

# Industrial Parameter Control and Monitor by Using MATLAB

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**Abstract**— In the current era of industrialization, the field of automation has great opportunities for R&D. When we talk about automation of any industry, an engineer has to develop a system such that a person can have a view of various processes going on in the industry, status of various machines in the industry, status of certain parameters (e.g. temperature, current etc) in the industry remotely. Along with this, a system should be capable of providing certain control facilities of the industrial processes, parameters or instruments from distant place.

The paper focuses on developing Matlab GUI Standard comprising of a combination of hardware and software to monitor and control various parameters in industry. The system is also capable of controlling devices in the industry from the remote place using internet with authentication and security.

## I. INTRODUCTION

The project best applies to the industrial environment, to monitor & control certain industrial parameters with/without human interference and to have graphical view of the current status of industry. This project is helpful in terms of learning SCADA system as a whole, role of embedded system in automation and server side programming concepts. Thus, project forms the prerequisites to understand industrial automation concepts and work on the same. This project is an example of embedded system, MATLAB and mobile communication as all its operations are controlled by intelligent software inside the microcontroller and MATLAB. The communication takes place using a cell-phone. Here is a circuit that lets you operate the industrial appliances like motors and compressors from the office or any other remote place. Here MATLAB is used to access the system from the computer or laptop. GUI present in the MATLAB shows us a real time conditions in the industry that is graph of the temperature, on- off state of appliances, present phases (that is R Y B). by just clicking on the tab in the GUI, you can turn on or turn off the certain application.

This system also prevents the phasing problem and thermal damages of the appliances. If one of the phases fails then the system gives a beep sound and automatically all the three phase

applications are shutdowns. Same as if one of the machine is running at a over temperature, then this machine is turn off by the system & it prevents from thermally damages.

## II. OBJECTIVES

The system is based on MATLAB and Arduino Uno board includes protection against single phasing, over-current, temperature and other desirable features. DTMF Technology has been used here to implement acoustic communication for controlling the any application remotely anywhere in the world through mobile phone network. The desired value of frequency signals, in terms of DTMF tones have been generated by using a mobile phone. The microcontroller has been used to implement the control algorithm after receiving the DTMF tone. Since no extra transmitting and receiving device is needed except mobile phone, the system is very much simple, rugged, and cost effective. The experimental results indicate that the system has high resolution, repeatability and error is also within tolerable.

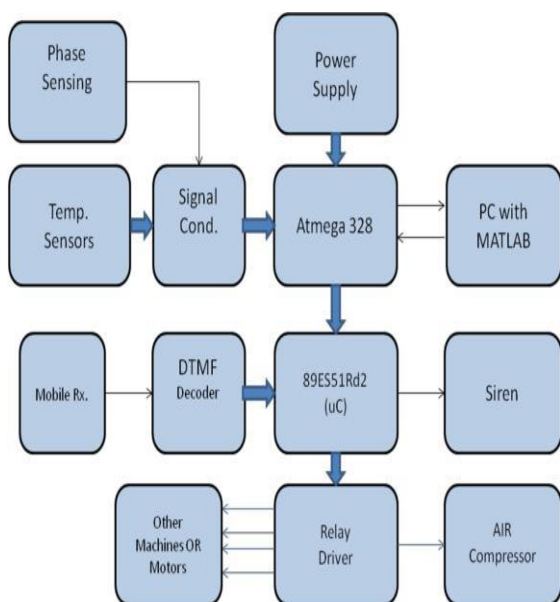
Within the ambit of wireless technology, appearance of remote control based devices and appliances have become the order of the day. It reduces human affords and increase the efficiency. Every sector needs automation, ranging from home to industries Automation Systems perform by allowing a number of devices to communicate with a central controller which in turn communicates all information to the user or the owner of the system as per the instructions and the structure of the system.

The application of such automation systems could be in areas such as heating, lighting, defense, energy management, audio and video systems, health monitoring, and entertainment. Keeping all these facts in mind, this is a system which based on GUI controlling through a PC(personal computer) or LAPTOP.GUI is MATLAB tool used in project for various parameter control's & monitor's in industry. To control any electronic device with the help this circuit, there is a need of just a click on the selected tab of the GUI MATLAB application.

This eliminates the drawbacks which would have to be faced with device controlling through SMS. The circuit is very much user friendly, as it gives graphics visualization. The graphics visualization also presents the 2D graph of selected channel. The use of advance Arduino board reduce size of the hardware to a greater extent.. The complete circuitry is proved to be very much economical. The set of instructions is very much simplified. This eliminates the requirement of expert user.

An introductory knowledge of mobile phone is more than sufficient. The numbers of devices that will be controlled through this circuitry are not limited to one or two. But total 6 devices can be controlled with ON/OFF facility of each, with industrial protection's such as Over current, phasing problem ,thermal damages. The circuitry is flexible enough to allow more number of devices to be operated, just by changing the software programming and relay driver IC.

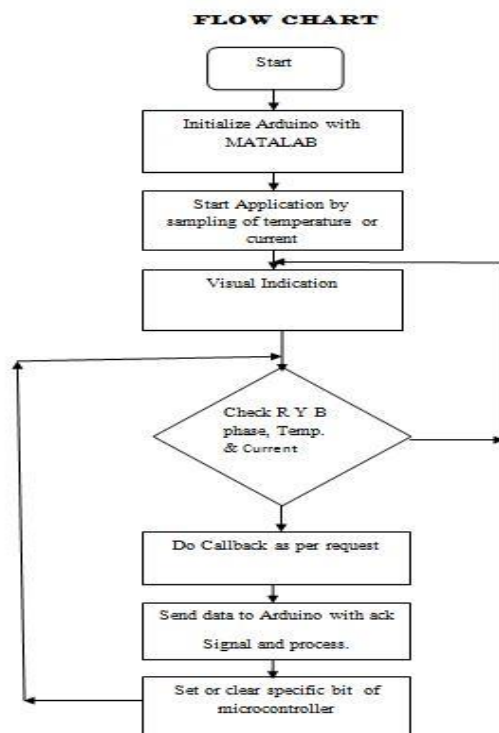
### III. METHODOLOGY



**Figure No.1. Block diagram of industrial parameter control's & monitor by using Matlab**

The paper can be implemented as per the above block diagram as shown in fig. no. 1. We can use various components as shown in block diagram. We can use three step down transformer for each phase for the purpose of phase sensing, LM35 can be used as temperature sensor for sensing temperature, Current transformers can be used for current sensing. After that all the signal can be given to signal conditioning block then given to ARDUINO.

### IV. SOFTWARE IMPLEMENTATION



**Figure No.2. Flowchart for industrial parameter control's & monitor by using Matlab**

### IV. IMPLEMENTATION

The power supply is a generally single phase 230v Ac step downed, and rectified & then regulated by using regulator .Here We will use 1 2volt for relay driver and 5 volt to the other control circuit's. Phase sensing circuit is a generally AND gate, each phase that is R Y B is step downed and applied to the input of the gate, if three phases are present then the output of the AND gate is logic High, otherwise it is Low

The output of the temperature and current sensor is very low in mV so we will be use a signal conditioning circuit, the output of the signal conditioning circuit is directly given to the analog input channels' of Atmega328 controller, which is present on Arduino board. The Arduino board is serially connected to the computer. A computer contents a MATLAB software with GUI, the graphics visualization is shown on the computer screen by using

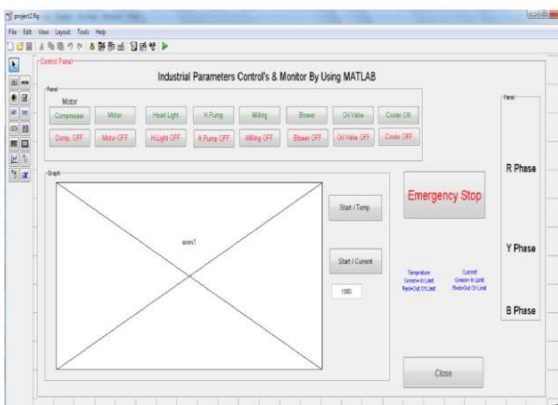
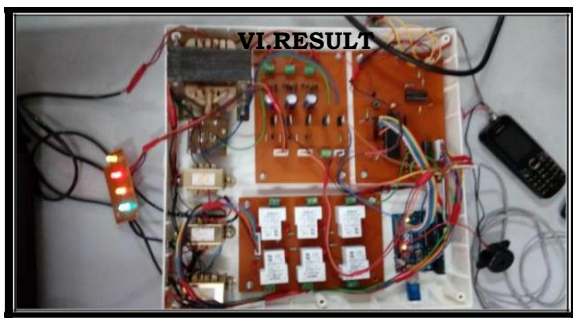
MATLAB GUI .the controls signal's send from the Arduino board to the slave microcontroller. The other input to the slave controller is a DTMF binary code which is obtained from MT8870 DTMF decoder. The mobile is acts as a receiver module which is connected using 3.5mm jack to the decoder circuit.

The relay driver is used for driving the relays , here we will use ULN 2003 as a relay driver. Here the Air compressor is remotely turn on or off by using the mobile phone. Siren is used for alarming conditions or in Emergency state.

Atmega328 is interfaced with laptop or pc through USB. By using GUI tool in MATLAB we control the parameter. Through laptop or pc we send the signal to ARDUINO Atmega328 Which sends output to microcontroller to controls the parameter.

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**Figure No.3 Hardware and GUI for industrial parameter control's & monitor by using Matlab**

Figure No.3 shows the actual GUI window in MATLAB.In this three phase indication can be indicated at right the side and real time process visualise in graph at the bottom corner.

### VII.CONCLUSIONS

To control any electronic device in the industry with the help this circuit, there is a need of clicking just a tab in GUI. The circuit is very much user friendly, as it gives graphics

visualization on computer screen. There are no specifications for the kind of mobile used to control remote device. The complete circuitry is proved to be very much economical. The set of instructions is very much simplified. This eliminates the requirement of expert user. An introductory knowledge of computer is more than sufficient. It avoids over current flowing, thermal damages, phasing problems, temperature problem.

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