Embeddeed Computer Control System For Service Mobile Robots

Mari Soumya
M.Tech Student,
Vignan Institute of Technology and Science.

P.Upender, M.Tech
Asst Prof,
Vignan Institute of Technology and Science.

ABSTRACT:

The wireless communication technologies are rapidly spreading many new areas, including the automation and the importance of the use of wireless technologies in the data acquisition, building control, monitoring systems and automation of manufacturing processes will grow. Our preliminary aim in this project is to build a PC operated robot, which could be able to move in forward backward right and left directions. One dc motor is used for camera rotation.

By using keys on the Keyboard the robot can be moved in all the above specified directions. And the transmission of wireless signals can be carried by using Zigbee communication. ARM7TDMI is an advanced version of microprocessors and forms the heart of the system.
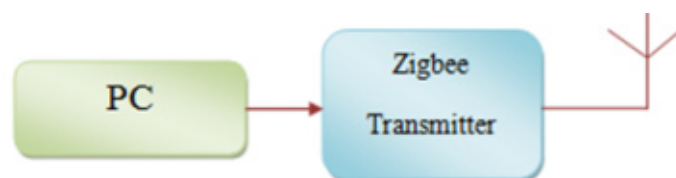
INTRODUCTION:

Intelligent mobile robots and cooperative multi robotic systems can be very efficient tools to speed up search and research operations in remote areas. Robots are also useful to do jobs in areas and in situations that are hazardous for human. They can go any where that is not reachable my humans and can go into gaps and move trough small holes that are impossible for humans and even trained dogs.
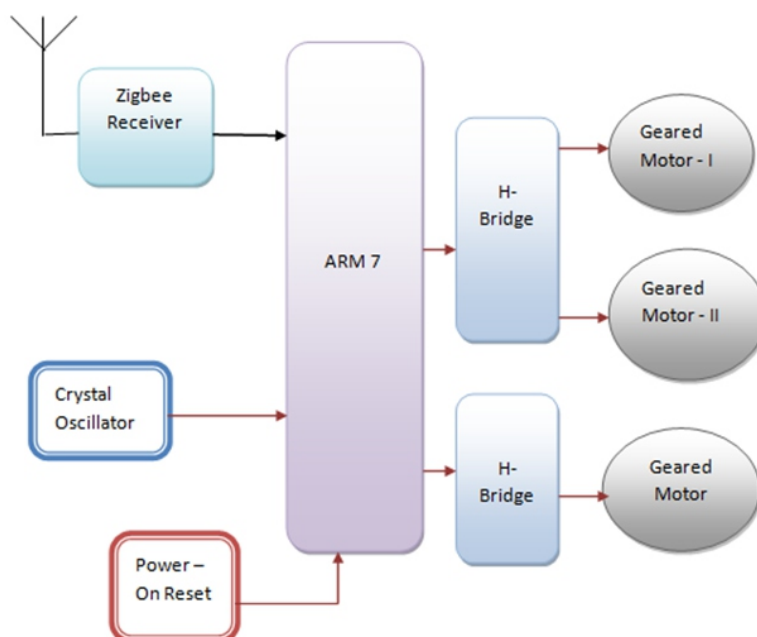
Zigbee is the name of a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4 standard for wireless personal area networks (WPANs), such as wireless headphones connecting with cell phones via short range radio.

Advances in mobile communications are paving way for many interesting applications using embedded systems. The mobile phone is one of the marvels of the last decade of the 20'h century. It is a very powerful embedded system that provides voice communication while we are on the move. The Personal Digital Assistants and the palmtops can now be used to access multimedia services over the Internet. Mobile communication infrastructure such as base station controllers, mobile switching centers are also powerful embedded systems.

BLOCK DIAGRAM
TRANSMITTER SECTION

RECEIVER SECTION

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HARDWARE REQUIRMENTS

Controller:

The ARM7TDMI-S is a general purpose 32-bit microprocessor, which offers high performance and very low power consumption. The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles, and the instruction set and related decode mechanism are much simpler than those of microprogrammed Complex Instruction Set Computers (CISC).

This simplicity results in a high instruction throughput and impressive real-time interrupt response from a small and cost-effective processor core.(1) Pipeline techniques are employed so that all parts of the

processing and memory systems can operate continuously. Typically, while one instruction is being executed, its successor is being decoded, and a third instruction is being fetched from memory.

The ARM7TDMI-S processor also employs a unique architectural strategy known as Thumb, which makes it ideally suited to high-volume applications with memory restrictions, or applications where code density is an issue. The key idea behind Thumb is that of a super-reduced instruction set. Essentially, the ARM7TDMI-S processor has two instruction sets:

• The standard 32-bit ARM set.

• A 16-bit Thumb set.

ZIGBEE TECHNOLOGY

ZigBee is a home-area network designed specifically to replace the proliferation of individual remote controls.

ZigBee was created to satisfy the market's need for a cost-effective, standards-based wireless network that supports low data rates, low power consumption, security, and reliability.

It may be helpful to think of IEEE 802.15.4 as the physical radio and ZigBee as the logical network and application software. Following the standard Open Systems Interconnection (OSI) reference model, ZigBee's protocol stack is structured in layers.

The first two layers, physical (PHY) and media access (MAC), are defined by the IEEE 802.15.4 standard. The layers above them are defined by the ZigBee Alliance.

3.SOFTWARE ARCHITECTURE AND IMPLEMENTATION:

3.1.Orcad:

OrCAD is a proprietary software tool suite used primarily for electronic design automation. The software is used mainly to create electronic prints for manufacturing of printed circuit boards, by electronic design engineers and electronic technicians to manufacture electronic schematics.

The name OrCAD is a portmanteau, reflecting the software's origins: Oregon + CAD.

3.2.Keil Micro vision 3 IDE:

The μVision development platform is easy-to-use and it helps you quickly create embedded programs that work.

The μVision IDE (Integrated Development Environment) from Keil combines project management, source code editing, program debugging, and complete simulation in one powerful environment. Code written in 'EMBEDDED C'
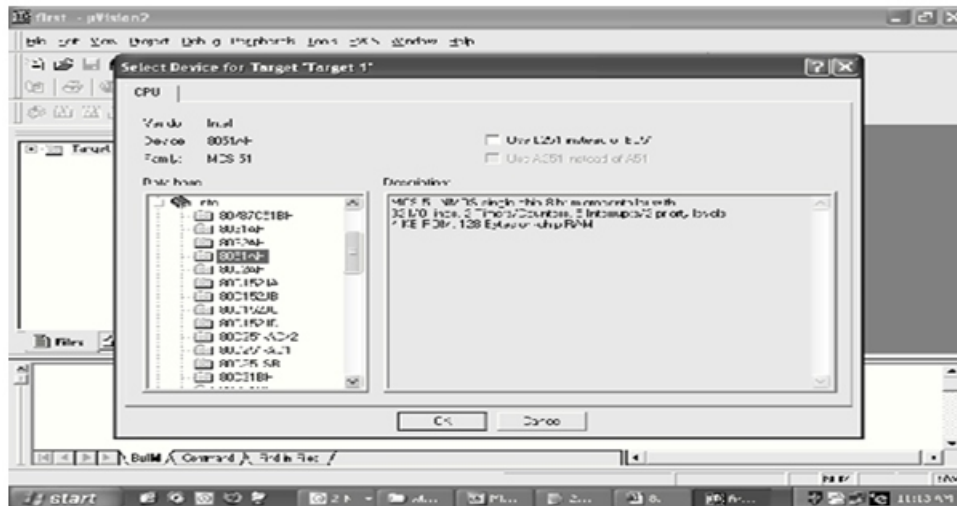
Figure: Implementation of Keil Software

The µVision3 IDE and Debugger is the central part of the Keil development tool chain. µVision3 offers a Build Mode and a Debug Mode.

In the µVision3 Build Mode you maintain the project files and generate the application.

3.3. Flash Magic Software:

The method to download Hex File into Flash Memory of MCU in Board is to use Program Flash Magic that is connected with MCU through Serial Port of computer PC.
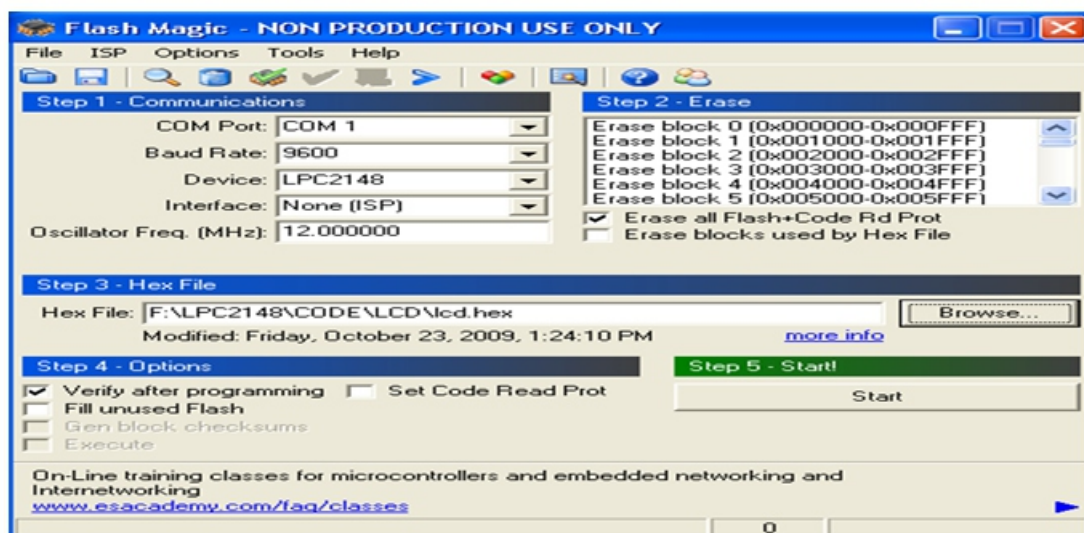

Figure. Implementation of Flash Magic software

CONCLUSION:

This project Zigbee based robot is been designed and implemented with ARM 7 in embedded system domain. Experimental work has been carried out carefully. The result shows that higher efficiency is indeed achieved using the embedded system according to requirement of the user.

The result shows that Zigbee robot using embedded system according to control signals given from transmitter. Zigbee module will provide efficient way to transmit the message and to control the Robot.

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