The Black Spot
GPS Jammer with 3.4W EQP

This manual will guide you how to assemble,
test and tune this GPS jammer KIT.

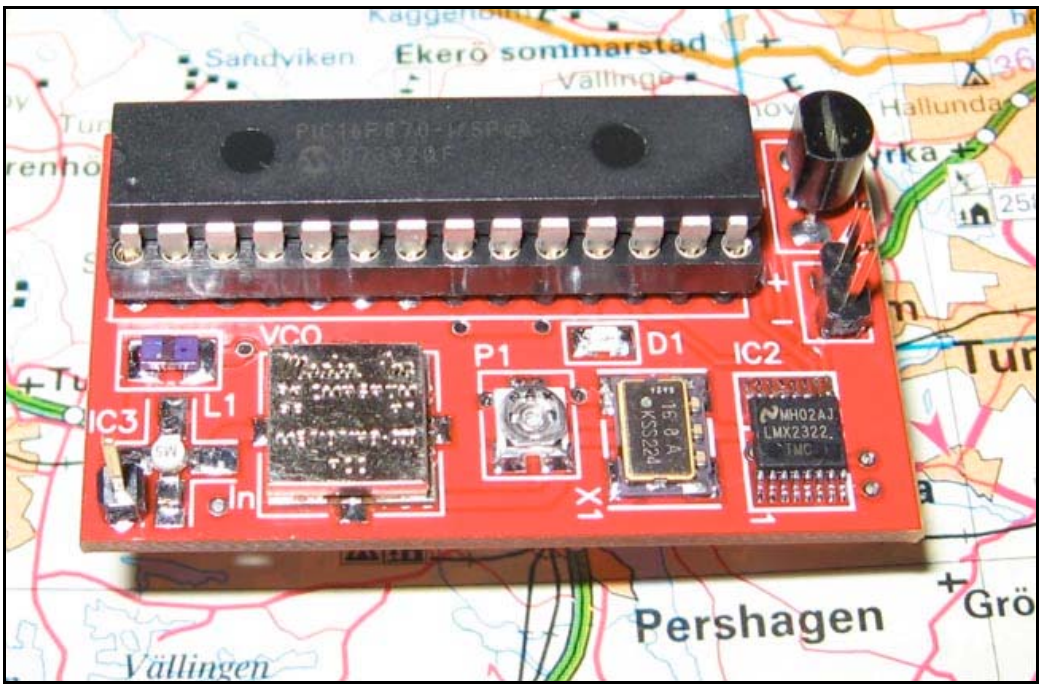

Illustration 1: Jammer

Features:

- Blocks all known GPS and trackers on the market.
- High accuracy RF system using PLL control
- High output power, equivalent power = 3.4 W
- Long Jamming range 1000-2000 feets (300m)
- Small size 1" X 1.8" (25 mm x 46 mm)
- 7-12 V DC power supply, 9V battery is default
- LED flash indication of operation
- Low current consumption
- +7.5 to 35 VDC input power supply
- Easy to build (one evening project)

Assembly instructions

Please follow the assembly instruction below.

Soldering Top_side

☐ Place IC2 (LMX2322)

☐ Place X1 (16.800 MHz VCTCXO)

☐ Place VCO (Modco 1.57542 GHz)

(*When you mount VCO, you must try to place it as centred as possible in the white frame on the PCB*)

☐ Place P1

☐ Place IC3 (MMIC)

☐ Place L1

☐ Place D1

(D1 has a green mark for the cathode and at the bottom side you also find a marking.)

☐ Place 28 pin IC socket for PIC16F870, V1, J1 and J2.

Soldering Bottom_side

☐ Place C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11 and C12.

☐ Place C1, C2, C3, C5, C6, C7, C8, C9, and C10

☐ R1, R2, R3, R4, R5, R6 and R7.

Please check your soldering for no bridges or errors !

Tuning and testing

Apply power and make sure the diode D1 blinks.
If D1 doesn‘t blink, check trouble section.

Measure the DC voltage over capacitor C3.
The voltage should be 0.5 to 1.5V.
This voltage represent the Tuning voltage and confirms that the PLL is locked.

If you measure 0V or +5V, check the trouble section.

Connect a frequency counter to the output and tune the frequency to 1.57542 GHz.
You can also tune the frequency by connecting a counter to the X1 output pin 3 and tune it to 16.800MHz.
Use P1 to tune the frequency.
(*The X1 is very stable and the jammer will work even if X1 is not correct tuner,
although a well tuned unit will have better performance.)*

This project use a simple whip antenna of 45mm.
It has zero gain and all measurements are done with this type of antenna.
You can of course make a better antenna with more gain and achieve much better performance and longer jamming range.

Measure the voltage over R3 and divide the value with 20 and you get the current to the IC3 MMIC.
The current should be in the range of 40 – 60 mA.

Placement of components primary side and secondary side.

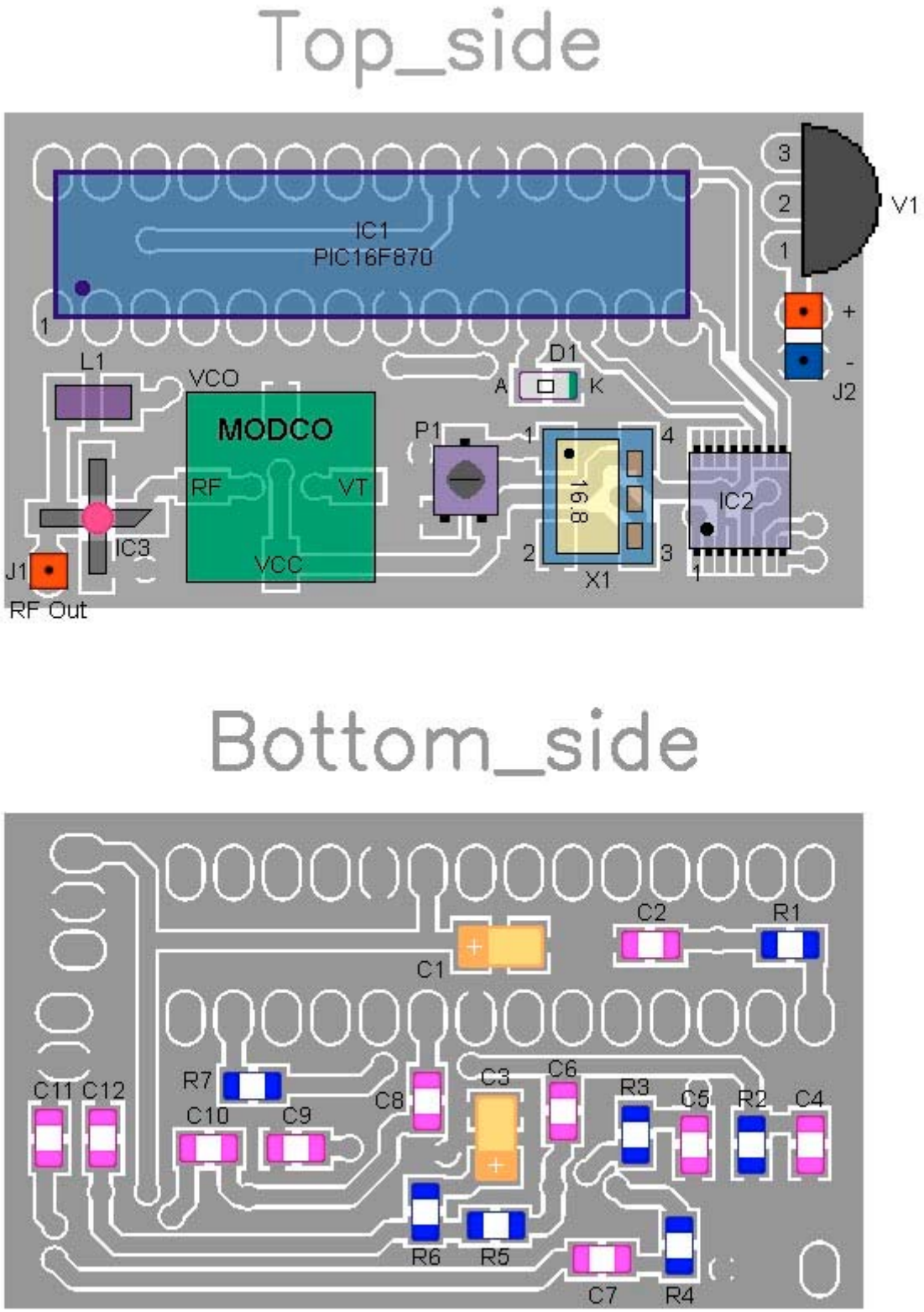

Illustration 2: Part placement

Component list

PCB
===
1 pcs Factory made red PCB

MISC
====
1 pcs 1 pin header 2.54mm pitch (J1)
1 pcs 2 pin header 2.54mm pitch (J2)
1 pcs 28 pin IC socket for PIC16F870
1 pcs antenna 45 mm

RESISTORS
=========
  20 = R3
 100 = R6
 330 = R4
3.3k = R1, R2
 10k = R5
 20k = P1
100k = R7

CAPACITORS
==========
 10pF = C7, C11
  1nF = C4, C5, C6, C8, C10
100nF = C2, C9, C12
2.2uF = C1, C3

INDUCTOR
========
68nH = L1

VOLTAGE REGULATOR
=================
V1 = 78L05

CRYSTALS
========
X1 = 16.800 MHz

SEMICONDUCTORS
==============
IC1   = PIC16F870P (pre-programmed)
IC2   = LMX2322
IC3   = MMIC MAR-3
VCO   = Modco 1.57542 GHz smd
D1   = LED smd (blue)

SOLDERING TOOLS
===============
Soldering lead (Extra thin)
Impregnated cleaning wick

Schematic

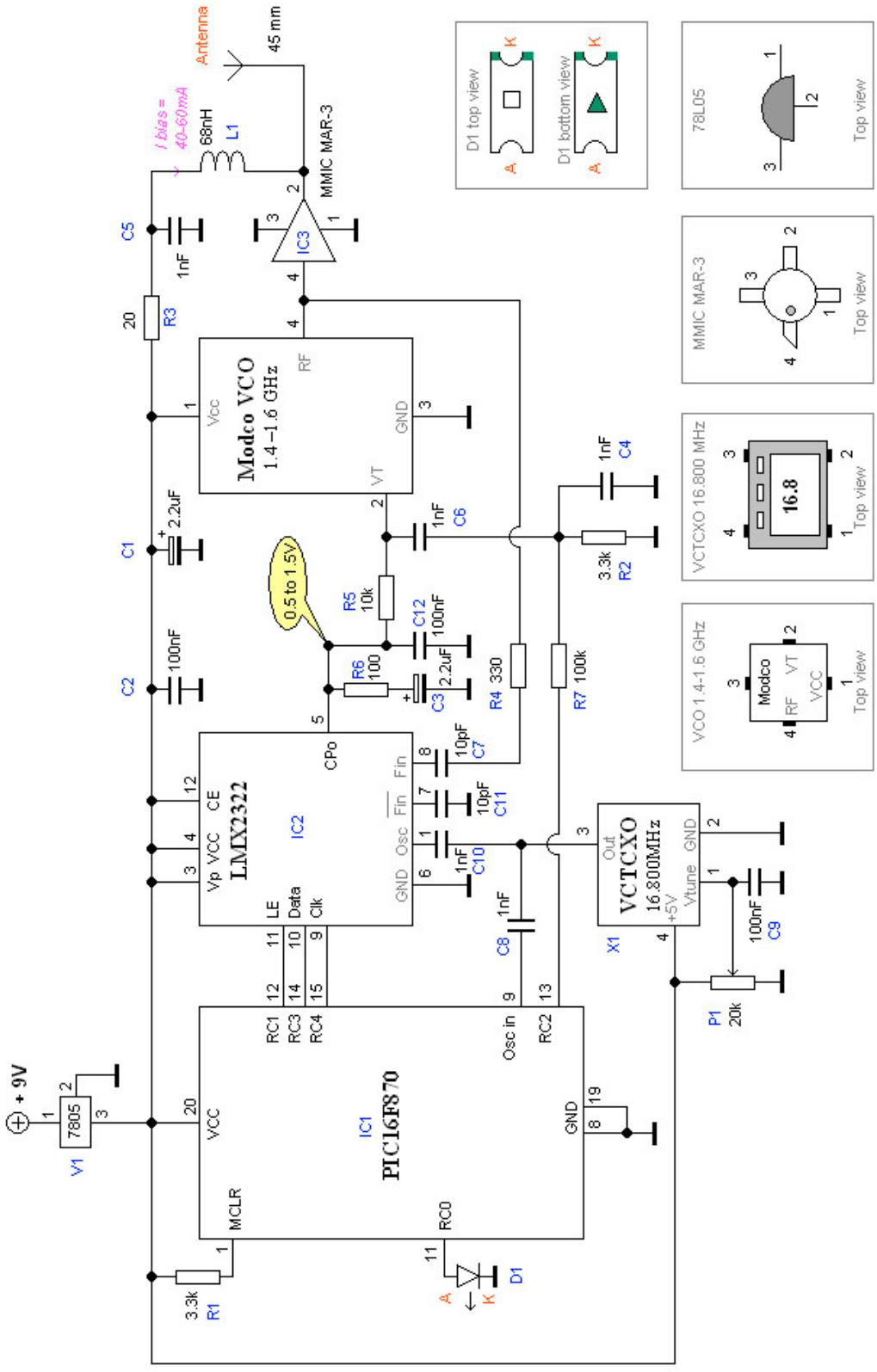

Illustration 3: Schematic

Trouble Shooting section

If you get a problem with your unit, you might find this section helpful.

My PIC16F870 is not working and I get no blink from the diode D1!

Make sure you have placed the PIC in correct way.
Make sure you have + 5V to pin 20 of the PIC.
You should test that the Reset (pin 1) goes high when power is turned on.
Make sure you have 16.8MHz oscillation on pin 10.
(*You can check this with an oscilloscope*)
Check that the diode is placed in correct way.

I often use a small speaker or piezo element and listen to the signals at pin 12, 14, 15.
You should hear clicking sound or beeping tone once per second.

I get 0V or +5V over capacitor C3 !

Your PLL system is probably not locking.
Make sure you have placed IC2 correct and that you have proper soldering.
Measure that you have reference frequency on pin 1 IC2.
Make sure you have placed VCO correct and solder it well.
Check all other parts involving the PLL filter.
If you have a frequency counter, you can connect it to VCO output or the MMIC output and apply a DC voltage to pin 2 of the VCO.
The VCO should then change frequency when the voltage changes.

I have no voltage over R3!

This means that you have no current running through the MMIC.
Make sure you have placed it in the correct way.
One leg is cut diagonal to indicate the input.

Remember that the output of the MMIC has a DC voltage of +5V!
If you connect any instrument to this output, you MUST add a serial capacitor.
47pF will work good.

If you still have problems, you can always mail me and we will work it out.

Final word

I hope you have had a fun time assembly this KIT.
The project may be a small one, but still it is a very powerful unit.
Thanks for your time…

Please use this project with high moral and responsibility!