin is soldered and the socket is straight up out of the board, you can solder the remaining pins.



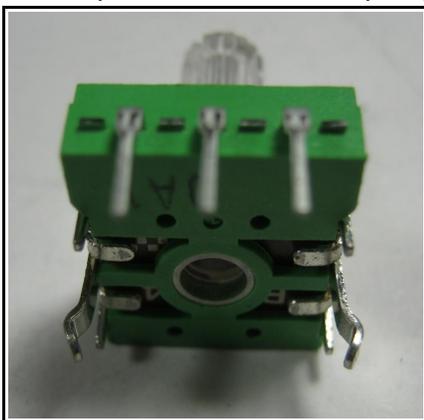
STAGE 4: THE POTENTIOMETERS

The potentiometers P1 and P2 are next. The pots that come with the kit are shown below. You have to spread the rear mounting tabs a little before mounting them in the slotted pads on the printed circuit board.



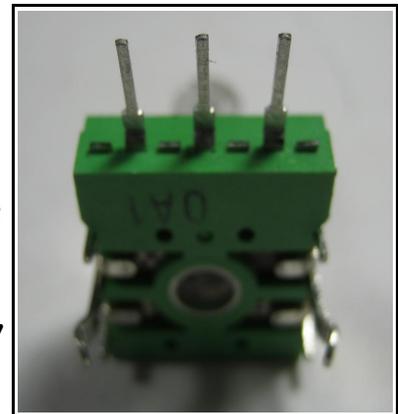
Sudden Storm][with standard pots

Additionally, the circuit board is also designed for soup-up pots with lighted shafts. If you didn't buy the soup-up pots, you can skip to page 16.....The soup-up pots fit in the front (larger) set of pads. The soup up pots have to be adapted for horizontal

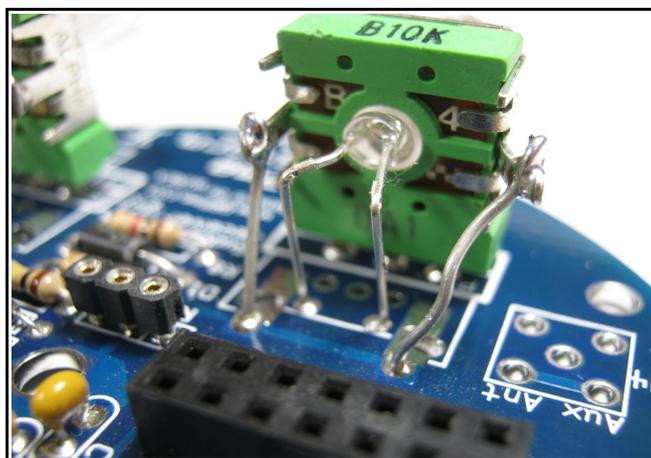


As shipped

mounting instead of vertical. Take the original pots and carefully bend the leads so that they come straight out of the body of the pot.



Bent straight



Soup up pot mounted in the forward set of pads.

The LED is bent to fit loosely into the back of the pot shaft. The soup up pot is then soldered in...followed by the LED. The cathode (-) side of the LED is to the right in the picture above. LED power is 9 volts from the voltage regulator and enters the TUNE pot LED near C20, then exits the TUNE pot LED, passing through the current limiting resistor R8 and then into the GAIN pot LED. The ground end of the LED lighting circuit ends up at the AUX antenna ground pad.



Twin Soup up pots

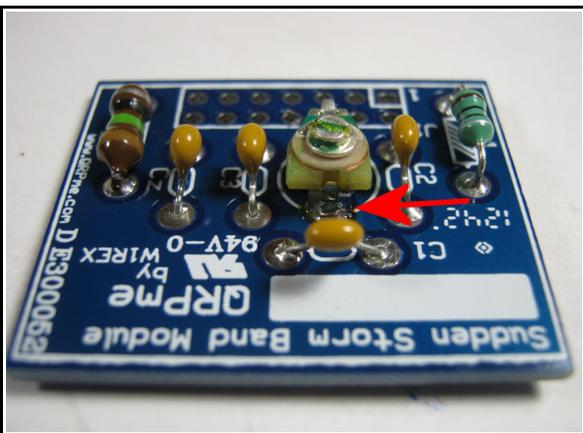


Ooooooh, scary!

STAGE 5: THE BAND MODULE

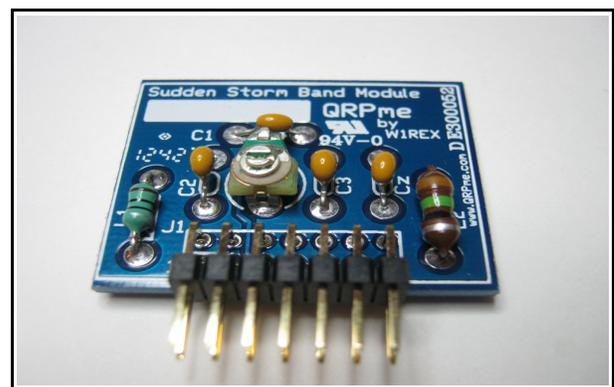
Now it is time to work on one of the unique features of the Sudden Storm version 6 kit: the band module. The parts required for this stage are (in order of installation): C2, C3, C1' (trim = trimmer cap), C1, L1, L2 and J1.

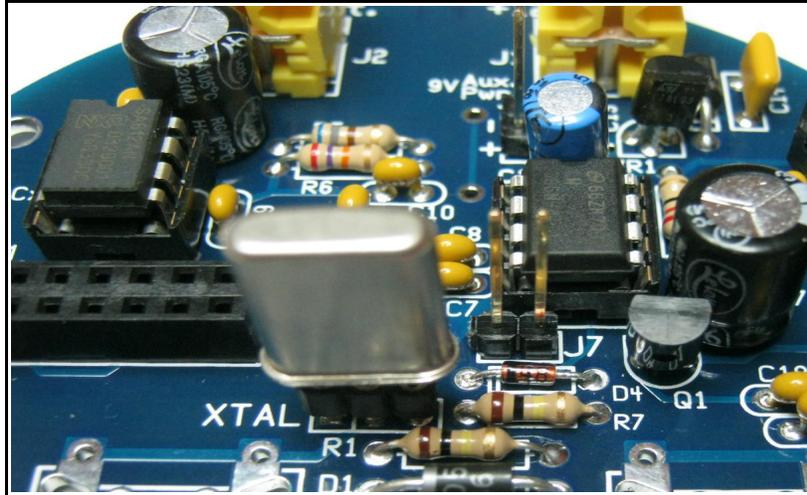
- ✓ C2 220pf = 221
- ✓ C3 .01uf = 103
- ✓ C1' the 50pf trimmer cap **also solder top pads**
- ✓ C1 27pf = 270
- ✓ L1 10uh = BRN-BLK-BLK
- ✓ L2 15uh = BRN-GRN-BLK
- ✓ Cz 33pf = 330



Band module board with caps installed.
Note that trim cap pin towards top of board is also soldered on the top side.

View of completed 40m band module board





And now install the band module related parts on the round tuna can board: U3, pot P1 and J2.

- ✓ U3 2x7x.1" female header
- ✓ P1 10k linear potentiometer
- ✓ J2 RCA connector



Mount the completed circuit board on the top of the tuna can using the 6-32 bolt & nut. The nut should be at the bottom of the can. You can now insert the SA612 chip, crystal and band module board. You are ready to operate!

STAGE 6: ADJUSTMENT & OPERATION

After your kit is completely built, you will need to perform a minor adjustment before you get optimum results. The small trimmer cap on EACH band module needs to be adjusted ONCE after construction. It is pretty easy. Simply attach any long-ish piece of wire to the antenna jack, plug in some phones, insert the newly finished band module and an appropriate crystal. Apply power and listen for a station. If there is no activity, adjust the tune pot to see if you can find a singlay near the crystal frequency. If not, power down and install a different crystal. Once you hear a signal, you should carefully adjust the trimmer cap on the band module board for the strongest signal. Use a non-conductive trimmer adjusting tool if you have one or make one if you don't. I've used all kinds of plastic items to construct a tuning tool. My mother was missing a knitting needle more than once.....but she had knitting needles like I have computer parts so I never fessed up. She did get nice knitting needle sets for Mother's Day and birthdays and the like...from her #1 son.

ANTENNA REQUIREMENTS

The Sudden Storm receiver is not very fussy about antennas. I've used cheap transistor whips and random scraps of wire. We even used an 18" alligator jumper lead clipped to the wire heat cage of a nearby soldering station at an FDIM Buildathon and heard signals from 2 states away. Remember that the better the antenna, the better the signals that will come out of it!

**ENJOY!
W1REX**