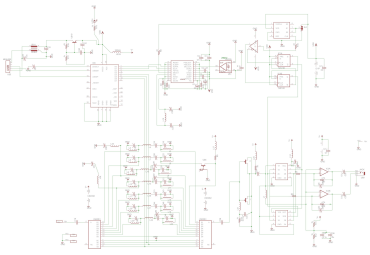
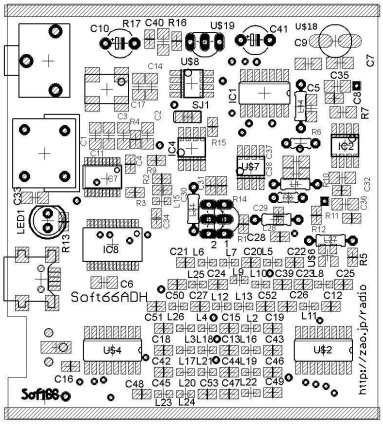
Soft66ADH How to make , instructions Part1

right click for enlarge





Please short SJ1 GND side.

1 Schematics and Parts

Soft66ADH is a direct conversion receiver. Soft66ADH takes out an AF signal by injecting departure from bureau of the frequency same as the frequency that receive in a mixer. Soft66ADH can get an IQ signal by preparing for the signal which departure from bureau to inject in a mixer was able to drag 90 degrees each.

The signal from an antenna is processed by a band pass filter and a low pass filter. SN74CBT3251 is used for the switch of the filter. Soft66ADH have seven filters and one direct connection circuit.

There is one step amplification of high frequency before a mixer. Soft66ADH use J310. A gain tended to be too big in MW frequency zone, the HF low band, but it is suitable for 21M zone.

Soft66ADH use FET bus switch, SN74CBT3306 for a mixer. Soft66ADH can receive up to the VHF zone.

The low pass filter picking up an AF signal uses OPA2356. It is the slightly luxurious constitution that there is band width more than 200MHz. I set cut-off frequency so that a sound card of 192kHz is usable. Therefore C8,C32 is changed to 220pF.

Soft66ADH use AD9834CURZ of Analog Device for DDS. An oscillation is possible to 37.5MHz by using a clock of 75MHz. AD9834 outputs a square wave by letting inside comparator go through. Soft66ADH get frequency of 4 times in Multipiler IC of the next step, ICS512M. It is reversed 180 degrees signal in next SN65LVDS1 and input it into the Johnson counter of 74LVC74. It can be gotten an IQ signal at 1/2 frequency by paying CLK 180 degrees for the signal which turned over each. Because it was 1/2 at 4 times, Johnson counter, It was able to get an IQ signal of the double frequency of AD9834 in ICS512.

The control of AD9834 goes via USB. Soft66ADH is controlled by FT245RL of FTDI. It is enable to use FT245RL only installing a driver in the PC side. You need no writing firm ware.

Soft66ADH works with bus power of the USB. A lot of noises cannot just use at all the 5V power supply of the USB for a receiver. Therefore I get a power supply through a common mode filter and an active rippled filter.

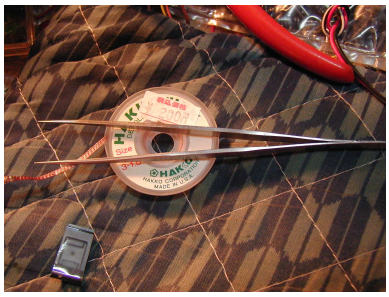
Commenting on a few about a band pass filter. These BPF are placed from the inside outward, and there is a filter from 1 to 7. A stop filter to deny 7M is in 3rd filter. It is 1uH and 470pF.

In addition, it is filtering it to a tip inductor C23 and C26 with 2,3 doing a low pass.

1:not used

2:05-1.2MHz　Low Pass Filter 8uH x2,1800pFx2,3800pF
3:1.2-5.5MHz　Low Pass Filter 2.2uHx2,470pFx2,1000pF
4:18.5-30MHz　0.18uHx2,1.2uH,270pFx2,33pF
5:5.5-9.5MHz　1uHx2,2.2uH,470pFx2,180pF
6:9.5-18.6MHz　0.47uHx2,1.5uH,330pFx2,100pF
7:30-70MHz　0.22uHx2,0.22uH,56pFx2,56pF

2 Tools for SMD



I confirm a necessary tool first. Please refer to the preparing one from now on.
30W Solder iron is reccomended, please prepare the thing of the ceramic heater. If you use less watt solder iron, it robbed of heat by GND, and it is hard to solder complete. If you prepare new solder iron, I recommend you buy a thing with the temperature adjustment.

And please prepare for a solder wick the thinnest type.

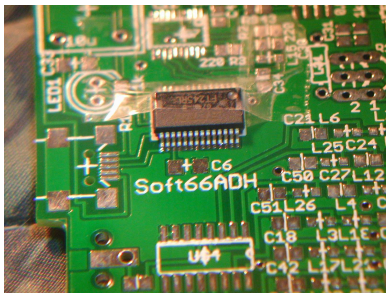
I reccomend you use flux for BGA type. It may be hard to buy at local shop. Please use flux liquid type.

Precision tweezers, the tip please prepare one sharp thing. When I purchase it in Home Center, it is easy to use it when I buy a good thing of around 1,000 yen. Because there is the thing which the tip does not just match, please warn the cheap tweezers.

A loupe, the magnifier of the cheap shop are recommended.

I use it to stop adhesive tape, a part. A transparent type is good.

3 Check Parts List

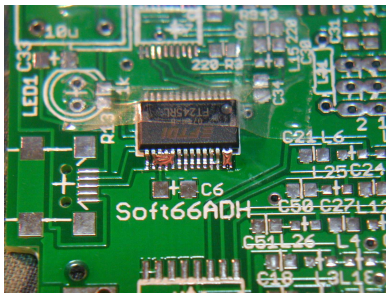


Each part is in a list of parts, the vinyl bag. Please confirm whether there is not the part which is missing from a list of parts first. It is put on the mount with tape, but I pick it up with tweezers, and please take it out. Because there are many cases without the mark in a chip part, please keep on it which is just before to solder.

4 Soldering TSSOP

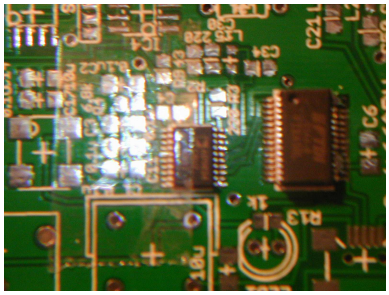
Soldering FT245RL and AD9834CURZ first. I perform the soldering of TSSOP by a method to fix with adhesive tape. There is another method that used superglue else and hot gun, but the method that used the adhesive tape is recommended for a beginner.

Like the left images, Covering the half of the tip with adhesive tape and stick it on a print board. It may slip off to some extent then. Inserting

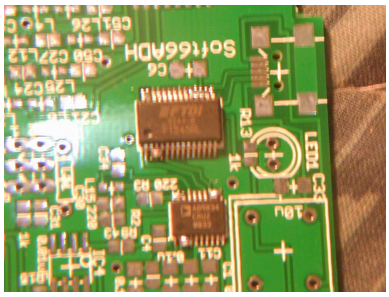


tweezers from the gap of the tape, and please match a land with a pin precisely. I perform position laying upon till I understand while confirming it with a loupe.

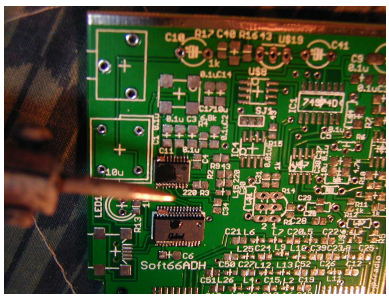
It carries away solder from the top of the pin if I fix it. Because there is too many it, and there is little|few it, and it is not good, Watch an image, and please regulate it.



Let AD9834 fix with tape. Soldering the both ends of the pin.



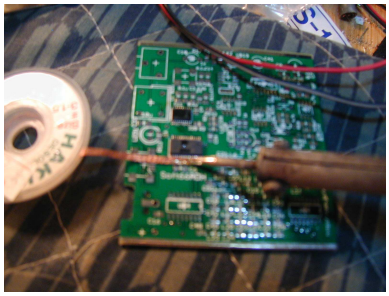
Soldering one place of other side. Dissolving solder from this side.



painting flux enough and touch slightly with solder iron and dissolve solder. Please let iron ahead slide on a pin slowly. When solder melts, Comming to follow an iron by surface tension. sliding solder iron few times enough.

Solder comes to stop by the one end of the pin when sliding the iron. Solder is close together by surface tension on an iron.

The current IC is strong for heat. You can work slowly enough.

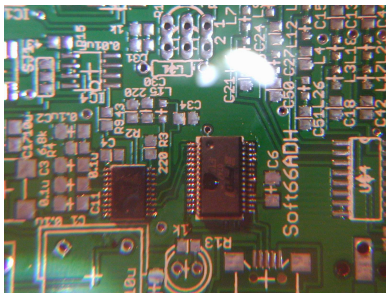


I think that it is difficult with the weak iron of the capacity.

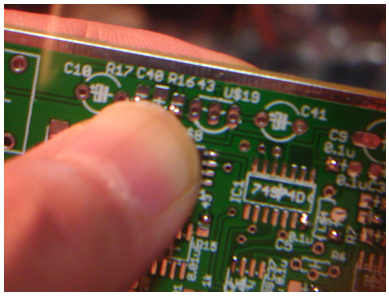
The unnecessary solder must be removed with solder wick.

Please be careful for completely removing solder, because a pin comes off. When you take off solder wick, please tear it off while heating it in iron ahead. A pin loosens when you lift it forcibly.

Like an image of the finish, the state that solder is delicately left around a pin is an ideal. Because there is the case that a bridge can take by surface tension when I paint with a flux once again and can warm up with an iron even if a solder bridge is done between pins to some extent, please try it.

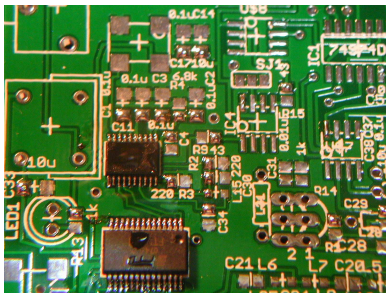


5 Soldering SOP ICs



You can easily solder SOP which has pin distance of double 1.25mm in comparison with TSSOP comparatively if I can become it. You may Sellotape it in the same way as TSSOP, but it is easy when I perform it in the next procedure.

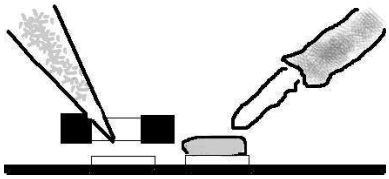
At first, in the case of the right-handed person, Piling a little solder to the pad of the pin of the top right corner. Fixing it with the left thumb if I position an IC with tweezers. You can just fix it with solder iron quietly. Fixing the pin of the diagonal next. Painting flux enough. Touching solder iron with few solder, and solder drifts when I pat the pin, and it is fixed.



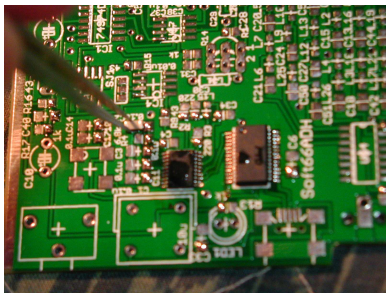
Soldering SMD parts, registers and capacitors

As for the chip resistance and the chip capacitor, a small quantity includes solder in the pad of the one side first.

Dissolving the solder which you piled to the pad in solder iron after bringing the chip part which picked up with tweezers close to a pad.

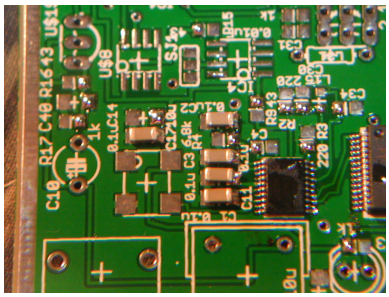


A chip part fits with nature in the solder which melted when you move tweezers slowly so that it is used to attract it. It is the feeling that it puts in the solder which melted. When a part touched the solder unless the temperature of the iron is enough then, solder hardens and does not get along well.



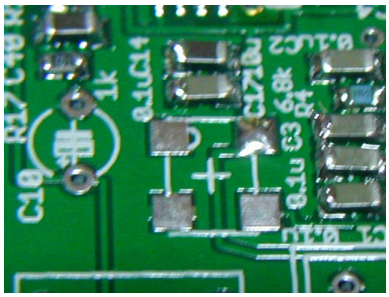
Chip part becomes parallel. In the state that declined, Causing the poor solder. Painting the whole board with a flux. Soldering other side of chip parts.

When you pick up a chip part with tweezers, please touch them not strongly. When you do it strong,you will missing a part anywhere Please be careful.

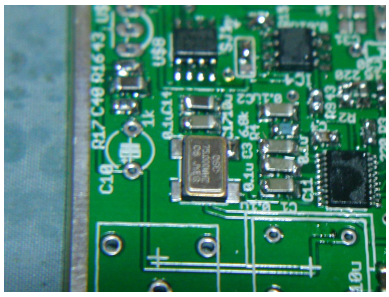


7 Soldering OSC

Please confirm the installation course of the oscillator by surface notation. At first, for installation, Piling solder in one place of the pad. Painting the back of OSC with a flux. The reason is because solder makes it easy to seep.



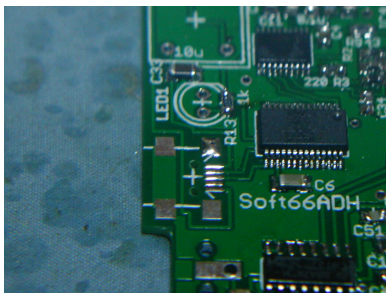
The pad is made widely so that iron ahead can be touched on. You hold OSC with a finger from the top and position it. You can solder with iron ahead and dissolve it enough. Solder the remaining pad if fixed.



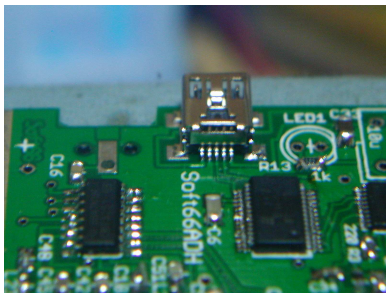
Please enlarge for comfirm direction.

8 Soldering miniUSB Jack

Soldering miniUSB Jack may be the most difficult. Piling solder in the one of the pads in the same way as OSC. It is easy to come to do the work of this trace when you paint the pad of the terminal with a flux then.

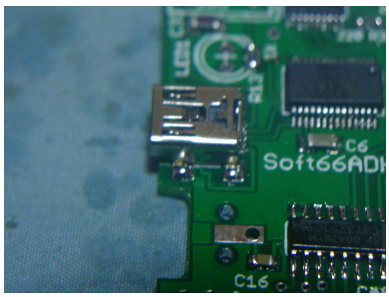


Dissolving the solder which piling to the pad and fix it if you put jack at the right position. Please be careful not to be out of the position of the terminal. Because it becomes considerably hot, please use tweezers.

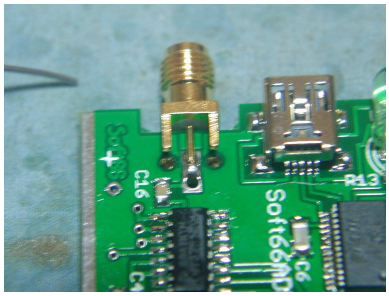


Soldering them with much solder. You can remove them with solder wick.

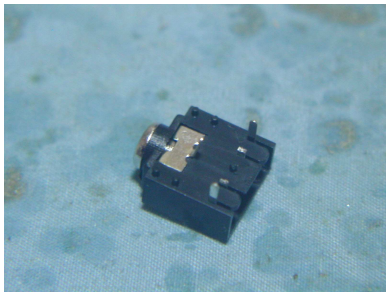
Soldering other pads completely.



9 SMA Jack and another pasts



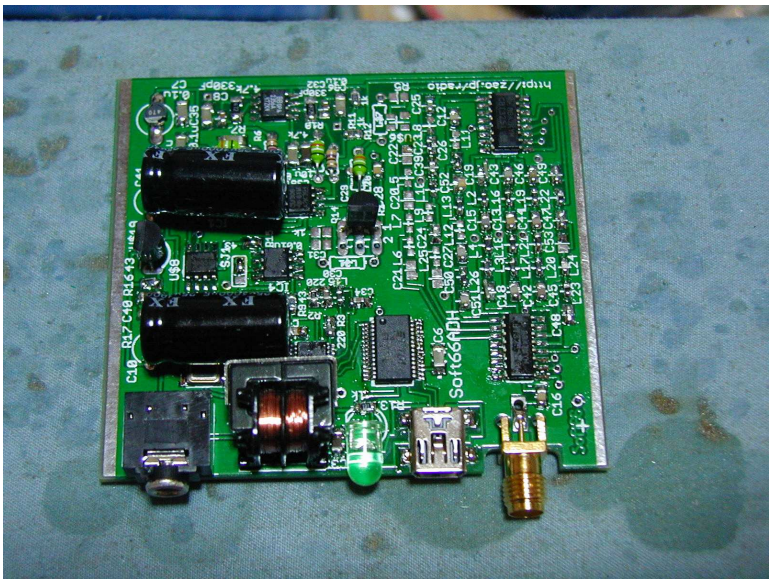
SMA Jack confirms whether the back and a list become straight and solders it from a core line. Please carry away solder after the pad of the bottom heated enough.



3.5mm earphone Jack, please cut two terminals in the inside. You can not insert it unless cutting it shortly.

LED,long lead is a plus. Bending lead from a root and install it.

Also capacitor of 1000uF, bending lead from a root and installs it closely to PCB.



Section2