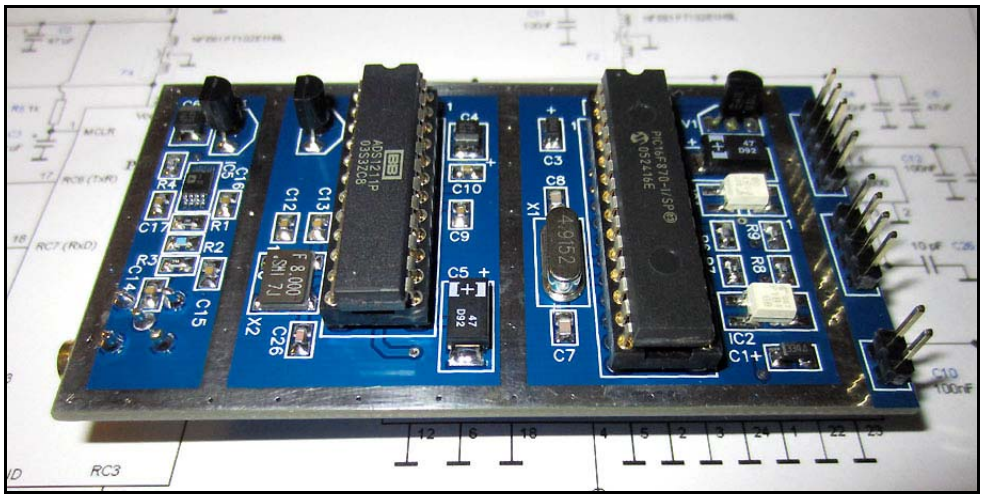
Trinity Virtual
RF Power Meter

10 MHz - 2.5 GHz with High dynamic range: 70 dB
High accuracy: ± 0.2 dB

This manual will guide you how to assemble,
test and operate this KIT.



Features:

- Virtual RF Power Meter Instrument with PCB integrated power sensor
- Wide frequency range 10 MHz to 2.5 GHz.
- Measure down to - 60 dBm (0.001 uW or 0.225mV)
- Present measurement in dBm, Watt, Volt and Screen Gauge Meter
- External Gauge Meter for accurate reading
- 24 Bit A/D resolution of sampled log detector
- Digital filtering to reject 50/60 Hz noise
- USB communication to computer
- Optical communication barrier to prevent noise
- Internal reference enable self calibration
- No complex trimming
- Self-test with LED indication
- Power supply +9 VDC to +18 VDC
- Low current consumption typ 30 mA
- Board size = 3.3" x 1.8" (84 mm x 46 mm)

Assembly instructions

The soldering of this unit is pretty basic if you solder the parts in correct order.
There is six steps for mounting the parts.

1.) IC1 and IC2 TLP181

Place the TLP181 to the PCB and by soldering fixate the top right leg and the bottom left leg. I use a magnifying glass to make sure it is places in line with the PCB pattern.
□ IC1, IC2

2.) IC5 AD8313

Place the AD8313 to the PCB and by soldering fixate the top right leg and the bottom left leg. I use a magnifying glass to make sure it is places in line with the PCB pattern. When the corner legs are fixed, solder the rest of the legs. If you get lead bridges between legs, you can easy clean it up by using the wick. Place the wick over the bridges and heat the wick with your soldering tool. The wick will absorb all overflow lead. Bridges will be gone and the circuit looks perfect.
□ IC5

3.) X2 8.000 MHz Crystal

Place the crystal to the PCB and solder all four pads.
□ X2

4.) F1-F5 Ferrite filters

Solder five ferrite filters. Solder both ends and the middle section.
□ F1 – F5

5- 6.) Capacitor & Resistor

Mount smd capacitors below :
□ 10 pF = C26
□ 18 pF = C7, C8
□ 1 nF = C13, C14, C15
□ 100 nF = C9, C10, C11, C12, C16, C17, C18, C19, C20, C21, C22, C23, C24
□ 0.33 uF = C1, C3, C25 (White line = positive)
□ 4.7 uF = C4, C6 (White plus = positive)
□ 47 uF = C2, C5 (White plus = positive)

Mount smd resistors below :
□ 10 = R12, R13
□ 100 = R1
□ 162 = R2
□ 402 = R3, R7, R9
□ 1 k = R4, R5, R6, R8
□ 19.6k = R10, R11

□ LED = D1 (green dot is K, see picture above)

7- 8.) Hole mounted parts

Mount hole mounted parts below :

- 28 pin IC socket = IC3 (*only socket, wait with PIC*)
- 24 pin IC socket = IC4 (*only socket, wait with AD*)
- 5 pin header = Power, 4 pin Header = Serial, 2 pin header = gauge meter
- SMA connector(*mount on backside of PCB*)
- 78L05 = V1, V2, V3
- PP3 Connector for 9V battery (J1)
- USB to TTL converter

Part List

```
General parts
=================

1 pcs Factory made PCB

1 pcs 5 pin header 2.54mm pitch (Power)
1 pcs 4 pin header 2.54mm pitch (Serial)
1 pcs 2 pin header 2.54mm pitch (Gauge Meter)

1 pcs 28 pin IC socket for PIC16F870
1 pcs 24 pin IC socket for ADS1211

1 pcs PP3 Connector for 9V battery

1 pcd SMA connector

1 pcs Soldering lead
1 pcs Wick

1 pcs Instruction manual

RESISTORS
=================
   10  = R12, R13
  100  = R1
  162  = R2
  402  = R3, R7, R9
   1k  = R4, R5, R6, R8
19.6k  = R10, R11
```

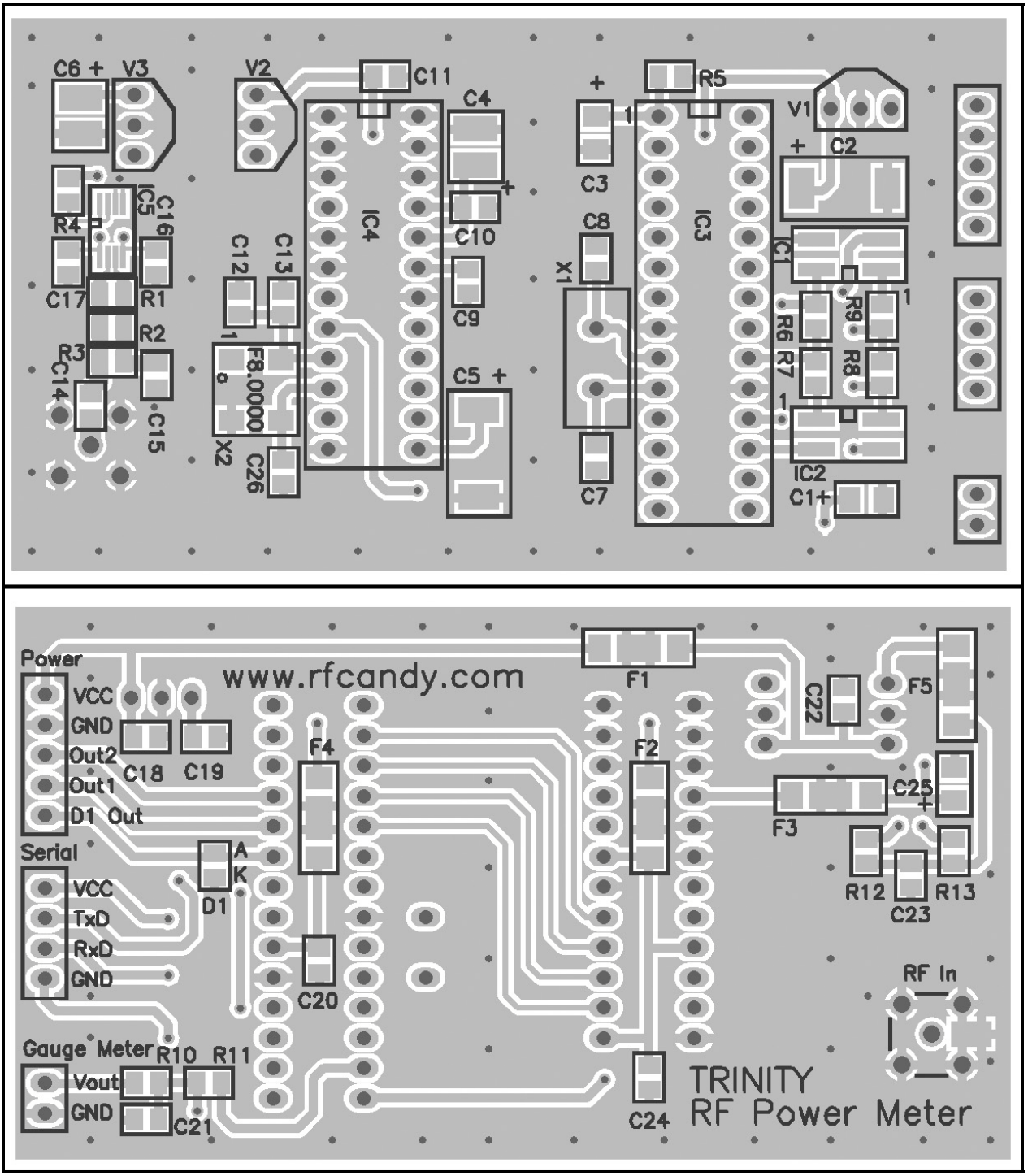
```
CAPACITORS
==================
   10pF = C26
   18pF = C7, C8
   1nF  = C13, C14, C15
 100nF  = C9, C10, C11, C12, C16, C17, C18, C19, C20, C21, C22, C23, C24
0.33uF  = C1, C3, C25 (White line = positive)
 4.7uF  = C4, C6 (White plus = positive)
  47uF  = C2, C5 (White plus = positive)



EMI FILTER
==================
F1, F2, F3, F4, F5 = NFE61PT102E1H9L ferrite filters


VOLTAGE REGULATOR
==================
V1   = 78L05
V2   = 78L05
V3   = 78L05

CRYSTAL
==================
X1   = 4.9152 MHz
X2   = 8.0000 MHz


SEMICONDUCTORS
==================
IC1, IC2 = TLP181
IC3      = PIC16F870 programmed and tested
IC4      = ADS1211
IC5      = AD8313

D1       = LED

1 pcs CP210x USB to TTL converter Module

1 m flat cable for USB to TTL converter
```

Final Word

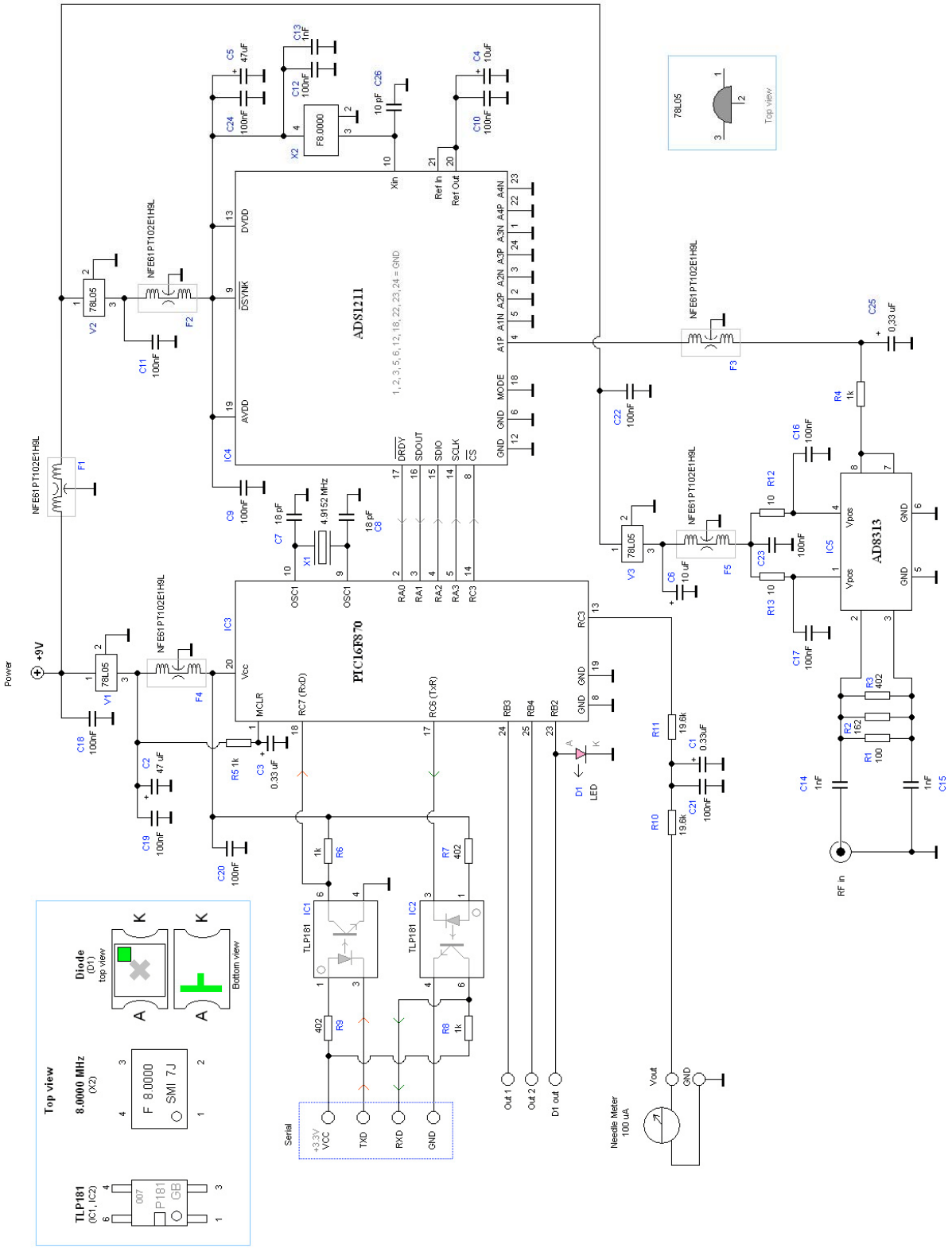
I hope you have had a fun time assembly this KIT.
Thanks for your time…

PCB Layer

Top layer and bottom layer.



Schematic


ADS1211
PIC16F870
AD8313
78L05
NFE61PT102E1H9L
TLP181
F8.0000
4.9152 MHz
Power
+9V
Serial
+3.3V
VCC
TXD
RXD
GND
Out 1
Out 2
D1 out
Vout
Needle Meter
100 uA
RF in
LED
Diode
(D1)
top view
Bottom view
Top view
8.0000 MHz
(X2)
TLP181
(IC1, IC2)