

Air Shower Controller System

Vishvesh Jhatakia¹, Narendra Solanki², Vikas Yadav³, Parth Chauhan⁴

¹Student, Dept. of Electronics and communication Engineering, Silver Oak University, Ahmedabad, Gujarat, India

²Head of Dept. of Electronics and communication Engineering, Azista Industries Pvt. Ltd., Ahmedabad, Gujarat, India

³⁻⁴Asst. Prof., Dept. of Electronics and communication Engineering, Silver Oak University, Ahmedabad, Gujarat, India

Abstract - Air shower for clean room framework with gathering and knockdown design. Get together and knockdown design implies that air showers are framed from a larger part of essential parts with standard determination in size. The air shower has two principal cases, a top case and abase case.

The cases above and underneath are two square shapes equal. Each equal cylinder has two right triangle cases and one isosceles triangle case. By orchestrating these two top and base cases, an air shower with an octagonal shape or passage type can be made.

This gives greater adaptability to the quantity of individuals entering or leaving the air shower, and an increment or reduction in the quantity of gadgets introduced may rely upon the volume of business. In the meantime, the space design for the air shower is movable.

Key Words: I2C, DIO, CLK

1. INTRODUCTION

An ordinary air shower ought to just be consolidated inside the plan of a designed cleanroom "passage framework." For the motivations behind our conversations, "section framework" ought to be characterized as a very much planned garmenting region integrating appropriate class recognizable proof, article of clothing stockpiling, and garmenting methods, with the general objective being the avoidance of particulate entering the cleanroom on articles of clothing, or because of the garmenting system. An Air shower is characterized as a disconnected chamber furnished with an independent blower and engine, interlocking entryways, stack/ultra filtration, and a recycling fumes framework. The highlights, capacities, and advantages of an air shower section framework rely generally upon its legitimate plan and use. This paper concentrates. To a great extent on the air shower and its legitimate plan to guarantee it conveys a functional and monetary advantage.

The contentions of the allies and pundits of the utilization of air showers, as well as of late distributed test reports will be inspected. The expected elements of an appropriately planned air shower will be talked about alongside the functional utilization of an air shower, inside an appropriately planned "passage framework", and the legitimate utilization of the air shower to upgrade adequacy. A definitive objective being to separate most extreme worth from its establishment.

Our undertaking is Air Shower Control and Monitor System that can be accustomed to tidying up space to eliminate dust or Nanoparticle in our body. Air shower serves to compellingly lessen impurities from people and materials preceding their entrance into the cleanroom. Air Shower Control and Monitor framework there are utilized in temperature and dampness sensor, microcontroller and microchip, controlling framework by AC drive, Galvanic Isolation (Opto - Coupler), attractive switch, Timer and counter, Electric high power Relay.

1.1 JUSTIFICATION

Air showers are specific encased waiting rooms which are consolidated as doorways of cleanrooms and other controlled conditions to decrease molecule contamination. Air showers use high-pressure, HEPA- or ULPA-separated air to eliminate dust, sinewy build up and different impurities from faculty or article surfaces. The powerful "purging" of surfaces preceding entering clean conditions diminishes the quantity of airborne particulates presented.

When appropriately integrated into cleanroom configuration, air showers give an ISO-arranged change vestibule to guarantee the tidiness of the ordered cleanroom. Air showers are normally positioned between a gowning region and cleanroom; after

specialists wear suitable attire and individual defensive gear, they enter the shower so the compressed air spouts eliminate any leftover particles from coveralls. When the program cycle is finished, clients exit out through a subsequent entryway, into the cleanroom. Air showers (or air burrows) may likewise be set between cleanrooms of various ISO evaluations.

1.2 LITERATURE REVIEW

A cleanroom air shower furnishes our item and our workers with an additional a layer of security from any destructive pollutants or particles that could advance into your cleanroom. One occasion of an excessive amount of particulate can bring about a demolished bunch of drugs or a failing piece of electrical hardware. An air shower capacities to keep these significant issues from occurring. They are additionally an accommodating suggestion to representatives about the significance of staying without particulate. Besides, in case a representative was not so cautious as they ought to have been while wearing an outfit, an air shower will assist with guaranteeing that any additional particulate is scour off prior to entering a foreign substance free space. [2].

Results from surface molecule tests show that air showers successfully eliminate particulate on ruined/utilized articles of clothing. Normal molecule decrease was between 56% (polyester) to 62 percent (Gortex), successful in eliminating tainting of 0.3 microns and bigger. Air showers are a successful apparatus in keeping tainting from moving into the cleanroom during the section interaction. Assuming piece of clothing use is more huge than one change for each passage into the cleanroom, an air shower will be a powerful instrument to eliminate tainting from pieces of clothing and control defilement from entering the cleanroom. Without a cleanse and stay time, an air shower's importance in controlling the movement of particles-eliminated from ruined pieces of clothing from entering the cleanroom will be fundamentally diminished. [3].

2. FLOW CHART

The Air Shower Control and monitor system is based on a microcontroller interface and together forms an embedded system. The block diagram shows the flow of the system that is implemented for the functioning and utilization of the Cleanroom.

The air shower operates two magnetic door that are being controlled by the prompts given from the microcontroller and the doors can be controlled using a push switch that has been incorporated in the design.

To enter the cleaning room, the User has to press the switch which prompts the MCU to send an acknowledgement signal and hence the door is opened as the receptive pulse is received. This is basically controlled by the code which sends a signal to the pin on which the functionality has been assigned. When the User enters the Door 1 the door will close without pressing the push switch and certain Functions are performed as follows

We have incorporated a Status Display in the cleaning rooms such that when any function is happening it shall be displayed on the same. After the Door 1 has closed, timer-based fans will start functioning for 15 to 20 seconds, please note that the intensity of the fans can be increased/decreased by the User as need be. These fans are powerful enough to blow-off the micro dust particles that the human body carries as clothing and such sorts. As the timer ticks, the fans are turned off, during this, both the Door 1 and 2 are closed. Once the blowing is finished, the Door 1 opens for the User to pass through.

As the User has now access through the Door 2, they are Particle-free at this instant and are safe to enter the area of work. After the operation of the cleaning room is finished, the User can leave from Door 2 which was closed the entire time the blowing was going on. The Door here gets the signal prompts with a push button hence after every use it becomes necessary to use the push button to open/close the Cleaning Room Doors.

For Entering Cleanroom

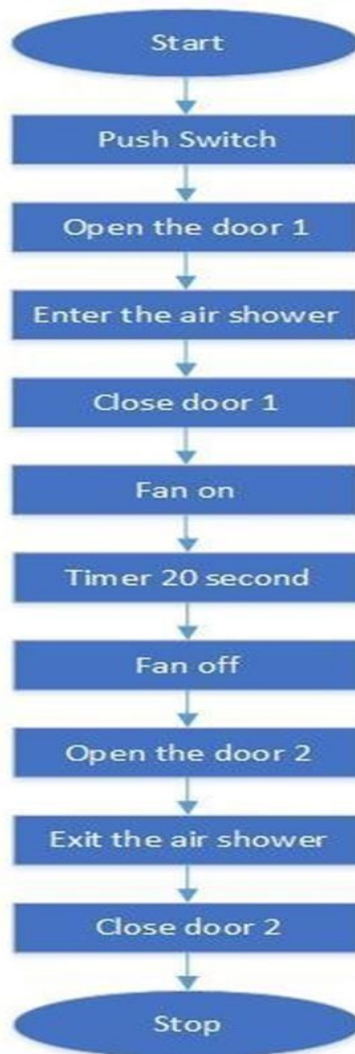


Figure 1: - Air Shower Control Working Flow Chart [1]

2.1 BLOCK DIAGRAM

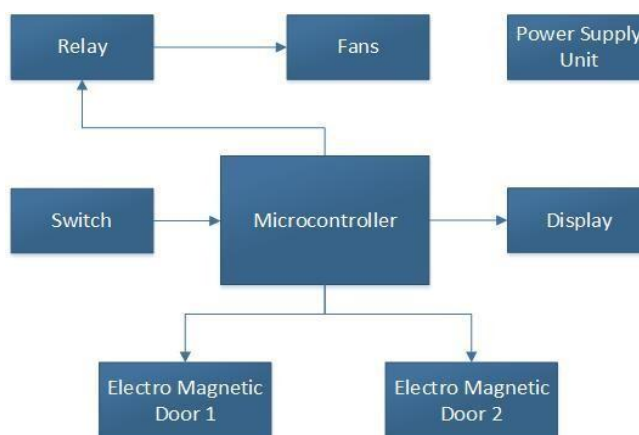


Figure 2: - Air Shower Control Block Diagram

Above block diagram fig 02. represent the process flow of the unit. Here Microcontroller act as brain of the system, which control the whole system by send and receive signals as weprogrammed alongside it supply power to certain components.

Initially the process starts by press the read switch, which is connected to microcontroller, and getting power from power supply unit, it then sends the signal to actuate the electromagnetic door 1 via microcontroller and the electromagnet actuated doors are getting power from powersupply unit.

Door-1 will be open for 5 seconds right after switch is pressed and then it will be closed automatically, as soon as the person enter the Room -1 the air shower will run for 20seconds and then it will shutoff automatically, display will beshow timer to aid the person entering the room with remaining time and current stage of process of entering theclean room.

After 20 seconds fan will turn off and electromagnetic door 2 will open and it will stay open for 5 seconds it will be represented on display unit.

Whole system will be power though power supply unit.

2.2 MICRO CONTROLLER

In this project I can use C8051F920 micro controller. Itis 32 pin microcontroller and there are 3 port in the microcontroller

- Port 0
- Port 1
- Port 2

All ports are input and output pins. Controller is working from 3.3V DC voltage.

In this project I can used which pin it is show in belowtable.

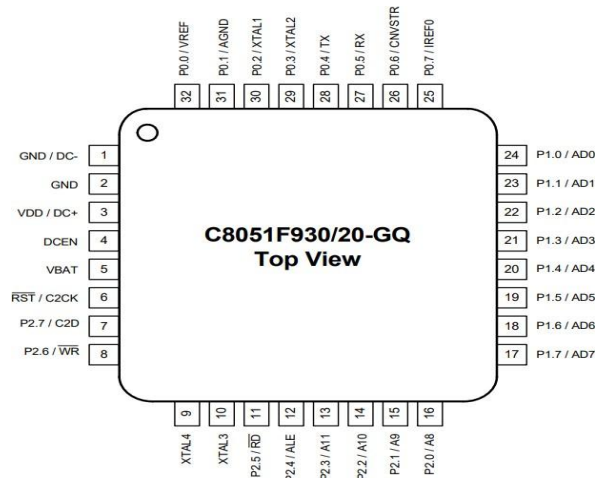


Figure 3: - C8051F920 Controller [4]

Pin No	Port Pin	Connected
32	P0.0	Relay_1
31	P0.1	Relay_2
30	P0.2	Relay_3
29	P0.3	Relay_4
26	P0.6	DIO
25	P0.7	CLK
20	P1.4	MS_1
19	P1.5	MS_2
18	P1.6	SW_1
17	P1.7	Sw_2

Table 1: - C8051F920 pin connected

2.3 DISPLAY



Figure 4: - 4 Digit 7 Segment Display Module [6]

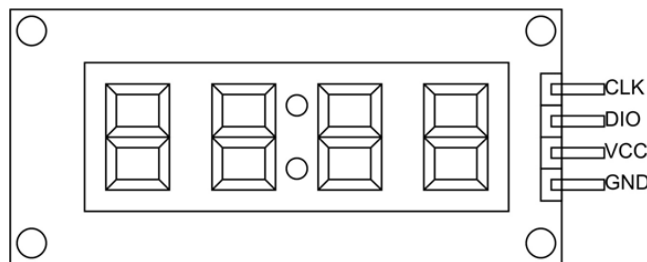


Figure 5: - 4 Digit 7 Segment Display [6]

Pin Name	Description
VCC	Connected to power source.
GND	Connected to ground.
DIO	Data Input/output pin
CLK	Clock pin

Table 2: - 4 Digit & Segment Pin Configuration [5]

2.4 RELAY CKT

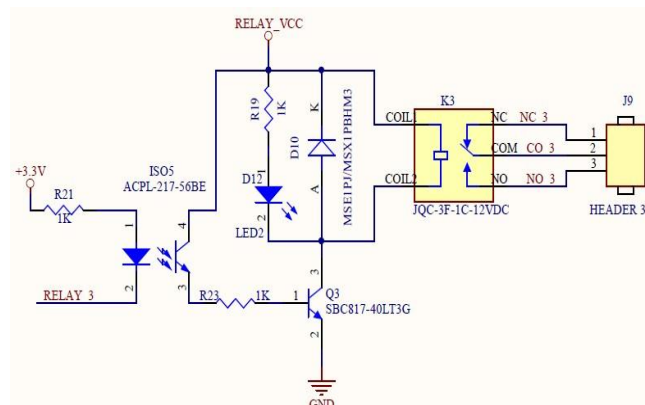


Figure 6: - Controller relay circuit

In above chart there are used semiconductor, opto semiconductor, resistor, diode, move. A 3.3V is apply to the opto semiconductor through resistor(R21). Resistor regard is 1K and pass in semiconductor pin No. 1 and pin No.2 is connector to the controller pin. opto Transistor work expecting a Led diode is on a light is pass on the semiconductor and opto semiconductor become on.

opto semiconductor pin no 3 is related with the semiconductor through resistor(R23) and resistor regard is 1K pass in semiconductor base. opto semiconductor pin no 4 is related with the vcc (5V). resistor(R19) and drove (D12, LED 2) are related with series and winning diode is related with the Parallel to the resistor(R19) and drove (D12, LED2).including a diode in an exchange circuit hinders gigantic voltage spikes from bouncing up while the strength convey isseparated. exactly when twist is off a contrary circle currentcan pass so it not be mischief to all circuit a general diode areused and it is related between resistor (R19), drove (D12, LED2) and circle with Parallel affiliation.

2.5 PCB DESIGN CONTROLLER

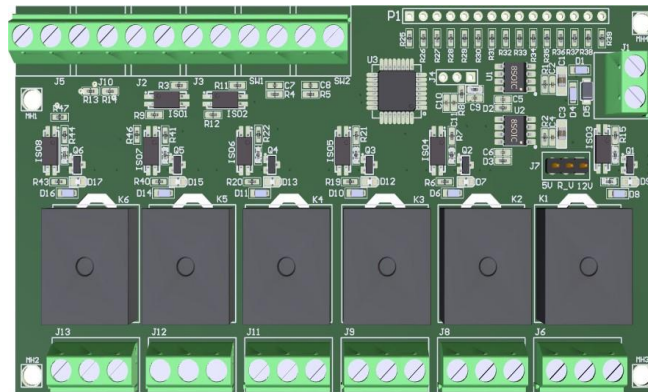


Figure 7: - PCB Front view



Figure 8: - PCB Back view

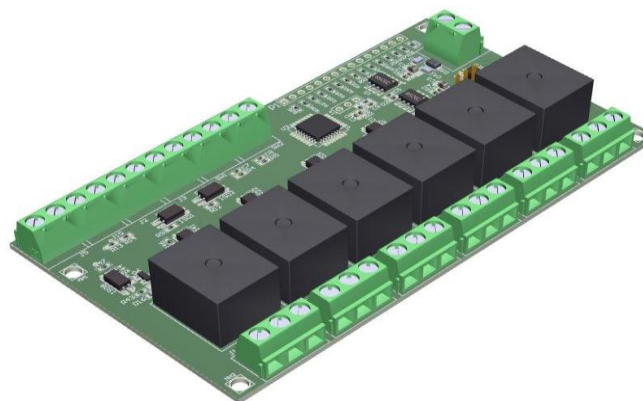


Figure 9: - PCB Side View

3. CONCLUSIONS

In the end we as a whole attempt to observe the importance and importance behind the Application and Implementation of any venture that we work whereupon functions as a significant component for the Project's genuine execution. This Air Shower Pod is one such task which has a great deal of inconsistencies and analysis also. The viability of an Air Shower passage framework relates straightforwardly to its legitimate plan and use. As of late tests have been led and articles composed which show air showers to be 35% to 90% effective in the evacuation of defilement reliant upon the size of the molecule, the plan of the air shower, piece of clothing type, article of clothing systems, shower use procedure, process duration, and cleanroom grouping. It ought not be expected that air showers recycle clean air, subsequently they don't need filtration themselves. Air showers, as cleanrooms, ought to follow the fundamental idea of sifting and moving air, to both eliminate pollution from the article of clothing and concentrate the eliminated tainting from the climate. In this project you can add some sensor to operate a fans in air shower cleaning room. If sensor can detect any object then fan will be on with clean room chamber otherwise fan is off. A fan is not on still 5 to 10 seconds the system can automatically reset and we can perform all task again. In my project I can use switch No. 1 to enter the room through air shower and exit through other room so if you can used switch No. 2 for enter the clean room and exit the clean room through one chamber It will be possible in On microcontroller board.

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