

22  
① The device should be small and light weight to fit easily on roofs.

② The device should be battery power rather than corded so that it becomes portable to place it anywhere.

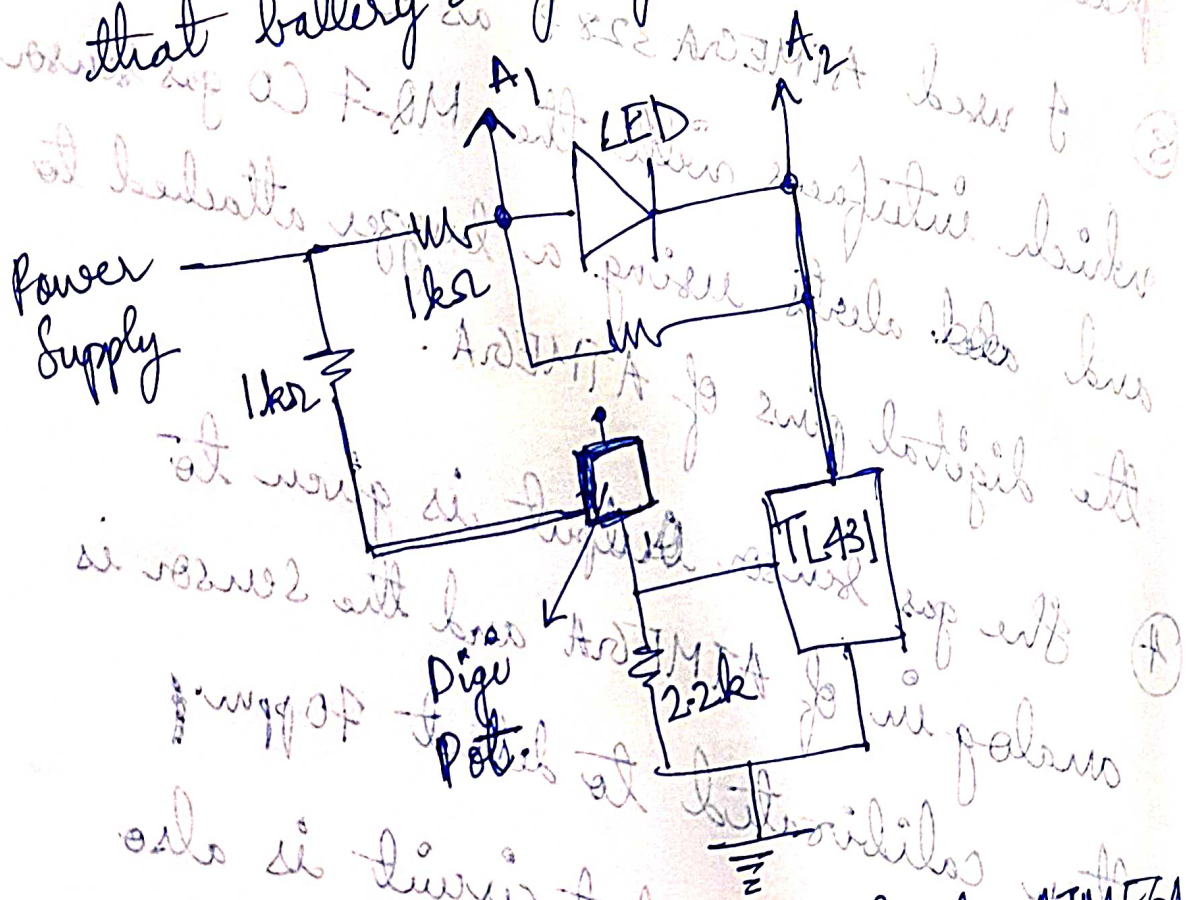
③ I used ATMEGA 328P as a microcontroller which interfaces with the MQ-7 CO gas sensor and ~~add~~ alerts using a buzzer attached to the digital pins of ATMEGA.

④ The gas sensor output is given to analog in of ATMEGA and the sensor is then calibrated to detect 70ppm.

⑤ A low battery alert circuit is also designed using TL431 Precision Shunt regulator which detects ~~with~~ 0.02V change in 5V supply from the (M7805) regulator.



This change can be detected by sending this signals to Analog in inputs and for a desired change we can program the ATMEGA to alert the buzzer with different frequency so that we know that battery is going to die.



The  $A_1$  &  $A_2$  are analog inputs for ATMEGA. The difference of this  $A_1$  &  $A_2$  voltage can be seen. For a specified difference the buzzer gets on.

## Components

AT MEGA 328P

7805 Voltage Regulator

TL431 Regulator (Precision Shunt Regulator)

LED

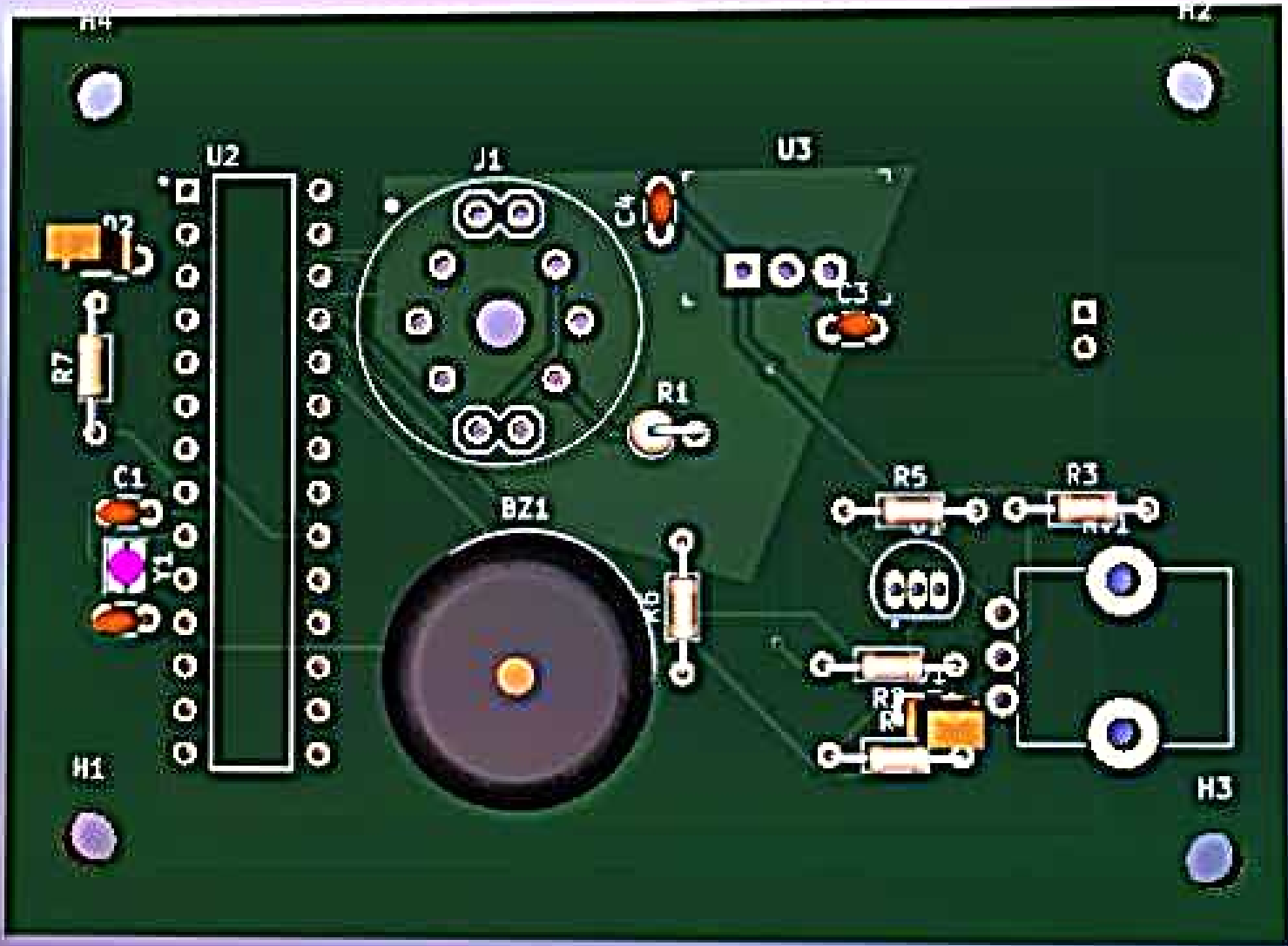
MQ-7 CO Gas Sensor + BOB 08891 Gas Sensor Breakout Board

Resistors & Capacitors

AAA Battery Holder. / 9V Battery Holder.

Crystal - 16MHz

Buzzer.



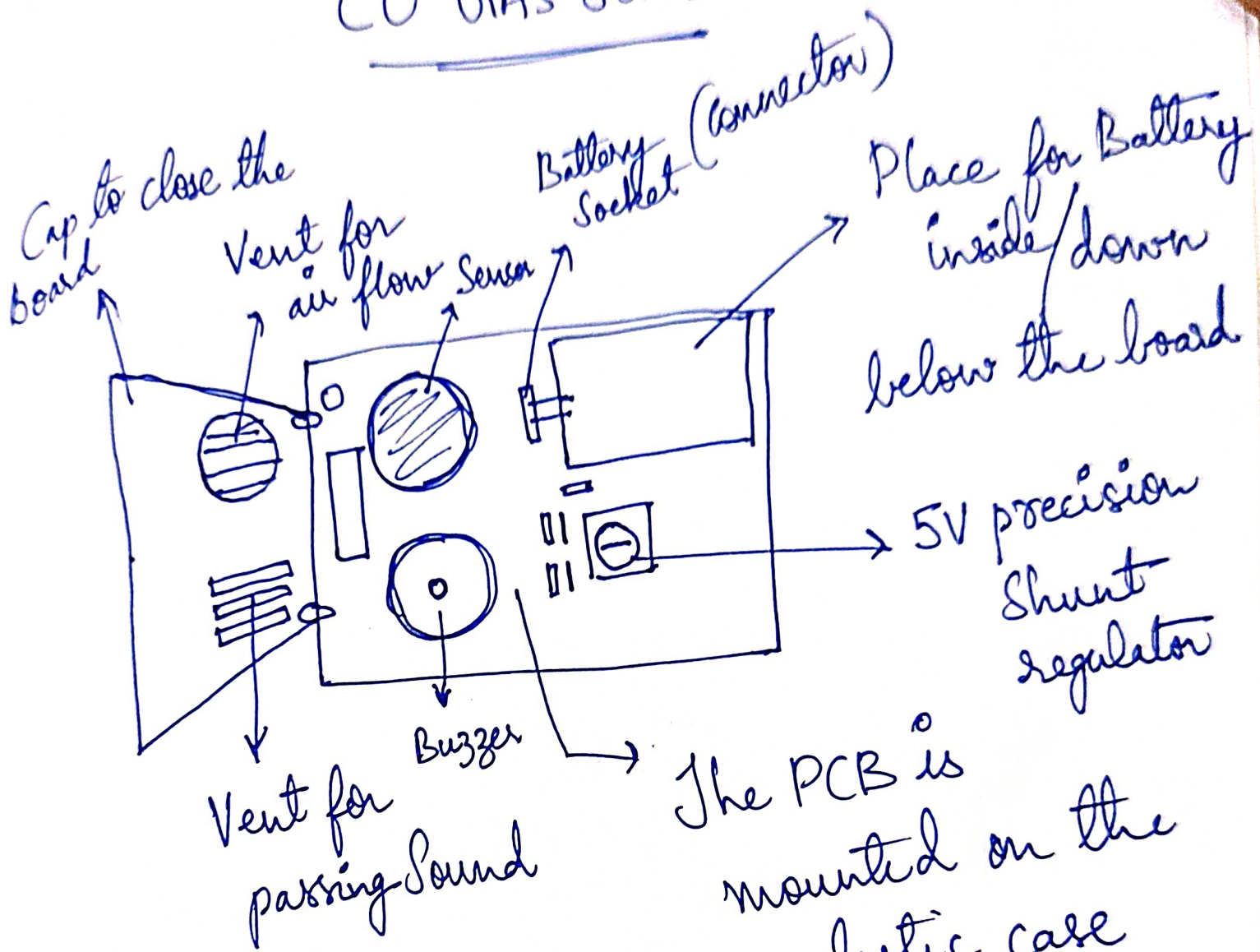


1	BZ1 -	Buzzer : Buzzer_Beeper:Buzzer_15x7.5RM7.6
2	C1 -	0.22u : Capacitor_THT:C_Disc_D3.0mm_W1.6mm_P2.50mm
3	C2 -	0.22u : Capacitor_THT:C_Disc_D3.0mm_W1.6mm_P2.50mm
4	C3 -	0.33u : Capacitor_THT:C_Disc_D3.0mm_W1.6mm_P2.50mm
5	C4 -	0.33u : Capacitor_THT:C_Disc_D3.0mm_W1.6mm_P2.50mm
6	D1 -	LED : LED_THT:LED_Rectangular_W3.0mm_H2.0mm
7	D2 -	LED : LED_THT:LED_Rectangular_W3.0mm_H2.0mm
8	H1 -	MountingHole : MountingHole:MountingHole_3.2mm_M3
9	H2 -	MountingHole : MountingHole:MountingHole_3.2mm_M3
10	H3 -	MountingHole : MountingHole:MountingHole_3.2mm_M3
11	H4 -	MountingHole : MountingHole:MountingHole_3.2mm_M3
12	J1 -	BOB-08891 : BOB:SPARKFUN_BOB-08891
13	J2 -	Conn_01x02_Female : Connector_PinSocket_2.00mm:PinSocket_1x02_P2.00mm_Ver
14	R1 -	10k : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P2.54mm_Ver
15	R2 -	1k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Hor
16	R3 -	1k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Hor
17	R4 -	1k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Hor
18	R5 -	2.2k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Hor
19	R6 -	1k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Hor
20	R7 -	1k : Resistor_THT:R_Axial_DIN0204_L3.6mm_D1.6mm_P7.62mm_Hor
21	RV1 -	10k : Potentiometer_THT:Potentiometer_Alps_RK09K_Single_Vert
22	U1 -	TL431ILP : TL431:T092127P520H660-3
23	U2 -	ATMEGA328P-FU : Atmega:DIP794W46P254L2967H457Q28B
24	U3 -	V7805-500 : digikey-footprints:3-SIP_Module_V7805-500
25	Y1 -	Crystal_GND24 : Oscillator:Oscillator_SMD_SeikoEpson_SG210-4Pin_2.5x2.



NOTE :- I started the test again after submitting at 5:00 PM, so I need to upload all the answers again. But in the 2<sup>nd</sup> attempt test I got another sensor — My earlier original sensor question was CO gas sensor. So all the answers are related to the gas sensor only. ~~\*\*\*~~ Everything is done after taking Abhijith permission Only ~~\*\*\*~~

# CO GAS Sensor



The total enclosure is made of plastic.