GSM Based Industrial Disaster Intimation Control System

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Abstract— In this module we will be interfacing 3 sensors with the microcontroller which will be used to distinguish distinctive conditions and send messages in like way. At first the sensors are to be definitely interfaced with RL75 controller. RL78 is 8051 scaled down scale controller family which has many preferences determined in depiction starting at now. The item ventures are dumped into the controller and certain edge purposes of restriction will be set by which the yield is considered. Microcontrollers are so poor and effortlessly accessible that it is commonplace to utilize them instead of clear technique for thinking circuits like counters for the sole motivation driving growing some chart adaptability and sparing some space. Two or three machines and robots will even depend on upon incalculable, every one concentrated on a specific errand. Most recent microcontrollers are "In System Programmable", suggesting that you can modify the program being executed, without ousting the microcontroller from its place.
*Key words:* Microcontroller, RL75

I. INTRODUCTION

As we apparently am careful the present situation in the field of media transmission and gadgets, assorted developments and upgrades have taken in supplanting the old and request methodologies to complete the work through human hands. GSM (Global System for Monitoring) progression is a critical asylum to the field of gear and correspondence, control structure and in Industrial Automation too. In attempts, for example, epic steel softening shops, paint industry, CFL light storing up industry, tires making planning plants and so on will have an immense contraption, control unit, clearing plant outline which are more arranged to perils like fire, temperature crossing its cutoff centers in testing zones, standard dangers like earth tremor, some fundamental zone where human intercession ought to be done with farthest care. Another headway is presented which joins arranging GSM with new assembling of 8051 microcontroller named Renesas (RL78) with four to five sensor gotten the opportunity to maintain a strategic distance from the above show fiascoes in attempts, current workplaces and adjacent conditions. Orchestrating a control structure is bit dreary undertaking however then it changes into a most central figure fabricating a staggering and exceedingly outrageous associations in world.

Controlling the activities which are proceeding inside the plant go or the creation unit and giving back the input data to embraced workforce exasperating about glitches and unsettling impacts. So with the assistance of GSM based Android Application all present improvement and blocks are immediately instructed through message and alert the close to flame station, police focal station, pro's workplaces and other guaranteeing zones. By utilizing this little application client can know all happenings in the associations, period unit, testing and quality examination

focuses and an implication will be given to pioneer of the unit rapidly to take help practices and maintain a strategic distance from massive loss of gadget and besides creation.

II. BLOCK DIAGRAM
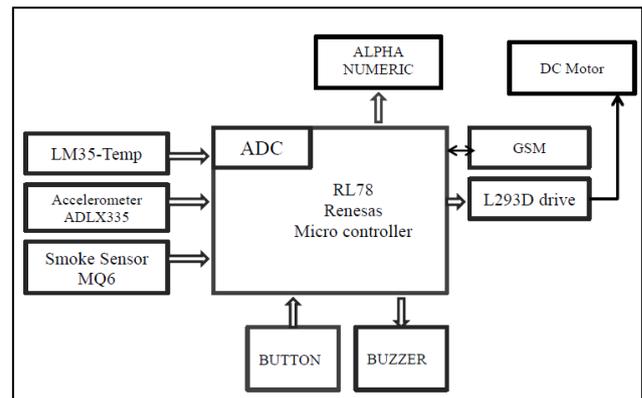
Fig. 1: Block diagram showing the processes

At the point when fire exists in progress plant right away the sensor LM35 resources the fire with respect to temperature raise in the incorporating air, say if the set estimation of temperature is around 50 degree infers it transforms into the treshhold regard past which the sensor strat giving the banner to the controller through voltage assortments. Here in the wander for the 2 area LCD indicate, dynamic gauge technique for finding the assortment in voltages is used when sensor sends commitment to the controller.figure 4.2 shows the adc circuit and the operation of the same. The controller yield is 5volts and if any of the three sensors demonstrates assortment then there will be shirking in the voltage from sensor to controller (by and large low voltage of 3.5v). The comparator contrasts existing volts and data and gives a sign to the ringer to sound an alarm immediately when fire happens.

A synchronous movement is procceded by controller that when alert is sounded then a messege sign is sent through GSM to the affirmed people and near to Fire station for spare. In like way in the midst of any poisionous gas or air spills inside the plant especially in substance generation lines and ventures, for instance, light amassing unit then smoke sensor MQ3 will work. The whole unit is redone and the course are dumped into the controller parallely through dumper and UART correspondence port. Using AT requests of SIM900a the substance messege is sent to the distinctive units which are adjoining arranged around the edges of plant. In case the ringer is in accuse conditions then a manual worked solidify switch will be given to open the emergency door of the unit at the period of fault.

III. HARDWARE IMPLEMENTATION

A. Micro Controller Rl78

Renesas microcontroller RL78 beats its precursor i.e. 8051 gathering of microcontrollers, with various in-developed highlights. A few the numerous parts are said underneath.

- Renesas is a 16 bit microcontroller
- Minimum course time can be changed from ultra-low speed (30.5us) to quick (0.03125us).
- 16 to 512KB of ROM and 2 to 32KB of RAM are available depending on the course of action and number of pins.
- On-chip quick (32 MHz to 1 MHz) too a low-speed (15 KHz) oscillator is accessible.
- 10 bit assurance A/D converter (6 to 26 channels dependent upon the course of action)
- Totally 3 UART for Serial Interface
- Totally 0-7 channels for check with worked in PWM highlights.

B. GSM

GSM is a smaller correspondence modem; it is stands for general framework for adaptable correspondence (GSM). The probability of GSM was conveyed at Bell Laboratories in 1970. It is all around utilized versatile correspondence framework on the planet. GSM is an open and impelled cell headway utilized for transmitting smaller voice and information associations works at the 850MHz, 900MHz, 1800MHz and 1900MHz rehash get-togethers. GSM structure was made as a moved framework utilizing time division different get to (TDMA) philosophy for correspondence reason. A GSM digitizes and decreases the information, then sends it down through a channel with two specific surges of customer information, each in its own specific opening. The modernized framework has a capacity to pass on 64 kbps to 120 Mbps of data rates. There are unmistakable cell sizes in a GSM structure, for example, far reaching scale, downsized scale, pico and umbrella cells. Every cell changes as demonstrated by the execution space. There are five varying cell sizes in a GSM engineer full scale, smaller scale, pico and umbrella cells. The expansion extent of every cell moves as indicated by the utilization condition.

C. SIM900A

SIM900A is a Tri-band GSM/GPRS motor that works onfrequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. SIM900 highlights GPRSmulti-space class 10/class 8 (discretionary) and strengthens the GPRS coding organizes CS-1, CS-2, CS-3 and CS-4. AT Command is utilized to get data in SIM card.The SIM interface strengthens the accommodation of the GSM Phase 1 confirmation and alsosupports the estimation of the new GSM Phase 2+ detail for FAST 64 kbps SIM(intended for use with a SIM application Tool-kit).Both 1.8V and 3.0V SIM Cards aresupported. The SIM interface is filled from an inside controller in the modulehaving evident voltage 2.8V. All pins reset as yields driving low.

D. Piezo Buzzer

Piezo banner is an electronic contraption usually used to pass on sound. Light weight, coordinate change and low regard make it usable in different applications like auto/truck turning marker, PCs, call rings and so forth. Piezo ringer depends on upon the reverse lead of piezo power found in 1880 by Jacques and Pierre Curie. It is the wonders of conveying power when mechanical weight is related with specific materials and the other course around is additionally significant. Such materials are called piezo electric materials. Piezo electric materials are either consistently accessible or reenacted. Piezo stoneware is class of recreated material, which positions piezo electric impact and is generally used to make plate, the heart of piezo ringer. Precisely when subjected to an exchanging electric field they enhance or pack, as indicated by the rehash of the standard in this manner making sound. Typified in a tube formed plastic covering, it has an opening on the top face for sound to bring about. A yellow metallic circle which acknowledge a fundamental part in the passing on sound can be seen through the hole.

E. TEMPERATURE SENSOR LM35

The LM35 strategy are accuracy solidified circuit temperature sensors, whose yield voltage is straightly as for the Celsius (Centigrade) temperature. The LM35 along these lines has great position over straight temperature sensors adjusted in Kelvin, as the client is not required to subtract a critical predictable voltage from its regard get strong Centigrade scaling. The LM35 does not require any outside course of action or trimming to give standard precision of $\pm1/4°C$ at room temperature and $\pm3/4°C$, over a full -55 to $+150°C$ temperature run. Unimportant effort is guaranteed by trimming and course of action at the water level. The LM35's low yield impedance, straight yield, and right trademark course of action make interfacing to readout or control gear particularly essential. It can be utilized with single power supplies, or with despite and less supplies. As it draws just 60 μA from its supply, it has low self-warming, under $0.1°C$ in still air. The LM35 is surveyed to work over a $-55°$ to $+150°C$ temperature run. The LM35 can be related effectively in an unclear path from other intertwined circuit temperature sensors. It can be clung or set to a surface and its temperature will be inside around $0.01°C$ of the surface temperature.

F. SMOKE SENSOR-MQ6

A smoke identifier is a contraption that recognizes the proximity of poisioness gasses in a domain, for instance, nuclear plant ,engineered ventures et cetera, consistently as an element of a security system. This sort of equipment is used to perceive a gas spill and interfaced with a control structure so a strategy can be actually seen by alerted the plant zone when spillage happens. A gas locator sounds an alert to managers through piezo movement in the area where the break is happening, enabling them to surrender the zone. This sort of gadget is fundamental in light of the path that there are different profluent harmfull gasses that can understand Risk to the experts and laborers in endeavors.

This sensor has a high affectability and fast response time. The sensor's yield is a straightforward resistance. The drive circuit is incredibly direct; you ought to just control the radiator twist with 5V, incorporate a store resistance, and partner the respect an ADC. A smoke sensor reacts to smoke that enters the area chamber and not warm. The recognized closeness of smoke is exhibited by illuminating a LED and trading a hand-off contact. Smoke is

distinguished just if it direct "hits" the sensor. The ready condition continues until the ID chamber is free of smoke particles. This thing is depended upon to be utilized with an outside 12V power source - it is not battery controlled.

G. ALPHA NUMERIC LCD DISPLAY

A fluid important stone show (LCD) is a level board show up, electronic visual show, in context of Liquid Crystal Technology. A fluid precious stone show includes a combination of minor fragments (called pixels) that can be controlled to present data. Fluid precious stones don't transmit light especially rather they utilize light altering procedures. LCDs are utilized as a bit of an expansive combination of livelihoods, including PC screens, TV, instrument sheets, transporter cockpit appears, signage, and so forth. They are standard in purchaser gadgets, for example, video players, gaming contraptions, timekeepers, watches, number crunchers, and phones.

H. MOTOR DRIVE-L293D

The Device is a strong facilitated high voltage, high back and forth movement four channel driver expected to recognize standard DTL or TTL method of reasoning levels and drive inductive burdens, for instance, exchanges, solenoids, DC and Stepper motor) and trading power transistors. To unravel use as two frameworks each consolidate of channels is furnished with an engaged data. An alternate supply data is obliged the method of reasoning, allowing operation at a lower voltage and inward secure diodes are joined.

This contraption is sensible for use in trading applications at frequencies up to 5 KHz.The L293D is amassed in a 16 lead plastic package which has 4 center pins related together and used for warmth sinking. Since L293D is a consolidated circuit motor driver it can be used for simultaneous bidirectional control of two little motors. L293D is compelled to 600 mA.

I. ACCELEROMETER

This Accelerometer module depends on upon the prominent ADXL335 three-turn essential accelerometer IC, which inspects off the X, Y and Z growing rate as fundamental voltages. By measuring the measure of extending speed in perspective of gravity, an accelerometer can comprehend the edge it is tilted at concerning the earth. By distinguishing the measure of dynamic quickening, the accelerometer can discover how quick and in what heading the gadget is moving. Utilizing these two properties, you can make a broad assortment of cool endeavors, from melodic instruments.

For most accelerometers, the fundamental affiliations required for operation are power and the correspondence lines. Accelerometers with a clear interface show extending speeds through changing voltage levels. These qualities taking all things into account influence among ground and the supply voltage level. An ADC on a microcontroller can then be utilized to investigate this respect. These are general more direct than motorized accelerometers.

IV. SOFTWARE DESCRIPTION

A. Implementation of Cube Suite

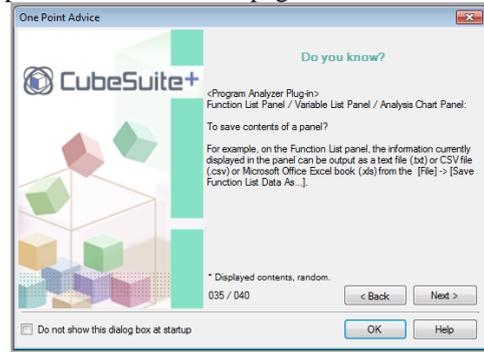First appearance of cube suite page CLICK OK

Fig. 2:

Select Controller, give a project name and folder will be created with the same name and CLICK CREATE
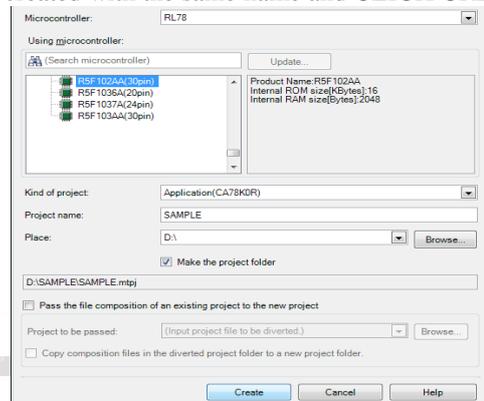

Fig. 3:

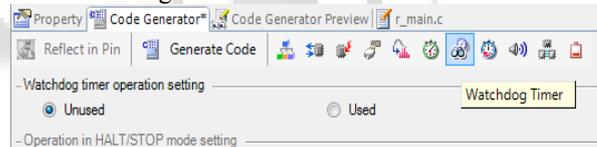Select "Watchdog Timer" and make it as "Unused"

Fig. 4:

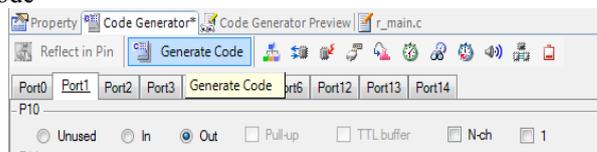After Selecting required peripherals CLICK ON "Generate Code"

Fig. 5:

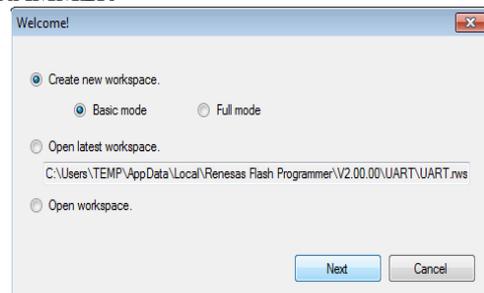FLASH PROGRAM USING RENESAS FLASH PROGRAMMER
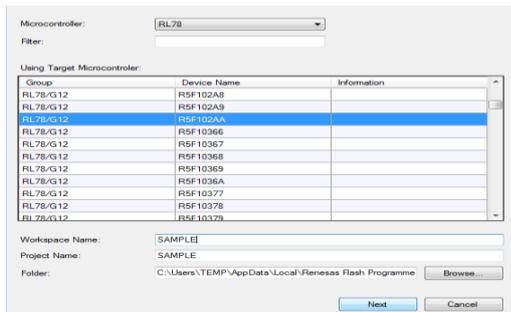

Fig. 6:

Select device

Fig. 7:

Select emulator
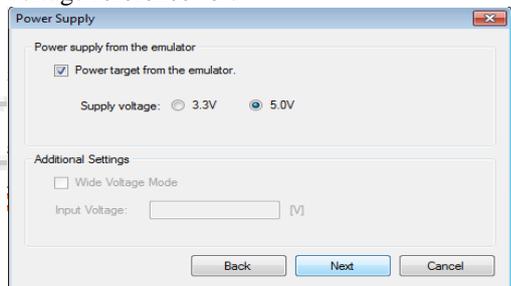

Fig. 8:

Select voltage reference "5V"

Fig. 9:

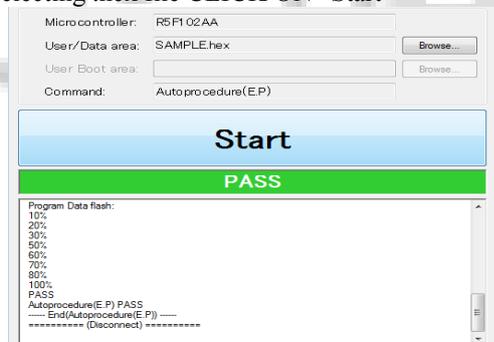After selecting .hex file CLICK ON "Start"

Fig. 10:

V. RESULT

In the first place the entire program is dumped into the sim900a on GSM module through UART interface from the PC. The dumper used here actually clears any development data before proceeding with the genuine operation of the module. Initialisation of GSM module is done by giving a power supply to the Micro controller(RL78). Once the supply is given to RL78, it checks all the sensor and devices related with it for its better workspace . It ensures each one of the devices are working prohibitively. For example say if sensor (LM35,MQ6,ADXL335) are interfaced to ringer and motor drive in GIDICS. At the point when power is proceeded with, ringer beeps and motor turns ,and the ADC will demonstrate the messege like "GSM test has passed".

The assortments in the sensors that is in LM35, ADXL335 will realize variety voltage movement from the sensor which is seen by ADC joined to RL78 controller. The strategy used for ADc is dynamic gauge of voltage. At the point when the received banner is seen the ALCD will demonstrate a particular estimation of addition in temperature or vibration to the extent regard.
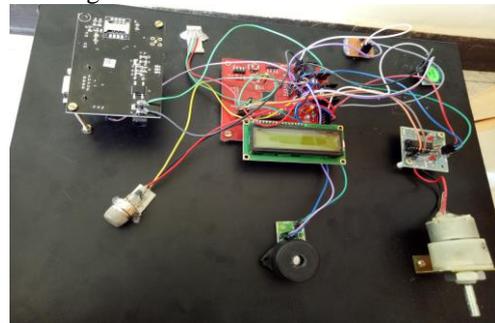

Fig. 11: Shows the result

VI. CONCLUSION

This wander exhibits simple to utilize and insignificant exertion mechanical automation and security systems. After a serious examination of composed works of the impressive number of focuses that consolidate current automation diagram and remote frameworks. A direct system to improve the models is made. It is a steady monitorable structure made with clear hardware which reworks the probability of bumble free security system. This system can be successfully completed with most outrageous immovable quality and the high security effortlessly is an excellent update from the present structures for industry security.

VII. FUTURE SCOPE

−   The structure can be work for more number of scenes that occur inside the plant. Controller can be interfaced with various sensors in addition.
−   Both undertakings and furthermore home security can be made with such kind of setup.
−   Later the GIDICS can be executed in the zone where the huge device testing will be finished with no human proximity at the plant zone.

REFERENCES

[1] M.Sravan Kumar, M.Mounika, L.Ramya Pavani, E.Ranadeep,B.Siddhartha,K.B.V.S.R.Subramanyam, Associate Professor, SR Engineering College paper on GSM BASED INDUSTRIAL SECURITY SYSTEM.
[2] Kamrul Hassan1, Raziul Islam Siddiqui, Md. Takdirul Islam, Nahid Alam Siddique, Syed Mohammad Enam Uddin- International Journal of Advancements in Research & Technology on "GSM Based Automatic Motor Control and Protection System".
[3] Oke A.O, Falohun A.S and Adetunji A.B- Proceedings of the World Congress on Engineering 2015
[4] S. Boopathi1, M. Jagadeeshraja2, L. Manivannan3 and M. Dhanasu4 1Department of Electrical and electronics engineering, Knowledge Institute of Technology, Salem, India

[5] A. Sachan, "Microcontroller based Monitoring and Control System with Gsm Modem" IOSR Journal of Electrical and Electronics Engineering.

[6] M. Sarsamba "The Load Monitoring and Protection on Electricity Power lines using GSM Network", International Journal of Advanced Research in Computer Science and Software Engineering.