

QRP Pixie CW DIY Kit

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1. EQUIPMENT & TOOLS

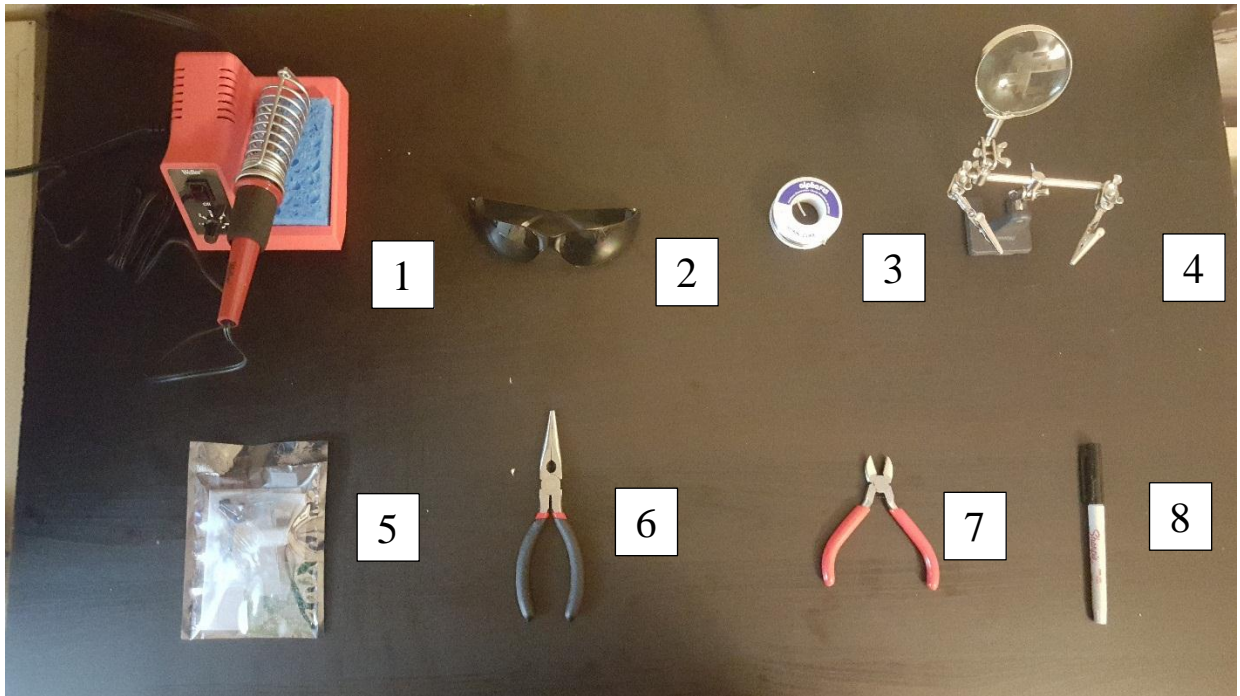


Figure 1 Equipment & Tools

Number	Name	use
1	Soldering Iron	Solder kit components to board.
2	Safety Glasses	Protect eyes from metal clippings.
3	Soldering Wire	Connects kit components to board when heated.
4	Magnifying Glass w/ Helping hands	Helps with soldering small components & holds board.
5	QRP Pixie CW DIY Kit	Contains components and schematics.
6	Needle Nose Pliers	Used for handling components.
7	Wire Cutters	Removes excess wire after solder.
8	Sharpie	Used to track components.

2. QRP PIXIE CW DIY KIT COMPONENTS



Figure 2 QRP Pixie CW DIY Kit Components

Number	Name
1	Anti-Static Packaging
2	Capacitors
3	Peripheral Connectors
4	Resistors
5	Circuit Board
6	Schematics

2.1. ANTI-STATIC PACKAGING



Figure 3 Anti-Static Packaging

The anti-static packaging is used to store all of the components for shipping and can again be used to store sensitive components, when not working with them, to prevent damage due to static discharges.

2.2.CAPACITORS

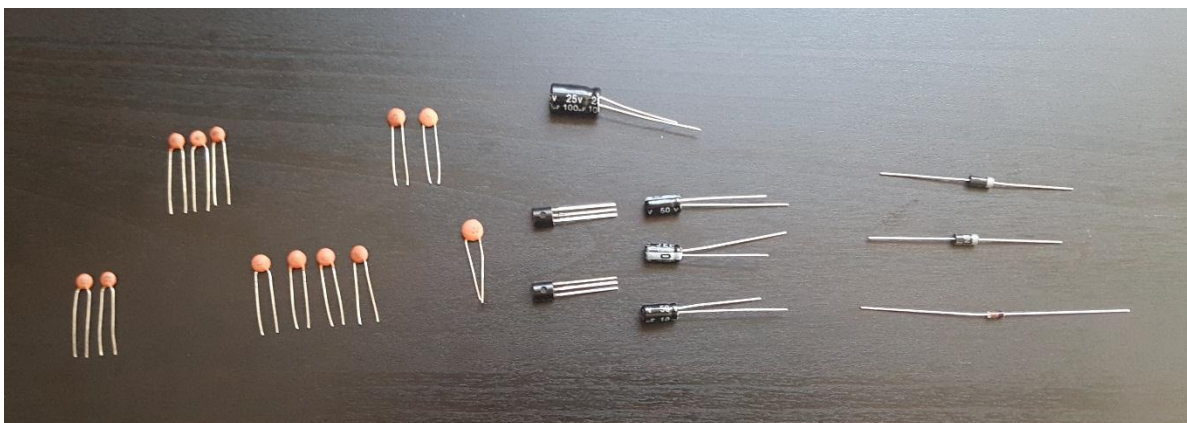


Figure 4-Capacitors

Part(s)	Value	# In Kit?			
C1	0.1uF (104)	1			
C2,C4,C8,C11	10 uF (103)	1	2	3	4
C3, C7	100 pF (101)	1		2	
C5, C6	470 pF (471)	1		2	
C9, C10	0.047 uF (473)	1		2	
CP1	100uF/16v	1			
CP2, CP3, CP4	10uF/16V	1	2	3	
D1, D2	IN4001	1		2	
D3	IN4148	1			
Q1	9018	1			
Q2	8050	1			

2.3. PERIPHERAL CONNECTORS

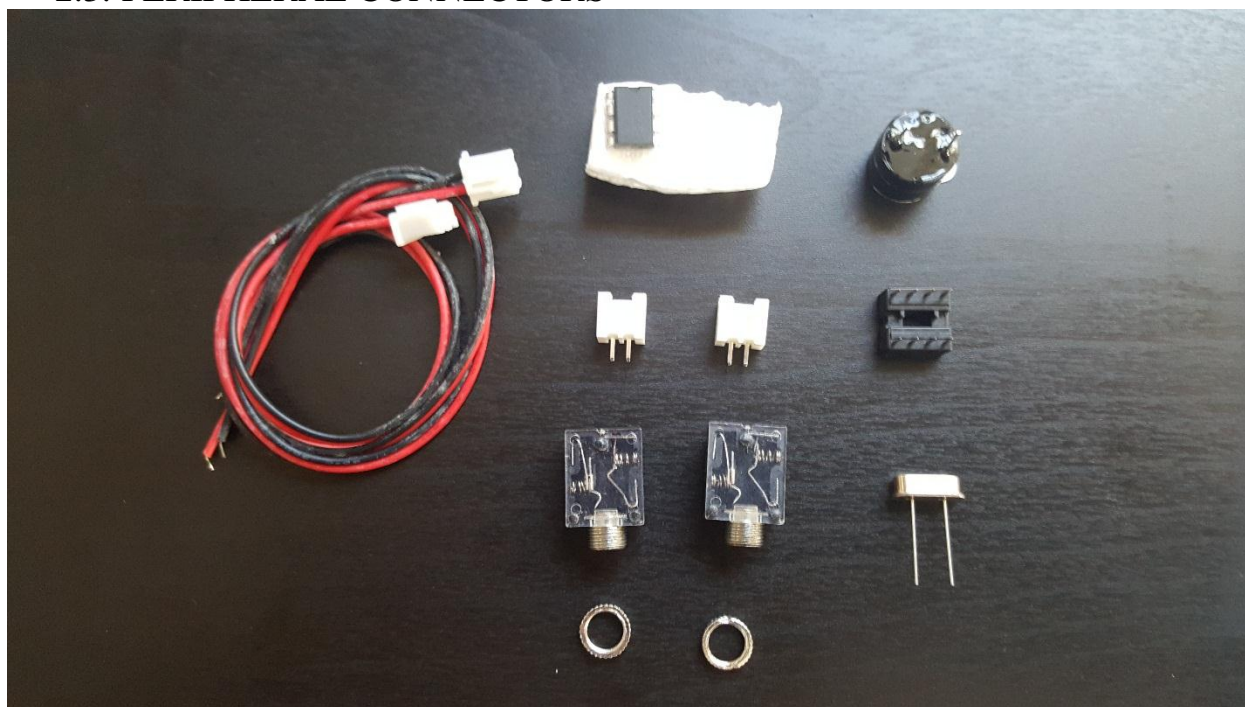


Figure 5 Peripheral Connectors

Part(s)	Value	# In Kit?
U1	LM386 (DIP8)	1
Y1	7.023 MHz	1
J1	DC	1
J2	Q9 (BNC)	1
J3	3.5mm (KEY)	1
J4	3.5mm (Phone)	1
	PCB	1
	IC	1

2.4. RESISTORS

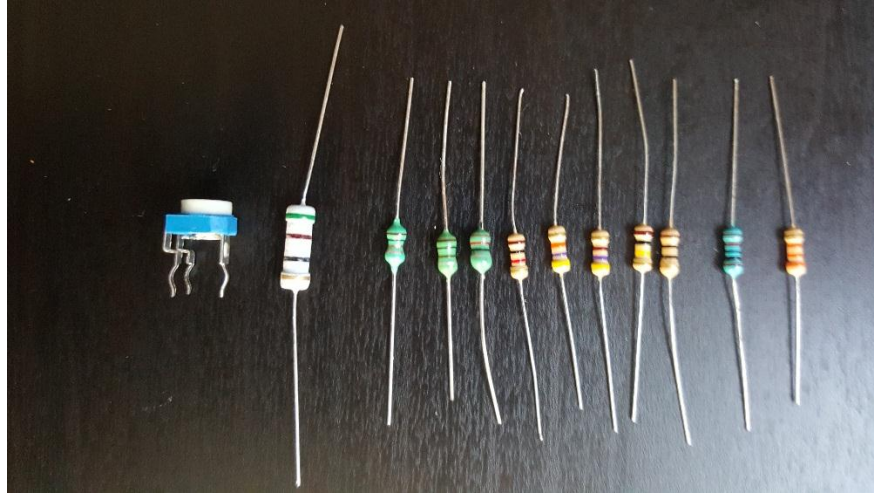


Figure 6- Resistors

Part(s)	Value	# In Kit?
R1	47K	1
R2	33K	1
R3	1K	1
R4	470K	1
R5	10K	1
R6	100K	1
R7	10 ohm	1
W1	47K (473)	1
L1	22uH	1
L2	1uH	1
L3	100uH	1

2.4.1. Steps for Identifying Resistor Values

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5-Band-Resistor					
Color	Band 1	Band 2	Band 3	Multiplic.	Tolerance
Black	0	0	0	10^0 (1Ω)	
Brown	1	1	1	10^1 (10Ω)	± 1%
Red	2	2	2	10^2 (100Ω)	± 2%
Orange	3	3	3	10^3 (1kΩ)	
Yellow	4	4	4	10^4 (10kΩ)	
Green	5	5	5	10^5 (100kΩ)	± 0.5%
Blue	6	6	6	10^6 (1MΩ)	± 0.25%
Purple	7	7	7	10^7 (10MΩ)	± 0.1%
Gray	8	8	8	10^8 (100MΩ)	± 0.05%
White	9	9	9	10^9 (1GΩ)	
Gold				10^{-1} (100mΩ)	± 5%
Silver				10^{-2} (10mΩ)	± 10%
4-Band-Resistor					

Figure 7 https://openclipart.org/image/2400px/svg_to_png/250259/colorcode-en.png

- 2.4.1.1. Line up the resistors so the gold or silver bar is on the right hand side.
- 2.4.1.2. Note the color of the band from left to right.
- 2.4.1.3. Assign the correct numeric value for the colors associated with each band
- 2.4.1.4. Record the value of the resistor and mark off corresponding part in section 2.4.

2.4.2. Resistor Identification Example for QRP Pixie Kit

R1	Y	V	O	4	7	3	47000
R4	Y	V	Br	4	7	1	470
R7	Br	B	B	1	0	0	10
R2	O	O	O	3	3	3	33000
R3	Br	B	R	1	0	2	1000
R6	Br	B	Y	1	0	4	100000
L1	R	Y	Bl	1	1	0	22
L2	Br	Bl	G	1	0		10
L3	Br	B	Br	1	0	1	100
R5	Br	R	Bl	1	2	0	10000
51Ω	G	Br	M	5	1	0	51Ω

Figure 8- Transistor Identification Example

2.5. CIRCUIT BOARD

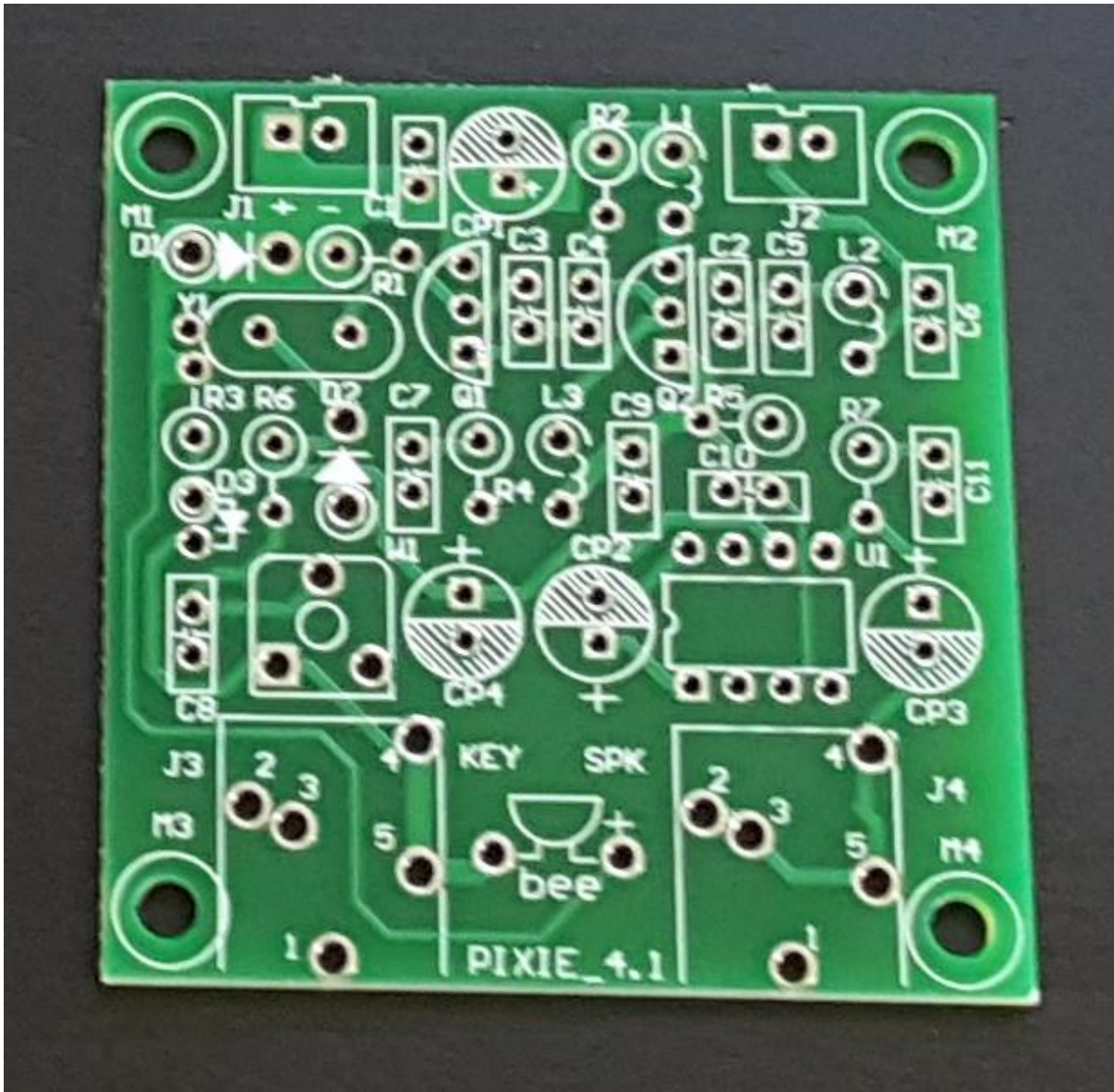


Figure 9 Circuit Board

All components in the kit are soldered to the circuit board by matching the component name with the corresponding spot on the board. This process connects all of the individual components into a single large device (Ham Radio).

2.6. SCHEMATICS

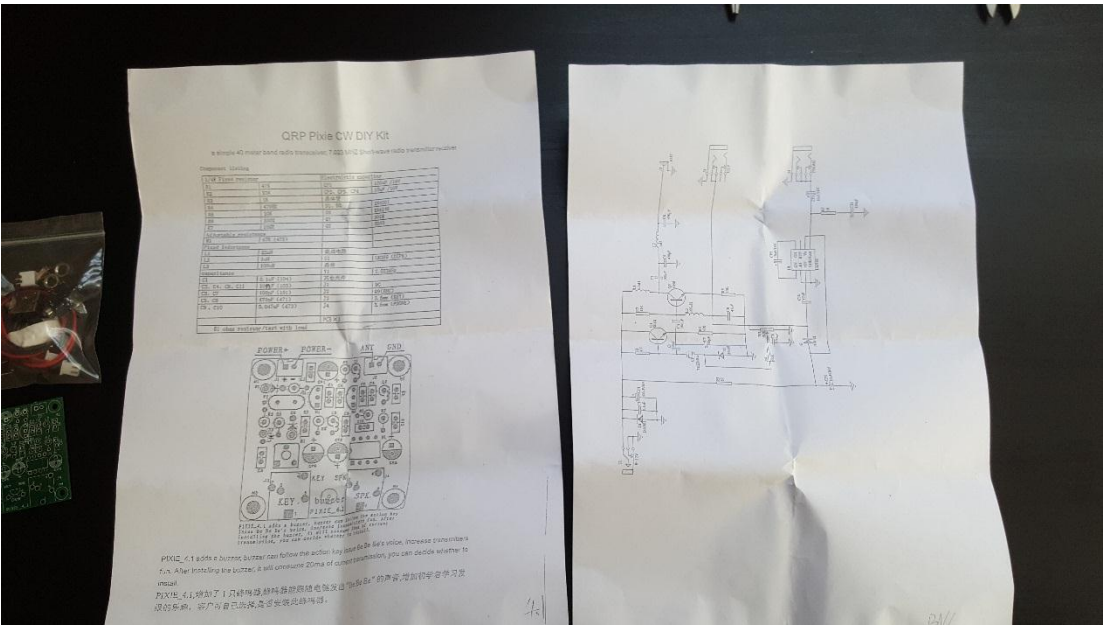


Figure 10 Schematics

2.6.1. Component list

Component listing			
1/4W Fixed resistor		Electrolytic capacitor	
R1	47K	CP1	100uF /16V
R2	33K	CP2, CP3, CP4	10uF /16V
R3	1K	晶体管	
R4	470欧	D1, D2	1N4001
R5	10K	D3	1N4148
R6	100K	Q1	9018
R7	10欧	Q2	9050
Adjustable resistance			
W1	47K (473)		
Fixed inductance			
L1	22uH	集成电路	
L2	1uH	U1	LM386 (DIP8)
L3	100uH	晶体	
capacitance		Y1	7.023MHz
C1	0.1uF (104)	其他元件	
C2, C3, C4, C5, C6, C7, C8, C9, C10	100pF (103)	J1	DC
	100pF (101)	J2	Q9(BNC)
	470pF (471)	J3	3.5mm (KEY)
	0.047uF (473)	J4	3.5mm (PHONE)
		PCB X1	
51 ohms resistor/test with load			

Figure 11 Component List

2.6.2. Circuit Board Schematic

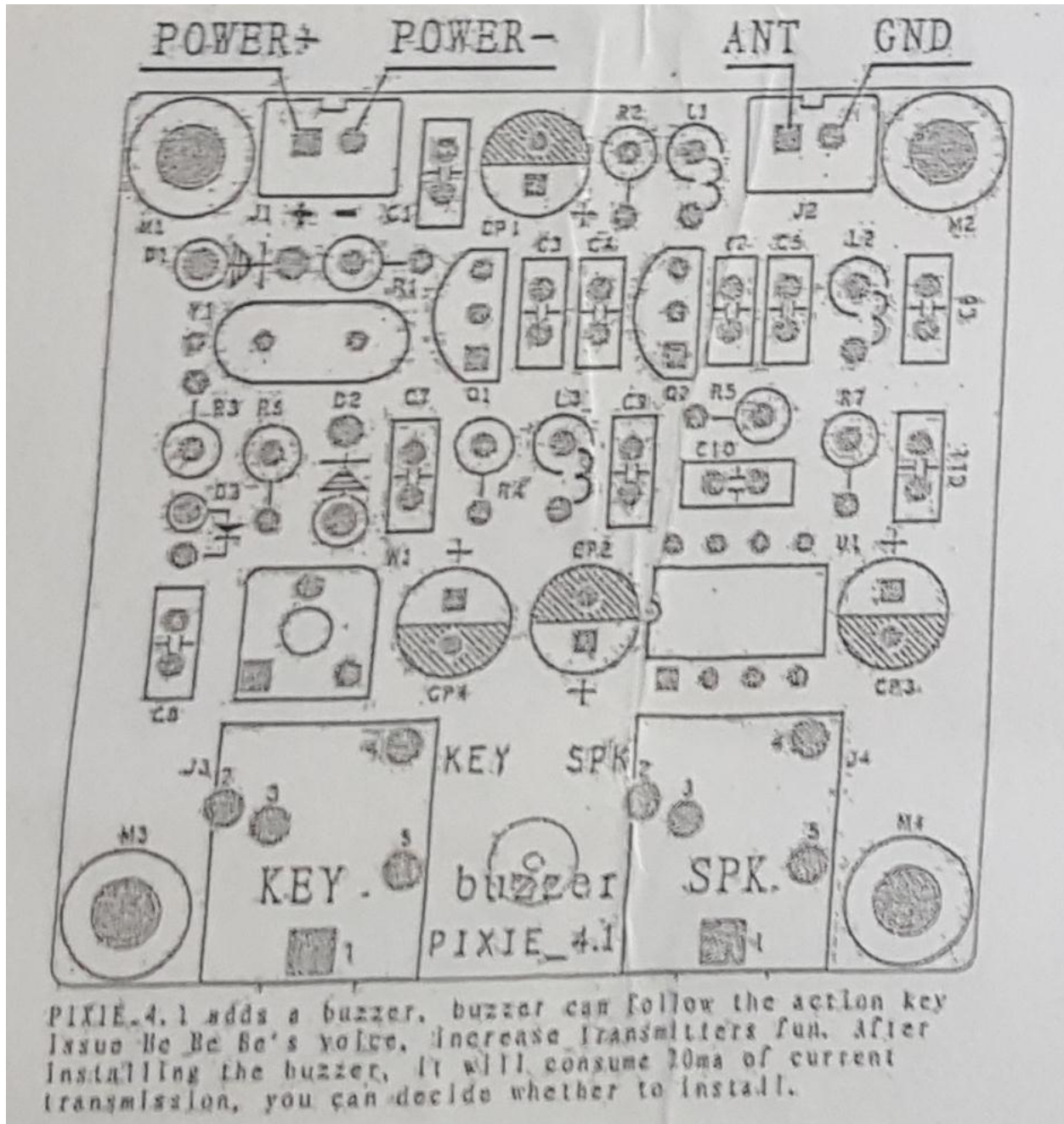


Figure 12 Circuit Board Schematic

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2.6.3. Circuit Schematic

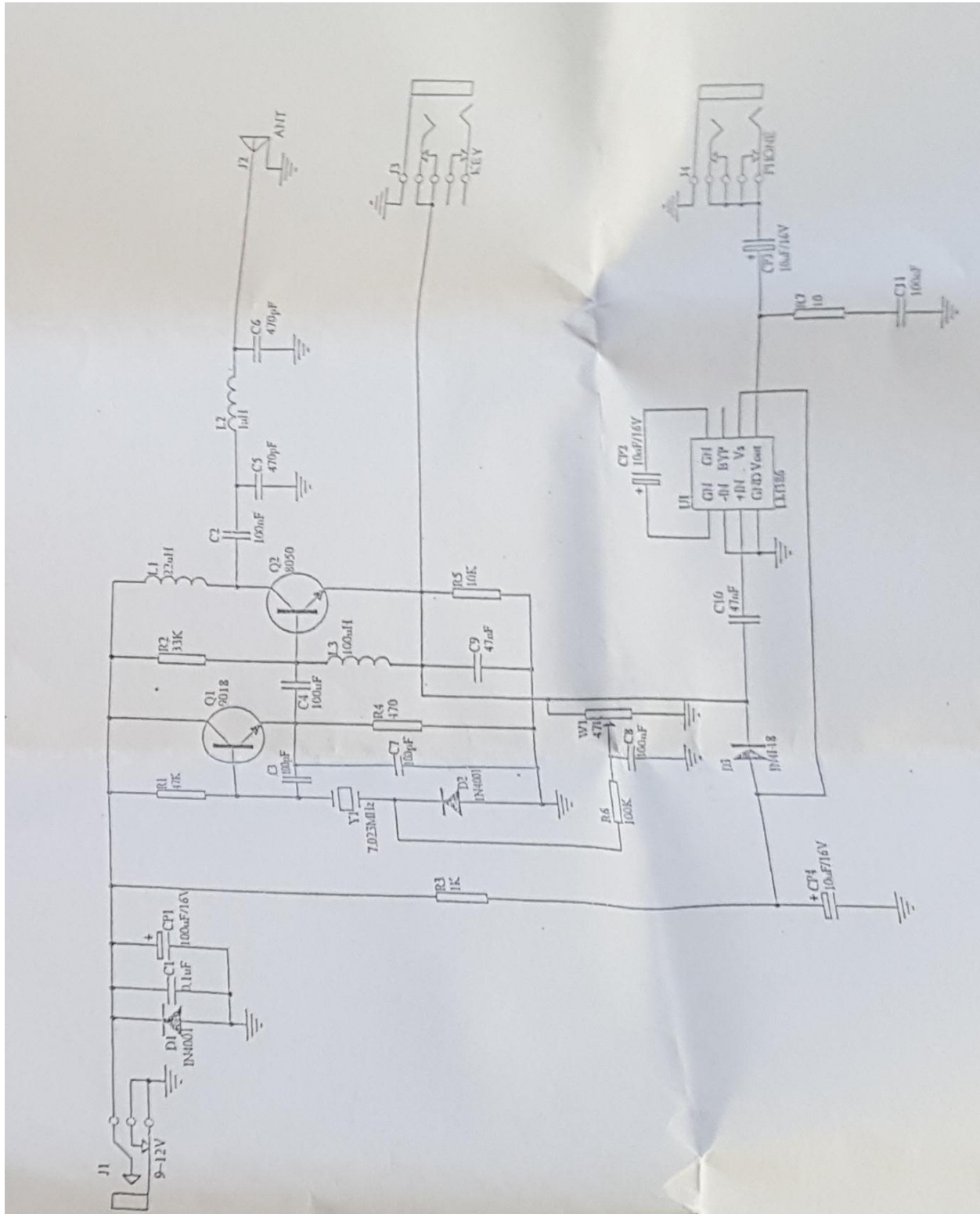


Figure 13 Circuit Schematic

3. Soldering Components onto Circuit Board

3.1.EQUIPMENT

You will need the following equipment from [section 1](#) of this document:

- Soldering Iron
- Safety Glasses
- Soldering Wire
- Magnifying Glass w/ Helping Hands
- Needle nose pliers
- Wire Cutters

3.2.PREPARATION

3.2.1. Place a wet Sponge in the well of the soldering Iron power Source.



Figure 14 Wet Sponge Placement

3.2.1.1. The wet sponge will be used to clean the tip of the soldering iron by removing an oxide layer from the tin surface. This will allow a good connection to the soldering wire and help prevent damage to the radio components.

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- 3.2.2. Check that the Soldering iron is plugged in to the power source. Than plug in the power source and turn the power switch to the on position.
- 3.2.3. Turn the temperature setting to 4 or 5. (This can vary with each Power Source).
- 3.2.4. Let the Iron heat up for 5-10 minutes.

3.3.HOW TO SOLDER COMPONENTS

- 3.3.1. Brush the tip of the soldering iron on the wet sponge to clean it before and after soldering any component.
- 3.3.2. Choose a component to solder onto the board
 - 3.3.2.1. For the resistors and the electrolytic capacitors bend one of the wires so that the ends of both wires are facing the same direction. So that both ends can be inserted in to the pre-milled holes in the circuit board.

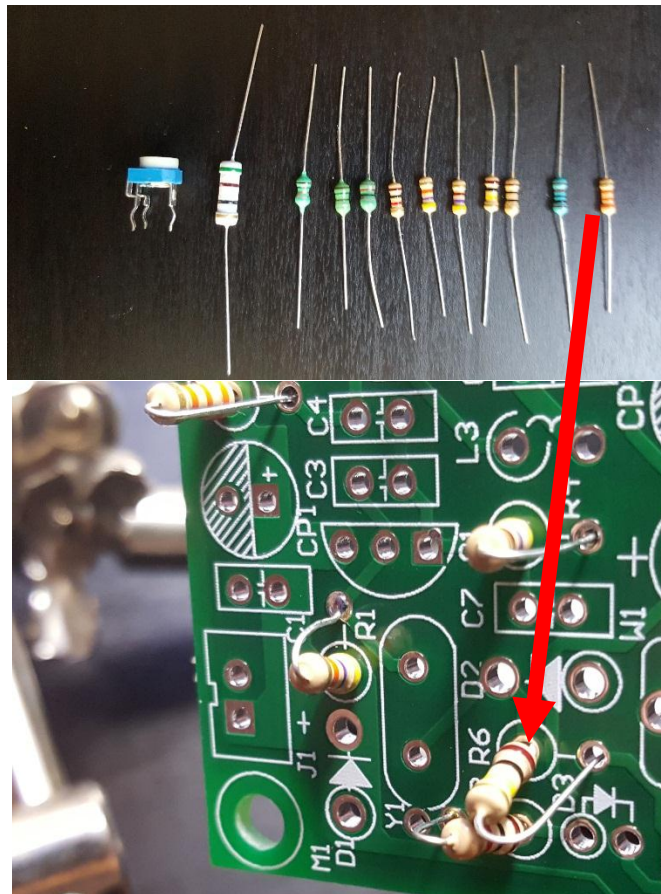


Figure 15 Bending Wires for Circuit Board Insertion

- 3.3.2.2. After the component has been inserted into the board fix the component into place by angling the wires to they are flush against the edges of the holes in the circuit board. This will keep the component from falling out when the board is flipped over for soldering on the back side of the circuit board.

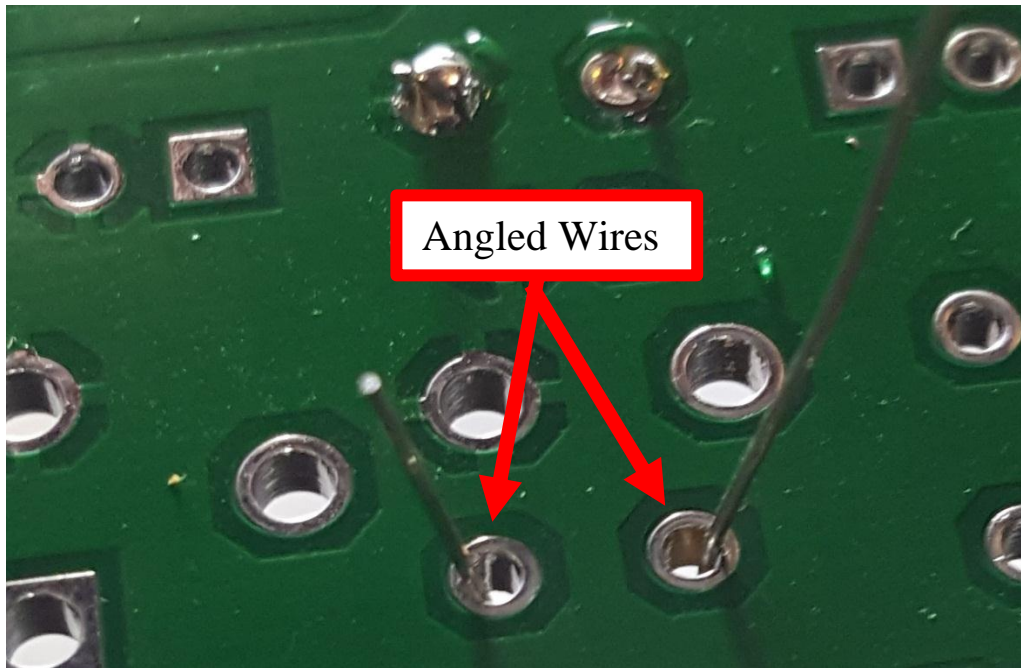


Figure 16 Angle Wires to Hold Component in Place for Soldering

- 3.3.3. Solder the component to the board using the soldering iron and soldering wire. Use the schematic in figure 16 to achieve proper results.

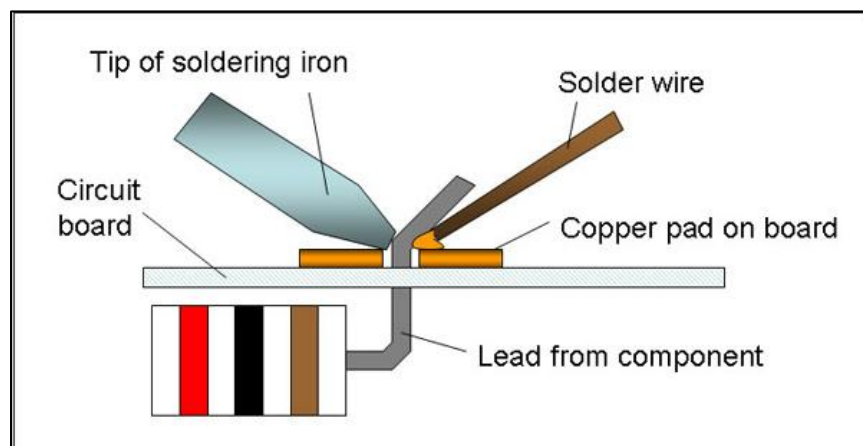


Figure 17 How to Solder the Component to the board

http://www.cdn.sciencebuddies.org/Files/2084/5/Elec_primer-solder2.jpg

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- 3.3.4. After both leads have been soldered use the wire cutter to remove the excess wire.
- 3.3.4.1. You should be left with a soldering ball that will create a good connection between the component and the circuit board.
- 3.3.4.2. A good solder should be shiny in appearance and have a “volcano” Shape (Figure 18)

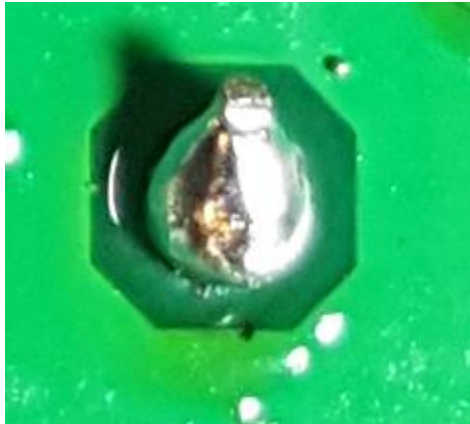


Figure 18 Solder ball shape example

- 3.3.5. Repeat steps 3.3.1- 3.3.4 with every component until all of the components have been correctly soldered to the circuit board.
- 3.3.5.1. ***Remember that some components such as the electrolytic capacitors are polarized and that the leads must be aligned in the correct direction according to the Circuit schematic or the device will not work.***
- 3.3.5.2. The finished board should look like figure 19.



Figure 19 Finished Circuit Board

4. Testing the Device