Medicine Handing Robotic Arm with Computer Synchronization

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Abstract: Now a day's most of the work is done by robot or robotic arm. This proposed system deals with designing and implementation of a "medicine handling robotic arm with computer synchronization". This system is divided into three parts such as transmitter section, robotic arm and platform. Robotic arm used to perform simple activities like pick up objects from source location and placing that objects to the destination. It is based on a user and robotic arm via RF. In the proposed system user can control robotic arm by using computer. In the system robotic arm controlled as like human arm movement by using LPC2148. The programming is done on LPC2148 microcontroller. Motor driver is used for movement of robotic arm which is forward, backward, left and right for given path. This system is wireless which is based on RF module. This proposed system work done by robotic arm would be highly precise.

Keywords: LPC2148 IC, PIC16f877A, RF Module, Motor driver IC, Sensor LM358N.

I. INTRODUCTION

Robotics is the department of engineering science and technology related to robots or robotic arm and their design and applications [2]. Now a day's wireless communication is widely used. ARM processor is one of the new inventions of embedded processor which takes embedded system at a new level in the world. In this proposed system we are going to use embedded system. In today's world most developing technique is wireless embedded system and robotics [4]. Using embedded technology we can easily connect data wirelessly over a long distance.

In proposed system we can use RF for transmitting and receiving purposes. Using radio frequency we can easily collect information by wireless. Most important work of proposed system is to detect the object, pick that object and place in the destination. For detection of object we can use infrared sensor to detect the path. In this system we can used motor driver IC which is move to right side, left side or forward and backward. Using that motor we can move robotic arm. The aim of this proposed system is to design a robotic arm which is helpful to overcome the strength and speed as like human [5]. We can reduce human error by using that system.

II. DESIGN OF PROPOSED SYSTEM

In proposed system there are two sections one is transmitter section and another is receiver section. In transmitter section we can use four blocks which consists of RF transmitter, computer, max232 and PIC16f877A is used.

In receiver section RF receiver is used. The main part of the proposed system is LPC 2148. Three sensors are used to for path detection. Motor driver IC L293D is used.
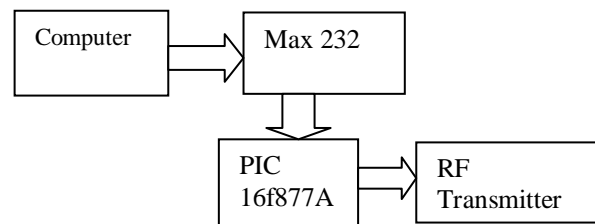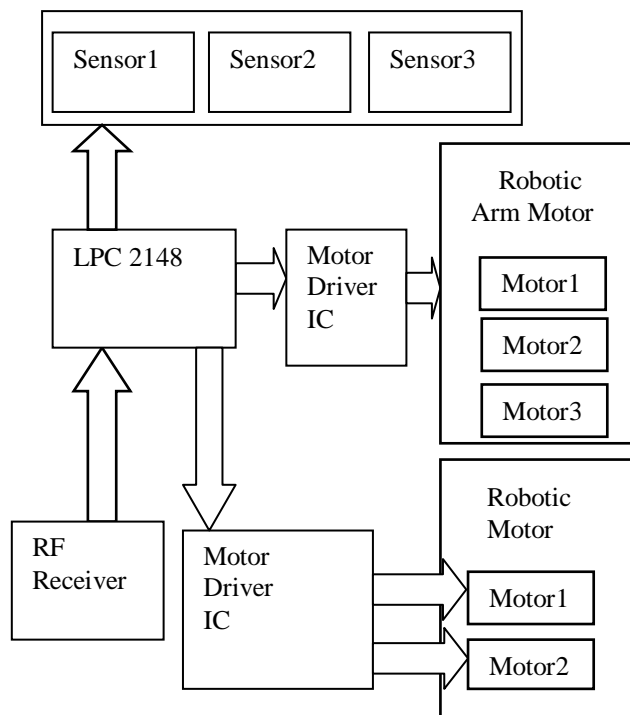

Fig 1.Block diagram of Transmitter section

Fig 2.Block diagram of Receiver section

III. WORKING

The functional block diagram consists of two section, transmitter section and receiver section. In transmitter part we can use four blocks which is computer, Max232, PIC16f877A, RF transmitter. We can give input to computer. In computer we can use software which is hyper terminal window. This data is transfer to MAX232. MAX 232 is widely used for communication systems in which the conversions of voltage level is required to make TTL devices to be compatible with PC serial port and vice versa.PIC16f877A is used to convert data in four bits. 433 MHz RF transmitter is used to transmit data.

In receiver section receives data by using 433 MHz RF receiver. Received data is transferred to the LPC 2148 and compared this data and then passed to next part.LPC2148 is the main part of the proposed system. Three sensors are used to detect the path. Motor driver L293D is used in block diagram. In that three motors are used for robotic arm and two motors for forward and backward operations.

IV. HARDWARE DETAILS

A.LPC 2148:

In receiving section we can use RF receiver for receiving data. Main part of the proposed system is LPC 2148 controller. The LPC 2148 microcontrollers are based on a 16-bit or 32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support. LPC 2148 is having high speed flash memory ranging from 32kB to 512kB. It is having their tiny size and low power consumption.

Fig 3.LPC2148 IC

The feature of LPC2148 is:
8 kB to 40 kB on chip static RAM.
16 bit or 32 bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.
It is having 32 bit timers.
It is up to 45 of 5 V tolerant fast general purpose I/O pins in a tiny LQFP64 package.

B.MAX 232:

MAX 232 consists of two drivers and two receivers. It is a logic level converter & it converts TTL logic to 232 & vice versa. This IC is used in RS232 communication system in which the conversion of voltage level is required to make TTL device to be compatible with PC serial port and vice versa. MAX232 used in 16 pin DIP packets. MAX232 requires minimum 4 external capacitors. The capacitors are used depending upon the application.

C.PIC 16f877A:

It is having operating voltage 4-5.5V. EEPROM data memory is 256 bytes. SRAM data is 368 bytes. In that 2 comparators are used. It is having 14 kb of program memory. Temperature range is from -40 to 125C. 35 single word instructions in the PIC. It is having timer 0, timer 1, timer 2.It consists of two capture, compare, PWM modules.

D. Motor Driver L293D:

In receiver another block is used which is motor driver IC. L293D is used as a motor driver IC. The Device is a monolithic integrated high voltage, high current four channel driver designed to accept standard TTL logic levels. It is having 600mA output current capability per channel and 1.2A peak output current per channel.L293D is having an enable facility.

E.RF Module:

In RF modules we can use ASK modulation. In RF transmitter we can use HT12E encoder. Encoder is used to convert 4 bit parallel data to serial. In RF we can use 433 MHz frequency same for both transmitter and receiver.
In RF receiver we can use HT12D decoder to convert serial data to parallel.HT12D is capable to decode 12 bit data in that 4 data bits and 8 address bits. The encoder and decoder pair for communication is chosen should have same number of address and data.

F.LM358 sensor:

It is also protected from Over temperature. Infrared sensor is used for sensing the path.LM358N sensor is used. It is compatible with all forms of logic

Features:

- Internally frequency compensated for unity gain.
- It is having wide bandwidth which is about 1MHz.
- Large dc voltage gain:100 dB

G. Software:

In proposed system we can use software which is keil uvision 4.This software development platform is easy to work and helping you quickly to create embedded programs. Also we are using proteus software which is used for simulation and PCB layout modules.

V.ADVANTAGES

- This System is time consuming.
- It is easy to handle.
- It has been reduced man power.

VI. APPLICATIONS

- The robotic arm can be designed to perform any desired task like picking up or placing the objects.
- Robots are used in security guard and also used in teaching fields.
- Robotic arm are used in medical care and hospital duties. Also used in agricultural robots and military robots.

VII. FUTURE SCOPE

The Medicine Handing Robotic ARM with Computer Syncronization can also be implemented by using zigbee model .It will increase the speed of robotic ARM as compared to RF. Also we will use image processing in robotic ARM to capture images of medicines and quickly pick up the medicines.

VIII. CONCLUSION

In this project a robotic arm is controlled by microcontroller using RF module. The purpose of proposed system is used to control robotic arm to pick object from source location and place that object at destination. In proposed system sensors are used to detect the path. Using DC Motor driver we can move robotic arm.

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