

### **LLT 3-80 Panoramic adapter (SMD mounted)**

The adapter LLT 3-80 is a small front-end SDR enabling installation inside the transceiver and adding the receiver panoramic vision option using a PC with any of the free SDR programs

You can use it as second receiver demodulator within the frequency range shown on the PC screen.

Despite its small size, the LLT 3-80 use a AD8348 integrated circuit designed specifically for IQ receptor systems, its high frequency characteristic gives far superior to designs with logic gates mixers. This enables connect to the receiver first mixer output, usually a high frequency, without losing sensitivity or signal quality display IQ generated allowing greater bandwidth in the SDR program having any filter before FI receptor.

In the most popular front-end SDR designs use a quartz crystal oscillator, this provides a good reception stability but limits severely any frequency change, requiring manufacture a specific component for the desired frequency.

This limit to adapt the front-end easily to the wide IF values in the variety of the various transceivers models.

The LLT 3-80 adapter has a stable PLL generator able of synthesize more than half a million frequencies in the range of 3 Mhz. 80 Mhz allowing adapt the I.F.values for actual, old or future transceivers.

The frequency tuning system is by weld points bridges in the printed circuit board. This system is an economical way for selecting a wide range of fixed frequencies.

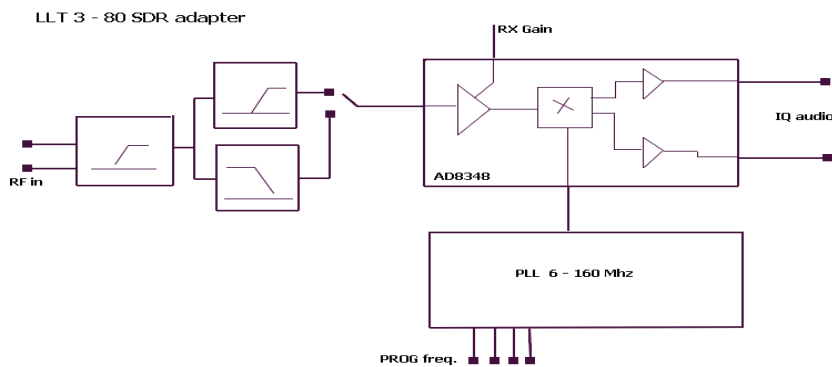
For easy configuration set up has a very easy to use graphic software. Using this software, simply setting the desired receive frequency and shows graphically the bridges to make and also the frequency ranges that can be delivered for your PC with the sample rate of your sound card. You can download this program to check the frequencies previously to buy it.

With the I.C.high levels of integration used it needs very few components, basically two integrated circuits.

An example of the value of F.I. some equipment and the reception frequency of 3-80 LLT

Transceiver	I.F.	LLT 3-80
ElectKraft K3	8.215	8.214,28
FT1000	47.210	47.209,27
FT2000 / FT950	69.550	69.552.131
TS830S	8.830	8.829,78
IC7400	64.455	64.444.438
FT747GX	8.200	8.200
TR7	48.050	48.048,74
FT817	68.330	68.333

### Block diagram



To avoid interactions with other frequencies generated in the interior of the transceiver LLT 3-80 has filters in the RF input, this filters comprises a high pass filter that prevents interaction with the 455kHz IF and a two selectable outputs duplexer that separates the reception below 15 Mhz or up 15 Mhz, this attenuates the usual values of the transceiver second IF, about 9 Mhz.

The LLT 3-80 panoramic adapter has a gain control that amplifies or attenuate the incoming signal, this allows easy adaptation for the different ways to adapt the the first transceiver mixer output .

This adapter LLT 3-80 can be used as receiver connecting the RF input to an outdoor antenna, gain control adapt the conditions of noise at the frequency band to receive. For example, using it as receiver connected to an external antenna below 10 MHz. need to attenuate the high band noise and good reception characteristics help the IQ mixer integrated circuit that provides up to +24 dB IP3.

At frequencies above 30Mhz receive with great sensitivity because its low noise and gain.

The adapter supply voltage must be connected a stable voltage transceiver to avoid possible noise. has been avoid a switched stabilization system and the analogue stabilization has several connections depending on the input voltage, which reduces consumption and avoid excessive stabilizer heat dissipation.

### Features:

consumption 71mA

Power from 5V. to 13V across multiple shots

RF Gain: Variable -19 to +25 dB (44 dB.)

IQ Amplifier Gain: 20 dB.

Baseband: 200Khz.

Reception Frequency: 3-80 MHz.

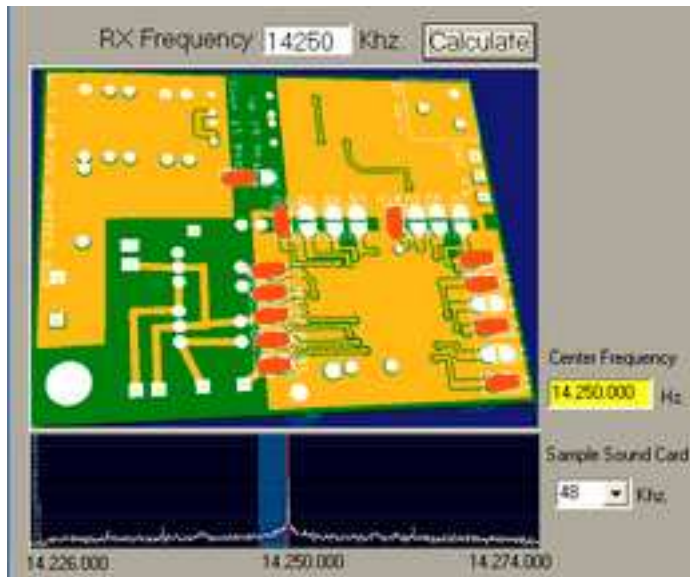
RF Input Impedance: 50 Ohms.

IP3 +28 dBm minimum gain

Size: 60 mm x 43 mm

PLL frequencys generation: more than 500,000

## Frequency setup software



Using this very simple graphic program is easy setup the receiver to the desired frequency. Runs on Windows XP and Windows 7 and requires no installation.

Enter in the box the desired RX frequency in kilohertz and press CALCULATE. Red points shows the straps that must be done to adjust the frequency receiver shown in Center Frequency. If the center frequency is very different from the desired frequency, test a few kHz below or above that can give a best estimate.

In the bottom diagram shows your SDR software receive bandwidth depending of your sound card sample rate. You can change it and clicking CALCULATE again will be updated. It is very advisable to check this program the frequency of the intermediate frequency transceiver for receiving test limits.

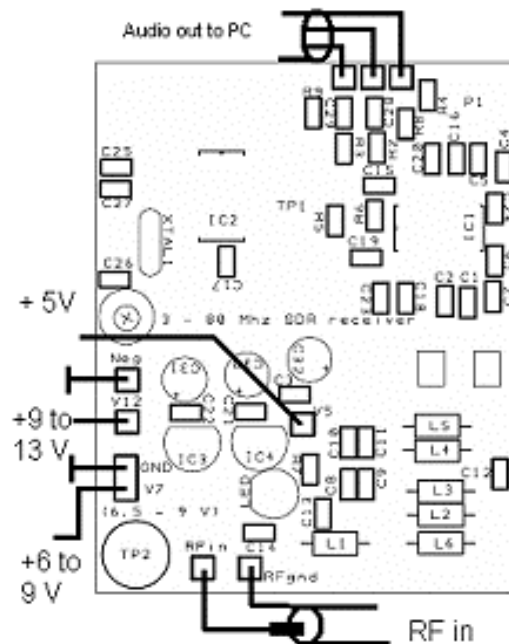
This program need not to be installed on Windows and not use the operating system's registry, if you no longer need it simply delete the file.

### Connecting the board

You have three entries for the supply voltage: 5 Volt, another from 6 to 9 volts and the last from 9 volts to 13,8 volts.  
 You can only use one input of the three depending of the voltage available.  
 NEG pad and GND pad are negative or ground and can be used as you need.  
 Available voltage must be checked before connect it to the board to avoid damage.

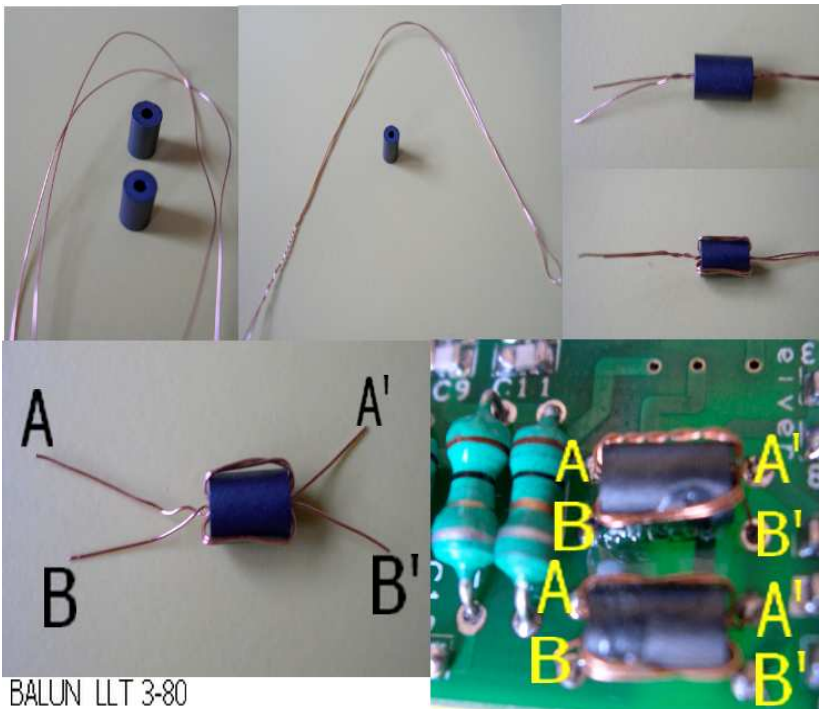
The RF input should be performed with a coaxial from the transceiver first mixer, coaxial center to RFin and to RFgnd the mesh.

The audio IQ out must be routed to PC sound card with screened audio coaxial wire .



You can mount the adjust potentiometer in the printed board back side . The trimmer capacitor also paying attention to the flat side position and should be more careful when soldering the bridge B1, if must set , it is close to the trimmer.

### Balun construction.



BALUN LLT 3-80

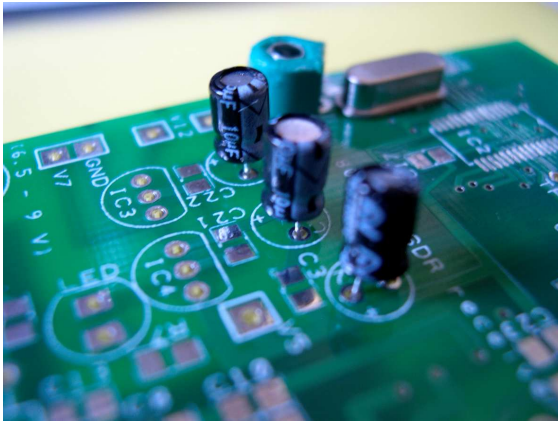
Joining the two ends of the wire and twist the wires rotating 10 times (see the pictures), introduce the two ends through the ferrite hole, left about 6 mm. to connect. With the other end give two turns through the ferrite bead hole.

Cut the wires leaving another 6 mm. and left the rest of wire for the other balun. Scratch the tips with fine sandpaper to remove enamel wire protection and tin them. With a ohmmeter check the wire phases, the one wire init is A and end A '. The other wire starting in B and end B '. You can mark the wires with a marker pen.

Do the second balun in the same way.

Check phases before mount to the printed circuit board. You can fix the balun with a bit of glue.

**It is very important mount the baluns with the correct wire phases or the receiver will not work.**



Check the polarity of the three electrolytic capacitors. The white band is the negative.

The trimmer capacitor, note the flat side position.

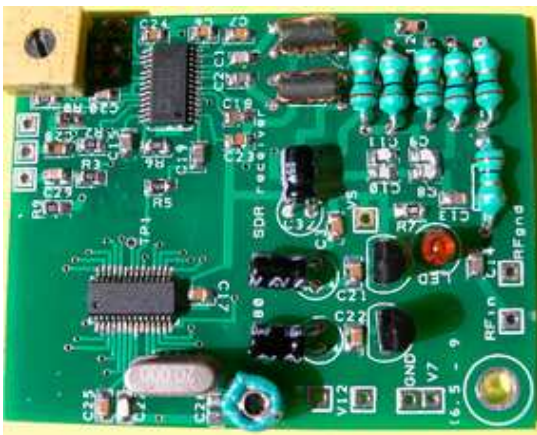
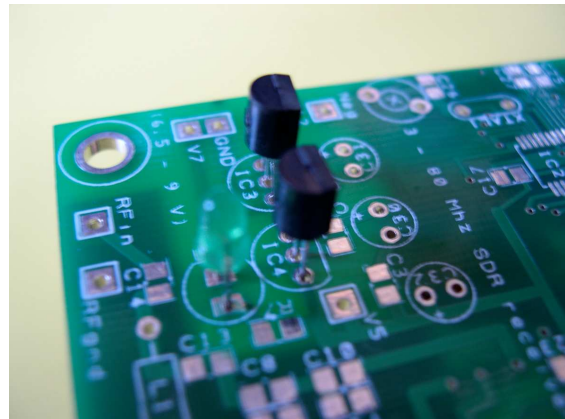
Leave the quartz crystal 0.5 mm. over the printed circuit board

Stabilizers IC3 is a 78L08 and IC4 is a 78L05, check the component marking to avoid mistakes.

The LED: the long leg to R7.

Caution: do not force the legs to avoid break the plastic body.

The hole for screw mount is isolated from ground.



All inductors are the same value.

It is normal if mixer integrated circuit get warm.

## Components In the bag

P1 Pot 1 Kohm.	Balun ferrite beads x 2
Xtal1 20 Mhz Xtal	Balun Enamel wire
IC1 Analog Devices AD 8348	LLT 3-80 PCB SMD mounted
IC2 IC525	CV1 Trimmer
IC3 78L08	
IC4 78L05	
LED 3 mm LED	
L1,L2,L3,L4,L5,L6 Inductor radial	
C30,c31,c32 10uF 25V Electrolytic capacitor	

## SMD components

<b>100K (0,1 uF)</b> c3,c4,c5,c6,c7,c16 c17, c21,c22,c23,c24,c25,c28,c29	<b>470 Ohm</b> r 5
<b>2,2 Kpf</b> c1,c2,c14,c15,c19	<b>680 Ohm.</b> r 7
<b>100 Pf</b> c8, c9, c10, c11	<b>68 Ohm</b> r 6
<b>12 Kpf</b> c18, c20	<b>1 Kohm.</b> r 2, r 3, r4
<b>470 pF</b> c12	<b>3K3</b> r 8, r 9
<b>330 Pf</b> c13	<b>C26 not mounted</b>
<b>5 Pf</b> c27	

We can delivery the circuit mounted and checked to the frequency you want.

Contact: [lltec@ono.com](mailto:lltec@ono.com)

Documentation and info [www.liliumtec.com/kits](http://www.liliumtec.com/kits)