PROJECT SYNOPSIS

OF

MACHINE OVERHEAT DETECTION USING MICROCONTROLLER

-AYMAN ATTAR

INTRODUCTION:

In march 10 1970, Howard J. Fremont & Company, Inc. filed patent in United States Patent Office. In that petent they mentioned " A great need has developed for a system that can be used in large buildings to detect an overheat condition, such as a fire in a portion of the building, and to indicate the area where the condition has occurred or where it is in progress." In that patent, they proposed the idea of Overheat Detection in a portion of building, we can apply similar concept to detect overheat in industrial machines and devices.

Global electricity consumption continues to increase faster than world population and the fact of this increase is also due to the increase of industries in urban sectors that require this resource. It is the basis of operation of machinery that range from small appliances to high power systems, being used by Industry, Commerce,Transport, Security, home automation, among others.

Thus, there is a need for inexpensive and low energy-consuming devices that may be adapted to function autonomously as a temperature monitor, providing an overheat signal or over-temperature signal, for the particular environment of many different machines used in manufacturing or other operations. There is a need for such devices to fit, non-obtrusively, on or in thermal contact with the equipment, or within the equipment, and to give a visible warning signal if, or when, some portion of the equipment reaches a temperature that indicates that it is overheating, which is likely to be harmful to its continued operation.

In general, and in the face of the informality that accompanies this energy growth, it is necessary to foresee certain difficulties specific to the electrical distribution, such as the overload and the overheating in the electrical devices / machines / appliances, often located in urban areas and easily accessible.In order to counter the difficulties of Overheating , we are introducing this microcontroller based overheat detection system.

Problem identification and Problem Formulation:

In the last thirteen years, electricity has grown by 32% and is an important element of analysis in the Peruvian energysector. The fact of electricity increase is also due to the increase of industries in urban sectors that require this resource because it is the basis of operation of machinery that range from small appliances to high power systems, being used by Industry, Commerce, Transport, Security, home automation, among others.Hence it is important to find the problem for the overheating as many machines are installed in companies and the rate of heating increases. In order to counter these difficulties, we have elements such as the thermomagnetic switch that acts, according to its current and time curve, as the main actuator for the detection of an overload.

An overheated system is one that's running at 180 degrees Fahrenheit or hotter, according to Machinery Lubrication Magazine. However, every system is unique. It's important to monitor the viscosity of your oil as well as your equipment temperature to determine whether it's overheating. "An overheated system is one that's running at 180 degrees Fahrenheit or hotter." The ability to identify overheating right away is a crucial skill, but it's preferable to avoid the issue altogether. The only way to avoid overheating, by definition, is to ensure that the amount of heat your system is generating is less than the amount it's dissipating.There are two ways to correct an overheating problem: Decrease the heat load, or increase the heat dissipation.The main goal here is to ensure that your equipment is operating efficiently at all times. When your system is operating as it should, there are fewer chances for it to overheat.
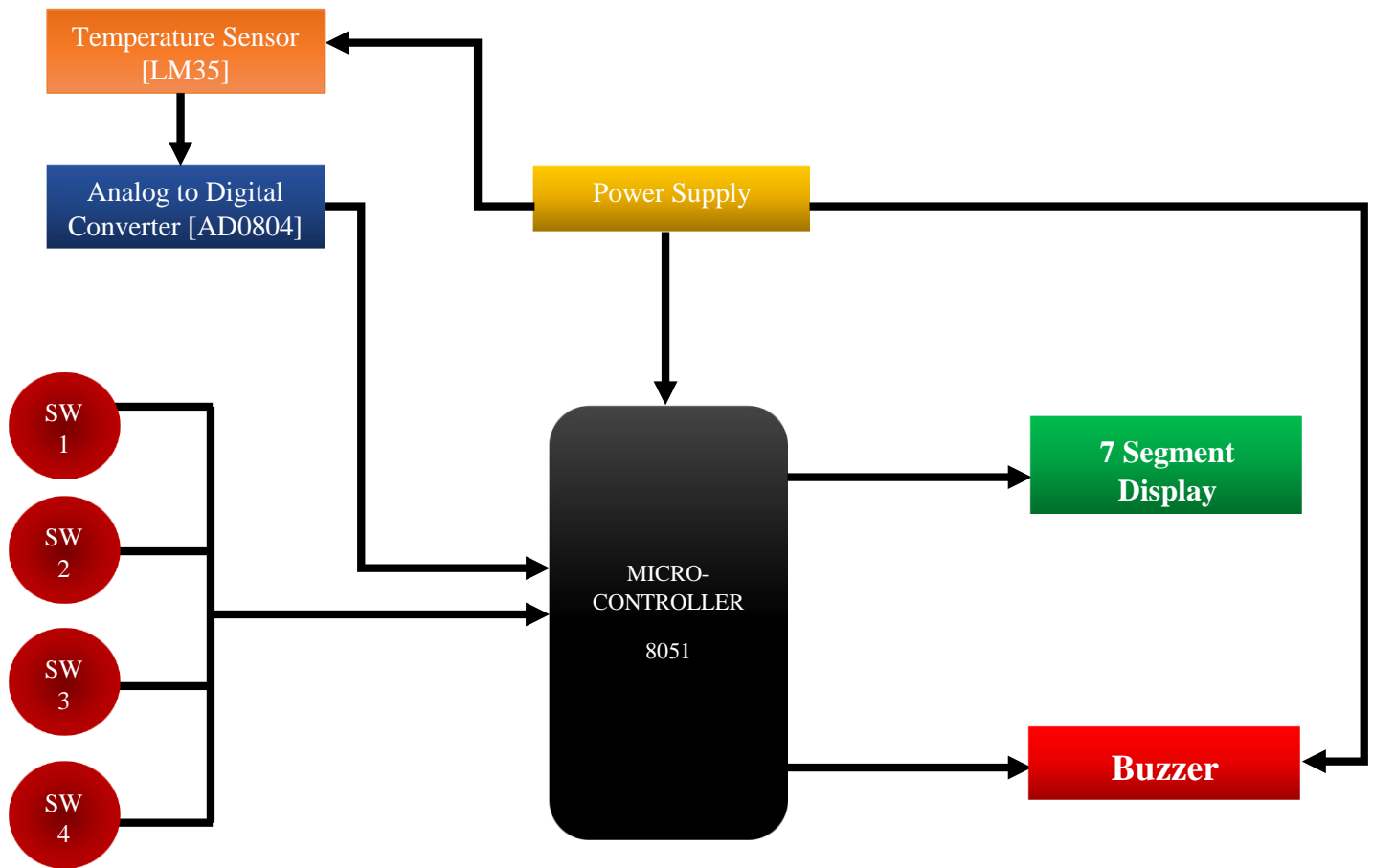
Objectives :

The main objectives of this project is to

1. Design a device which can used to detect overheating of a machine with accuracy.
2. To increase products of factories by avoiding machine damage.
3. To give notice of overheating of the machine to which it is attached by initiating an audible warning signal. (i.e. Buzzer)
4. To determine in which cases the machine can get overheated and can become a problem of failure in the supply as an interruption.
5. To improve the quality of machines in this type of project with the aim of protecting these electrical devices against the overheating issue.

Methodology :

The development of this methodology begins by selecting a microcontroller for this project, comparison of different microcontrollers, in addition to detect the temperature, we have to select proper digital temperature sensor, in this way we are going to carry out this Microcontoller Based Overheat Detection project by comparing and analyzing different components and devices. We are going to use 3 Digit 7 Segment Display to display the temperature ,the temperature data will be sent by the microcontroller. The push buttons are going to be used to set the high and low temperature. Then we are going to need 12V Transformer to supply power to this project, and a buzzer to indicate that the system or machine has exceeded the set temperature.

Block Diagram :

Fig.1. Block Diagram of Machine Overheat Detector Using Microcontroller 8051

Facilities required for proposed work :

 To achieve the objectives , we will require microcontroller programming software, in our project it is Keil μVision for 8051 Microcontroller. And to design a circuit diagram and for board development we are going to use Proteus 8 Professional.

Bibliography / References :

https://patents.google.com/patent/US3500367

https://www.freepatentsonline.com/3500367.pdf

https://ieeexplore.ieee.org/document/8920466 https://www.enerquip.com/2017/04/03/the-causes-of-overheating-and-how-to-avoidthem/#:~:text=Generally%20speaking%2C%20an%20overheated%20system,to%20determin e%20whether%20it's%20overheating.

https://www.therobotreport.com/4-overheating-solutions-for-commercialrobotics/#:~:text=Overheating%20can%20become%20a%20severe,machines%20during%20 a%20given%20shift.