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Operating Mobile Robot using JACKY Bluetooth Controller

Mathematics

KEYWORDS: Atmega8 micro-controller, Bluetooth Dongle, Bluetooth Module, JACKY Bluetooth Controller.

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ABSTRACT

Bluetooth is a wireless technology used for exchanging data over short distances because of its short-wavelength Ultra-High Frequency (UHF) radio waves in 2.4 GHz from stationary or mobile devices. Bluetooth building Personal Area Networks (PANs). In this paper, we design a mobile robot based on Atmega8 Micro-controller and two motors which can be control wirelessly using JACKY Bluetooth controller. We used a Bluetooth dongle which is connected with computer and a Bluetooth module which is connected with mobile robot. JACKY Bluetooth controller is a software which operate the mobile robot's movement. We design the software on Visual Basic .NET.

I. Introduction

Bluetooth technology is a short-range communications technology intended to replace the cables connecting portable and fixed devices while maintaining high levels of security. The key features of Bluetooth technology are low-power consumption and two-way radio specification that enables operation in the license-free 2.4–2.484GHz ISM band worldwide and is capable of up to 1 Mbps data transfer. Bluetooth's fundamental strength is its ability to simultaneously handle both voice and data transmissions. This enables the user to enjoy a variety of innovative solutions, such as hands-free headset use for voice calls, printing and fax capabilities, mobile phones, PDAs, portable computers, and digital cameras. Undoubtedly, Bluetooth-based communication capability will be playing an important role in current and future consumer electronics.

As is well known, a conventional micro strip antenna is attractive because of its low profile, small size, light weight, low cost but has disadvantages such as narrow impedance bandwidth. In the literature, several techniques to reduce the size of the patch antenna have been reported [1]. Many studies have been carried out to reduce antenna size for Bluetooth applications. Inverted-F type [2], meander-type [3], small chip-type [4], EBG-assisted slot type [5], Hilbert-type [6], two-layer patch type [7],[8], watch type [9], and bent, shorted planar type [10] antennas have been developed. A few papers are studied in order to carry out an active mode test on the Bluetooth module with antenna [11]-[12].

In this paper, we have proposed a Bluetooth module integrated with the Atmega8 board. We want to easily match the RF component by properly selecting the Atmega8 board as external environmental conditions change average gains.

II. Hardware System Design

Bluetooth controlled robot uses the Bluetooth module and can be controlled from the PC using a master Bluetooth or using the Bluetooth of an Android phone via an app. After reading this documentation and going through the assembly video from our website, you will be playing with the one shown above. Moreover you can make it modular so that it can be easily modified in future.

The main electronics and mechanical components that will be used in making this Bluetooth controlled robot are Bluetooth Module, an ATmega8 based micro controller board including motor driver circuitry, acrylic chassis set, two BO motors and wheels and battery holder.

Features:

- Compact size and easy to assemble.
- Can be controlled via Android phone or Bluetooth Master.
- ATmega8 micro controller board with in built motor driving circuitry.



Figure 1. Overview of Bluetooth-based Mobile Robot

The Bluetooth stack is embedded in ST's Blue Modules with the profiles and a user-friendly application that ensures a simple and effective way to use the modules via AT commands. The AT command set is a powerful application embedded in the Blue Modules and implements a user-friendly interface.



Figure 2. Bluetooth Module

III. Software System Design

The Software is design in Visual Basic to communicate with COM port.

```
'------------ START OF VB CODE -----------------
' NOTE: I am using COM10 so you need to change the Visual Basic code to match your COM port
```

```
Imports System.IO
Imports System.IO.Ports
Imports System.Threading
Public Class Form1
Shared _continue As Boolean
Shared _serialPort As SerialPort
Private Sub Form1_Load(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles MyBase.Load
SerialPort1.Close()
SerialPort1.PortName = "com10" 'change com port to
match your port
SerialPort1.BaudRate = 9600
SerialPort1.DataBits = 8
SerialPort1.Parity = Parity.None
SerialPort1.StopBits = StopBits.One
SerialPort1.Handshake = Handshake.None
SerialPort1.Encoding = System.Text.Encoding.Default 'very impo
rtant!
End Sub
Private Sub Button1_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles Button1.Click
SerialPort1.Open()
SerialPort1.Write("1")
SerialPort1.Close()
End Sub
Private Sub Button2_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles Button2.Click
SerialPort1.Open()
SerialPort1.Write("0")
SerialPort1.Close()
End Sub
End Class
'---------- END OF VB CODE ----------
```

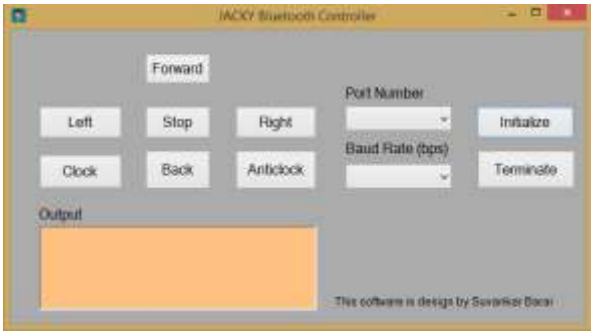


Figure 3. JACKY Bluetooth Controller

IV. Conclusions

In this paper we describe how the software is interfere with the hardware to control the mobile robot via Bluetooth module. User can control the movement of the robot using a mobile phone which has been installed with the developed vb code and existing Bluetooth application. Serial communication is done between ATMega8 micro controller, Bluetooth module. The micro controller processes the data and displays it on the screen of the mobile phone or computer. Bluetooth technology can be use to perform various applications. The prototype of this project has been successfully completed where the mobile robot can move and measure according to the user instructions from the computer. The idea of implementing Bluetooth technology is for safety purpose and is very useful especially in application where risk is a concern.

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REFERENCE

[1] Mohammod Ali and Gerard J. Hayes, "Analysis of integrated inverted-F antennas for Bluetooth applications", IEEE-APS Conference on Antennas and Propagation for Wireless Communications, 2000. | [2] Dong-Uk Sim, Jung-Ick Moon, Seong-Ook Park, "A wideband monopole antenna for PCS/IMT-2000/Bluetooth applications", Antennas and Wireless Propagation Letters, IEEE 2004. | [3] JoongHan Yoon, Young Chul Rhee, Woo Su Kim, Sang Tae Kim et al., "Compact meander-type antenna integrated with the module package for bluetooth operation", APMC 2009. Asia Pacific Microwave Conference, 2009. [4] M. F. Karim, H. G. Shiraz, "EBG-assisted slot antenna for Bluetooth applications", Microwave Opt. Technol. Lett., vol. 48, pp.482-487, 2006. | [5] M. Z. Azad, M. Ali, "A New Class of Miniature Embedded Inverted-F Antenna for 2.4GHz WLAN Application", IEEE Trans Antennas Propag., vol. 54, pp.2585-2592, 2006. | [6] L. Lu, J. C. Coetzee, "Characteristics of a two-layer micro strip patch antenna for Bluetooth applications", Microwave Opt. Technol. Lett., vol. 48, pp.683-686, 2006. | [7] C. H. Wu, K. L. Wong, Y. C. Lin, S. W. Su, "Internal shorted monopole antenna for the watch-type wireless communication device for Bluetooth operation", Microwave Opt. Techno!. Lett., vol. 49, pp.942-946, 2007. | [8] D. H. Seo, S. G. Jeon, N. K. Kang, J. Ryu, J. H. Choi, "Design of a novel compact antenna for a bluetooth L TCC module", Microwave Opt. Technol. Lett., vol. 50, pp.180-183, 2008. | [9] J. H. Yoon, "Design of a compact antenna for bluetooth application", Microwave Opt. Technol. Lett., vol. 50, no.10, pp.2568-2572, Oct., 2008. | [10] M. Ali, T. Sittirnnnarit, H. S. Hwang, G. J. Hayes, "Wideband/Dual Band Packaged Antenna for 5–6GHz WLAN Application", IEEE Trans Antennas Propag., vol. 52, no.2, pp.610-615, Feb., 2004. | [11] R. L Li, G. Dejean, M. K. Maeng, K. T. Lim, S. Pinel, M. M. Tenzeris, J. Laskar, "Design of Compact Stacked Patch Antennas in LTCC Multilayer Packaging Modules for Wireless Applications", IEEE Trans Advanced Packaging, vol. 27, no.4, pp.581-589, Nov., 2004. | [12] S. W Su, K. L Wong, C. L. Tang, S. H. Yeh, "Wideband Monopole Antenna Integrated Within the Front End Module Package", IEEE Trans. Antennas Propag., vol. 54, no.6, pp.1888-1891, June, 2006.