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REMOTE AUTOMATION PROGRAMMING WITH ONLINE PARAMETER MONITORING AND CONTROLLING FACILITY

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Abstract: Embedded systems and evolution in electronics has made dramatic change in all over world. It is used over a great extent in the different process control, automation, data monitoring, remote jumbo displays and many others. There are large number of developers and industries of such kind of devices in market. These devices are installed at various locations around the world by particular industries. One major problem these developers of industries face is if there is need of change of software at remote site, then they need to send one engineer at that location to change the program. Our aim is to develop a system called as Remote Automation Programming (RAP) along with Parameter Monitoring and controlling facility. Such "E-programmer" can be kept at remote end. This programmer will be connected to Internet and program will be changed and downloaded in remote application unit from server and it will Monitor and Control parameter of the remote application (i.e. from anywhere in the world).

Keywords: RAP, E-programmer, RCM3750, Embedded C, ARM7.



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INTRODUCTION

Embedded systems is used over a great extent the different process control, automation, data monitoring, remote jumbo displays and many more. There are many manufacturers of such products in market. Particular manufacturer installs these products at various locations around the country. One major problem these manufacturers face is if there is need of change of software at remote site, then they need to send one engineer at that location to change the program.

Our aim is to develop a system which can online download program monitor and control the system parameter from the remote location. This system will be connected to Internet and program will be changed and downloaded in remote application unit from server and also the system parameters are monitored and controlled from the remote location. RAP with online Parameter Monitoring and Controlling allows users to perform tasks or change the task of the automated equipment by changing its programming, over the Internet without being near to the actual equipment. This facility provides an environment for remote users to do many automation tasks along with monitoring and controlling the system parameter while using different controllers together with several types of actuators, sensors, and industrial communication networks.

The physical architecture of remote automation programming is designed for an easy and convenient up gradation, which converts automated equipment into a highly flexible and versatile tool which is able to do the expected work. We are able to upgrade system and able to remove the bugs from the automated equipment for the improvements. Here, RAP uses the **Networking** part, which is the interface between internet and the automation equipment.

RAP system consists of the client which produces the hex file of the program which we want to burn on the application. Remote user is connected to Rabbit processor unit through internet. Rabbit processor unit is connected to the automation application. Web browser is used to access processor unit which is connected to the automation application. This web browser gives the information about the automation application.

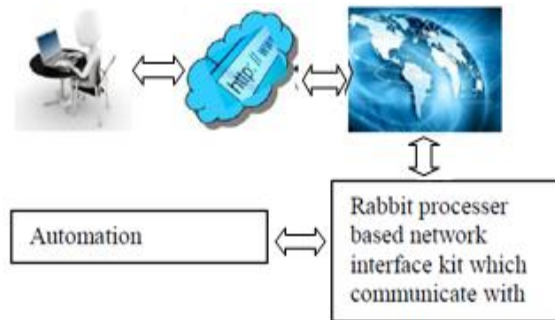


Fig 1. Overview of the Remote Automation

Programming with Online Parameter Monitoring and controlling facility.

Automation programming code is written in programming tool, which generates hex file. Hex file is generated for desired automation application and tested for it. Web browser has the option for resetting application used for automation, which is needed for burning hex file on target application. On resetting application unit hex file is send on the internet and Processor unit will receive the Hex file. Rabbit processor unit then burn hex file serially on target application unit.

II.PROBLEM FORMULATION

In conventional systems if we want to modify, update any application by changing its code of circuit, we have to manually approach the application site and change it accordingly. In this human work, time, cost is unnecessarily getting wasted and so as the stopping of application for long time takes place which is not at all desirable for any industrial automation application because it can lead to tremendous amount of loss in applications having higher production rates. RAP is introduced to overcome this drawback of conventional system which reduces unnecessary wastage of time, cost and human labor by smartly adapting to the fault.

Objectives:

- To check need of application user.
- To verify the current code of application.
- To diagnose the fault if any.
- To modify the code of application as per the requirement.
- To make the application controller in program mode using website interface which we have created.
- To wirelessly transmit the hex file.

- The rabbit processor will burn that file in application controller.

Methodology

In the proposed system, first of all the requirement of application is considered. In addition, as per the required task program code is changed. Program code will be written for required task in programming tool at client pc. The hex file generated after compilation it will be tested for the application which we required. After testing, it for required task hex file will send through the internet. Client at remote location access the rabbit processor controlling assembly though a VB program. On the web browser there will be interface for controlling application controller for burning code on it. The options will be program mode and reset mode for programmer and Parameter Monitoring and Controlling Mode for the user.

III.WORKING OF PROPOSED SYSTEM

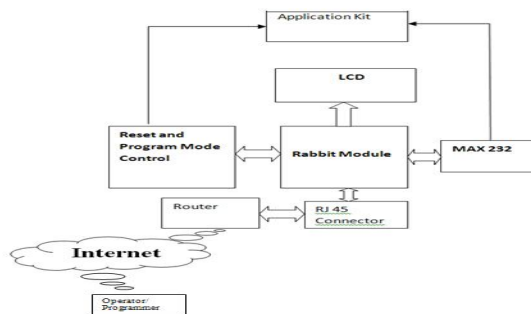


Fig 2. Block Diagram of Remote Automation Programming with Online Parameter Monitoring and Controlling facility.

We will keep E-Programmer kit with application unit at remote location, in remote unit. The E-programmer will include Rabbit Microcontroller. All-necessary action required for program downloading into application unit will be controlled by Rabbit Microcontroller. It will establish Internet link with the server and control reset and other necessary circuit required for programming, and download the program in application unit.

1. Description of Block Diagram

This remote automation programming system will be divided into different categories and will work in to three parts, one part will be programmer which is connected to internet, second part is connection between internets to rabbit processor unit, and third part is interfacing of automation application to rabbit processor unit

1.1 CLIENT UNIT

In this system programmer will write a program code for automation application. Generated hex file will be sent on internet through Visual Basics. Programmer will communicate through web browser with help of rabbit processor assembly IP address. Web page will have options for controlling and monitoring the automation application.

1.2 CONTROLLING UNIT

In this system rabbit processor assembly used to perform all the expected tasks. It is used for networking. It acts as mediator between application and internet. Client at remote location do programming of desired task and generate hex file. Then through internet client gets connected to controlling assembly through networking and send hex file to it. Hex file received at controlling unit is ready to burn on the automation application. Hex file received is loaded in to application serially. Controlling circuitry will interfaced with Rabbit processor assembly. Controlling circuitry controls operation of program mode/reset mode for burning program on application.

1.3 AUTOMATION

APPLICATION UNIT

Third part will be automation application part. Application will be interfaced with rabbit processor assembly. Controlling circuitry also interfaced with rabbit processor for controlling operation of serially loading program in to the application. Automation application will interface with rabbit processor through MAX232 logic converter. In our project, application unit is taken as combination of master and slave unit, which is shown in below figures.

Application Units:

Slave Unit:

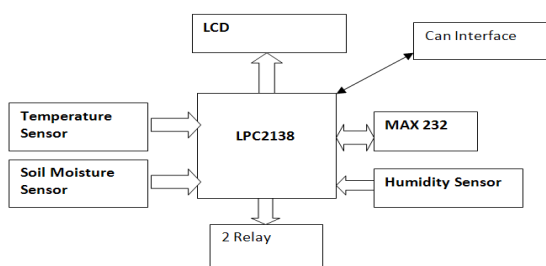


Fig.3

Master Unit:

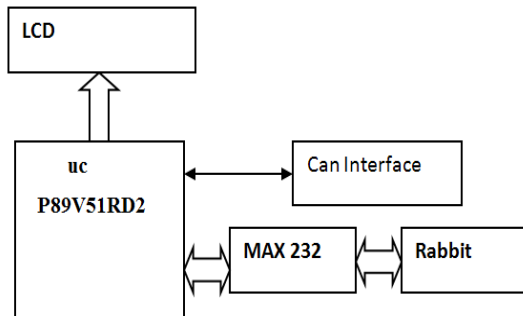


Fig.4

Master unit consist of P89V51RD2 Micro Controller. Rabbit processor is connected to P89V51RD2 through MAX 232 as shown in figure above. The application code is downloaded in a application unit using Rabbit processor. After downloading of hex code, the output after changing the code will be available at server end in the VB form.

➤ FACILITIES REQUIRED FOR PROPOSED WORK

1. Hardware Requirement:

- Rabbit Micro Controller- RCM3750
- ARM7 Micro Controller- LPC2138 (Application Unit)
- 8051 Microcontroller- P89V51RD2
- Max 232
- 16X2 LCD
- Temperature Sensor
- Soil Moisture Sensor
- Humidity Sensor
- Relay
- Power Supply
- Internet Connectivity along with router and modem etc.

2. Software Requirement:

- Embedded C for Micro Controller
- ECF Flash for program downloading
- Dynamic C for Rabbit Programming.

IV. RESULT

Remote Automation Programming with Parameter Monitoring and controlling facility download the program within a fraction of second in the application at remote end and also monitor and control system parameter continuously on VB application at the user end and made a drastic change in field of automation.

V. CONCLUSION

Remote Automation Programming allows users to perform programming parameter monitoring and controlling tasks of automated equipment over the Internet without being near to the actual equipment. This facility provides an environment for remote users to do many automation tasks while using different controllers together with several types of industrial communication networks, sensors and actuators. We are able to upgrade system with the help of this remote automation programming technique and able to remove the bugs from the automated equipment for the improvements in the automated system. It is better to use online program downloading kit to avoid inconvenience as in conventional system.

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