ADVANCED FAULT DIAGNOSIS IN PANNEL WITH REAL TIME DETECTION

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ABSTRACT

Now a day's various application of control panel contains different application like heater control , motor control, tensile machines, speed drives for process plants In such case if the some fault occurs in panel we can find out by this tools

Keyword : - —, *Microcontroller interface (16F877A CPU), control panel, USB SERIAL INTERFACE: laptop interface*

1. INTRODUCTION

Advances in production techniques have improved the capacity of the productive systems of the industries, since the equipment used in these processes have improved their reliability and availability in the operation, making the productive processes more efficient. Since the life cycle stages of production process equipment require high investments, and maintenance and operation procedures to achieve appropriate return times on the investments made, must ensure high availability and reliability rates. These performance indexes are improved by reducing the number of failures and managing their severities, while ensuring an increase in overall security.

This process of issuing the report basically comprises four stages:
Identification of the failure modes that are occurring;
Fault location;
Evaluation of its extension;
Estimation of the remaining life of the equipment or component in question.

2.SYSTEM MODEL

The all parameters are connected to various input requirement from panel with signal line unit and sensors input component the control circuit cheeks the normal condition of sensor output which is given to analog to digital converter which send info to controller and controller send information to LCD screen
Block diagram shows our proposed work is represented in fig. 1

3. BLOCK DIAGRAM

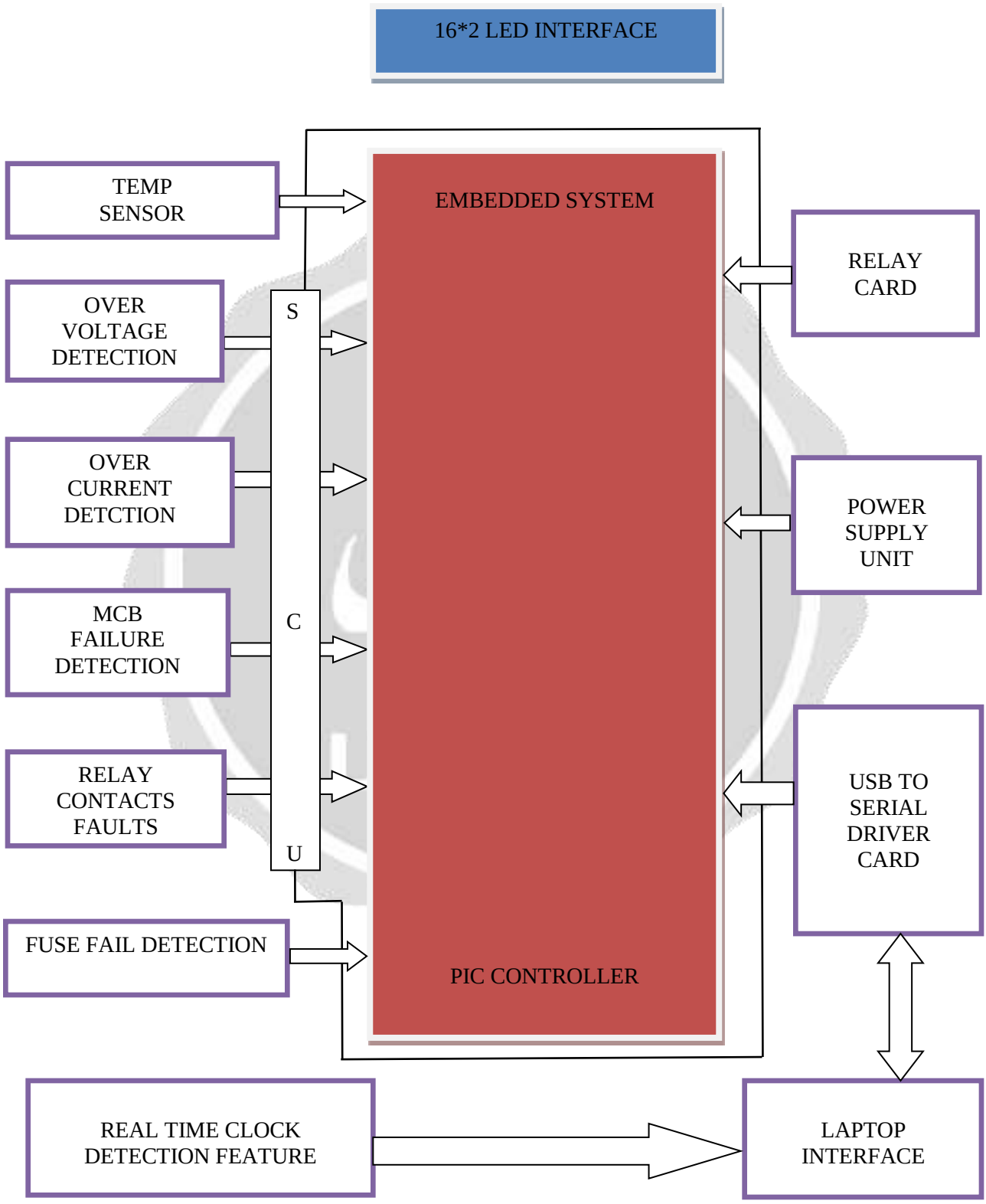

Fig-1: Block Diagram Of Proposed Work

4. COMPONENTS DISCRIPTION

4.1 MICROCONTROLLERS

The microcontroller contains full implementation of a standard MICROPROCESSOR, ROM, RAM, I/O, CLOCK, TIMERS, and also SERIAL PORTS. Microcontroller also called "system on a chip" or "single chip microprocessor system" or "computer on a chip". A microcontroller is a Computer-On-A-Chip, or, if you prefer, a single-chip computer. Micro suggests that the device is small, and controller tells you that the device might be used to control objects, processes, or events. Another term to describe a microcontroller is embedded controller, because the microcontroller and its support circuits are often built into, or embedded in, the devices they control. Today microcont- - rollers are very commonly used in wide variety of intelligent products. For example most personal computers keyboards and implemented with a microcontroller. It replaces Scanning, Debounce, Matrix Decoding, and Serial transmission circuits. Many low cost products, such as Toys, Electric Drills, Microwave Ovens, VCR and a host of other consumer and industrial products are based on microcontrollers.

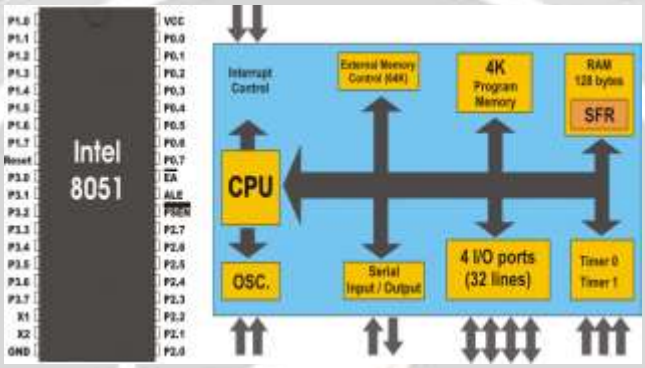

Fig- 2: Block Diagram of Microcontrollers

4.2 PIC

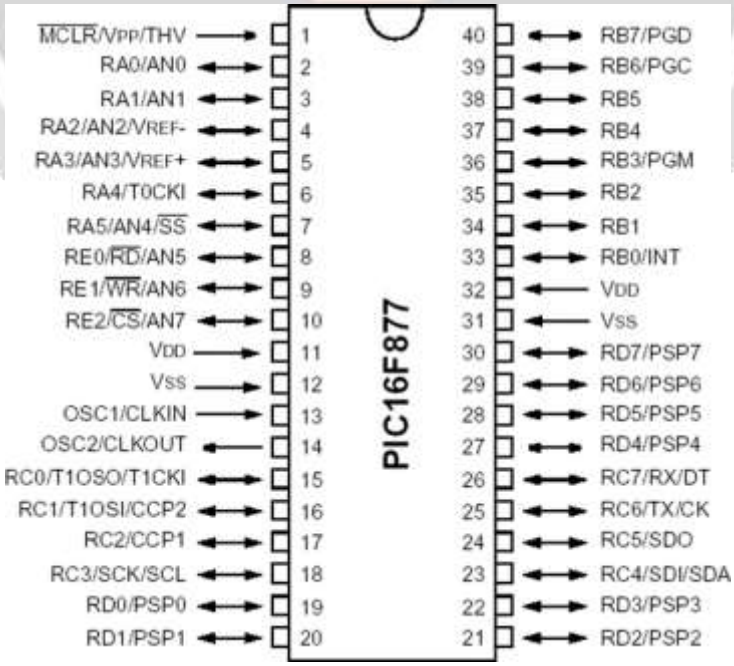

Fig-3: Block Diagram of PIC

The microcontroller that has been used for this project is from PIC series.PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complimentary metal oxide semiconductor) that uses separate bus for instruction and data allowing simultaneous access of program and data memory. The main advantage of CMOS and RISC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques. Various microcontrollers offer different kinds of memories. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. Technology that is used in pic16F877 is flash technology, so that data is retained even when the power is switched off. Easy Programming and Erasing are other features of PIC 16F877.

4.3 POWER SUPPLY UNIT

Power supply circuits built using filters, rectifiers, and then voltage regulators. Starting with an ac voltage, a steady dc voltage is obtained by rectifying the ac voltage, then filtering to a dc level, and finally, regulating to obtain a desired fixed dc voltage. The regulation is usually obtained from an IC voltage regulator unit, which takes a dc voltage and provides a some what lower dc voltage, which remains the same even if the input dc voltage varies, or the output load connected to the dc voltage changes.

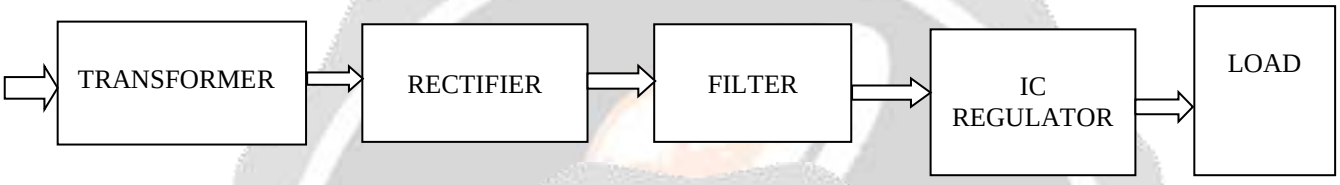

Fig-4: Block Diagram of Power Supply Unit

4.4 RELAY

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical. The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Most ICs (chips) cannot provide this current and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil. The maximum output current for the popular 555 timer IC is 200mA so these devices can supply relay coils directly without amplification

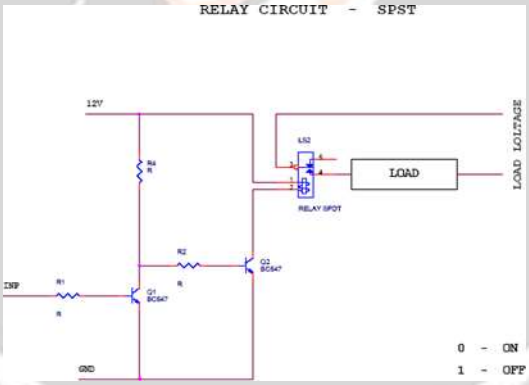

Fig-5: Circuit Diagram of Relay

4.5 16*2 LCD INTERFACE

PIC16F877A Mini Development Board comes with an LCD module (2×16) operating at 5V. Control lines (RS, R/W,

E) are connected to port pins RC0(RS), RC1(E) and data lines (D0-D7) to port pins RD0-RD7 whereas R/W is directly grounded. The board has a potentiometer to adjust LCD contrast. For reliable performance, LCD has to be initialized with certain commands

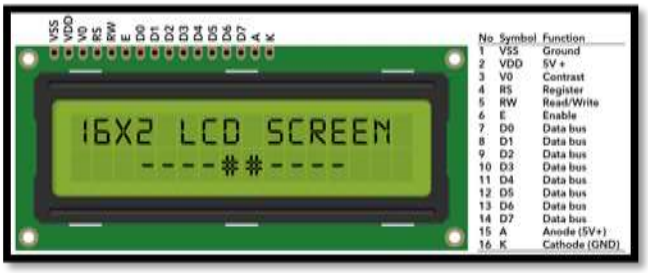

Fig-6:16*2 LCD

4.6 CONTROL PANNEL

1.TEMP.SENSPOR:

we are controlling 2 temp set points, if we give voice command 30 deg than automatically set point is calibrated to 30 deg & if temp rises above 30 relay trips in this way we are using voice commands to control temp The lm 35 is most used sensor to give the o/p in 10mv/deg cel with the reference voltage of stabilized power supply The temperature sensor is interface with the buffer or unity gain amplifier which reduces the burden effect on previous stages The buffer provides increase in driving capacity The signal o/p is given to non inverting amplifier with gain adjust by a feed back in i/p to o/p. Gain is divided by 2

- The sensor again is given to buffer before giving to ADC
- The instru amp. Can be modified according to type of sensor used and the required scaling of ADC input span
- The range of temperature display decides the calibration of the amplifier stages in order to give specific voltage that is maximum voltage related to maximum temp

FEATURES
Rated for -55oC to +150oC range, Operates from 4 to 30 volts. Current required less than 60ma, Low self-heating. Calibrated directly in Celsius (Centigrade).

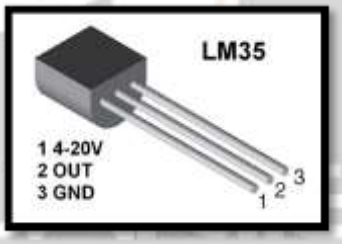

Fig-7:LM35

2.OVER VOLTAGE DETECTION

When the voltage in a circuit or part of it is raised above its upper design limit, this is known as overvoltage. The conditions may be hazardous. Depending on its duration, the overvoltage event can be transient—a voltage spike—or permanent, leading to a power surge. electrical devices are designed to operate at a certain maximum supply voltage, and considerable damage can be caused by voltage that is higher than that for which the devices are rated.

3.OVER CURRENT DETECTION

Overcurrent is just like it sounds: It's an excess of current—or amperage—in an electrical circuit. An overcurrent occurs when the current exceeds the rated amperage capacity of that circuit or of the connected equipment (such as an appliance) on that circuit. An overcurrent can be caused by overloading the circuit or by a short circuit, a ground fault, or an arc fault. Circuit breakers and fuses protect circuit wiring from damage caused by overcurrent.

4 MCB FAILURE DETECTION

A miniature circuit breaker (MCB) automatically switches off the electrical circuit during an abnormal condition of the network means in overload condition as well as faulty condition.

Mainly MCB fails due to:

1.Overload circuit
2.power surge and spike
3.Shorts circuit
4.Conduit system having grounded wires

5.RELAY CONTACTS FAULT

The main drawbacks are loose contacts, cracks in the contacts or excessive size and deviation the faults contacts components generally include contact overheating, wear and welding

Common contacts failure

1.due to mechanical engagement
2.the contact cannot be open or close due to excessive load
3.Because of the high voltage
4.High frequency

6.FUSE FAIL DETECTION

when too many lights or plug-in appliances draw power from the circuit, it can overload the capacity of the fuse and cause the metal ribbon inside the fuse to melt through. The result is that all lights, outlets, and appliances powered by the circuit will go dead suddenly. Diagnosing the location of a short circuit can take patience. Because many short circuits occur in plug-in lamps or appliances, start by unplugging every lamp and appliance, then replace the burned out fuse. If the new fuse holds, it is likely that the wiring problem was in one of the lamps or appliances you unplugged. If not, then the problem exists somewhere in the circuit wiring itself. You can visually inspect each outlet, wall switch, and light fixture for loose connections, but there is a good chance that you will need to call in a professional electrician to locate and fix the problem.

4.7 SCU (SIGNAL CONDITIOING UNIT)

Signal conditioning is the manipulation of a signal in a way that prepares it for the next stage of processing. Many applications involve environmental or structural measurement, such as temperature and vibration, from sensors. These sensors, in turn, require signal conditioning before a data acquisition device can effectively and accurately measure the signal. For example, thermocouple signals have very small voltage levels that must be amplified before they can be digitized. Other sensors, such as resistance temperature detectors (RTDs), thermistors, strain gages, and accelerometers, require excitation to operate. All of these preparation technologies are forms of signal conditioning.

4.8.REAL TIME CLOCK DETECTION FEATURE

This error is almost always caused by a problematic CMOS battery. This error usually means that your CMOS battery is dead and has no charge left. Since this CMOS battery is used to keep your system clock running when your system is turned off, you will get this error on every startup of your computer or laptop

4.9.USB TO SERIAL DRIVER CARD

A typical standard USB to serial adapter consists of a USB processor chip which processes the USB signals. The USB processor sends the processed USB signals to a serial driver chip which applies the correct voltages and sends the processed data signals to the serial output.

4.10.LAPTOP INTERFACE

In computing, an interface is a shared boundary across which two or more separate components of a computer system exchange information. The exchange can be between software, computer hardware, peripheral devices, humans, and combinations of these.

5.FLOWCHART

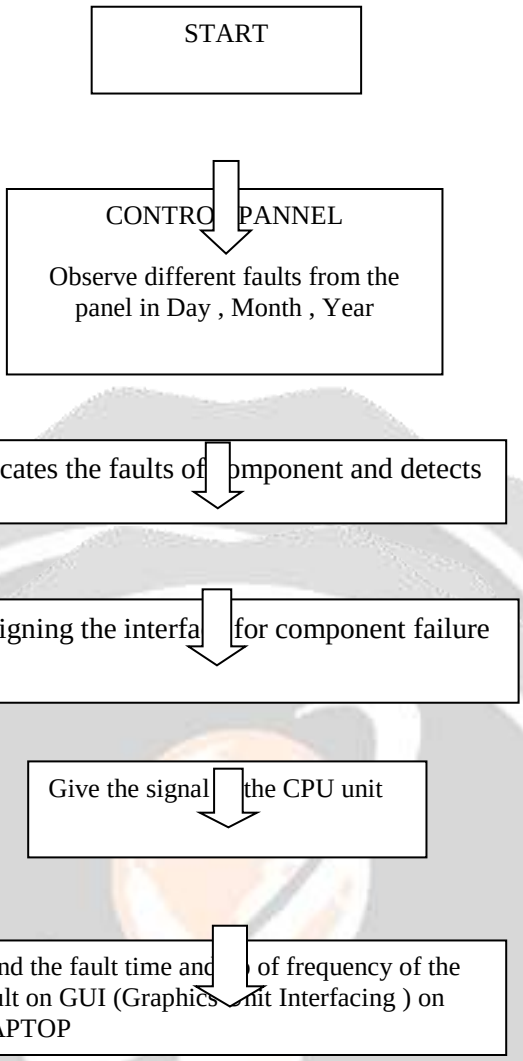

Fig -8 : Flowchart Of The Project

6.SOFTWARE USED FOR INTERFACING

1.Microsoft VISUAL BASIC 6.0
2.Proteus 8 CAD Connected

7.APPLICATIONS

- Production line.
- Electrical control panels.
- Printing m/c (big m/c only).
- Cloth elongation tester.
- Big electronics systems.
- Machine shop.
- Steel plants.

8.ADVANTAGES

- Reduce debug time
- Specific fault of sensor
- Fault indication by LCD display or laptop
- Easy to locate

9.DISADVANTGES

- Needs separate interface for different application
- Initial cost

10.FUTURE SCOPE

- Advance technology.
- Complex process can also have simplified.
- User friendly.
- Number of sensor can increase. Microcontroller based interface

11. CONCLUSION

From our project we conclude that control systems allow minimize the risks of failure of production systems, where intelligent systems are widely used, especially in large and top technology plants, and consequently increase its reliability (reduced failure rate/year) and the availability, improving the quality of energy supply by reducing the periods and interruption frequency of power supply Fault prognosis is also a very important future research area. If the location and moment of faults arising in the processes can be estimated or predicted properly, then a suitable action may be taken for preventing further degradation and serious damage of the products, and avoiding certain safety problems in advance. A failure in hardware or software. Fault detection methods, such as built-in tests, typically log the time that the error occurred and either trigger alarms for manual intervention or initiate automatic recovery. With enterprise networks, network analyzers are often attached to the lines in order to monitor traffic and send an alarm when disruptions are detected.

12. ACKNOWLEDGEMENT

The author acknowledgement the support of Ashokrao Mane Group Of Institute and the Electrical Department for the Project work.

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