

Android Controlled Robotic Boat to Travel in Water with Wireless Video and Voice

Bhanu G

M.Tech Student
MRCE, Hyderabad.

K. Rajeshwar, M.Tech

Associate Professor
MRCE, Hyderabad.

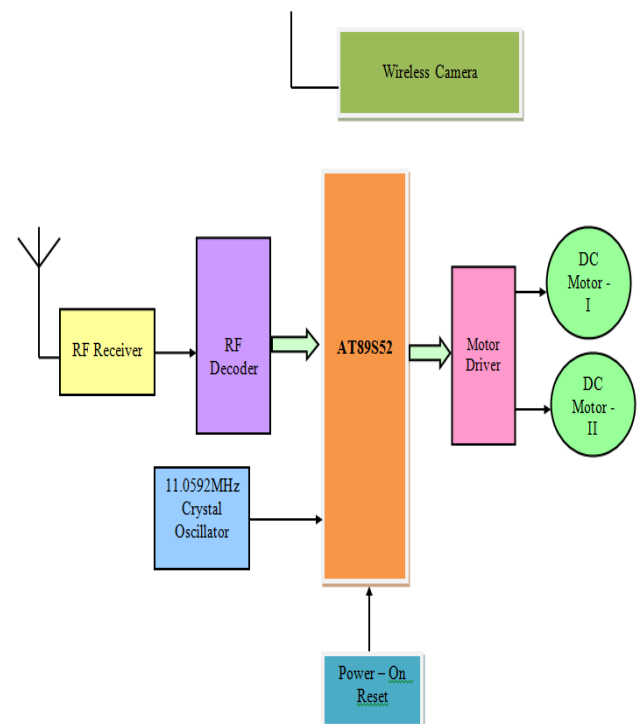
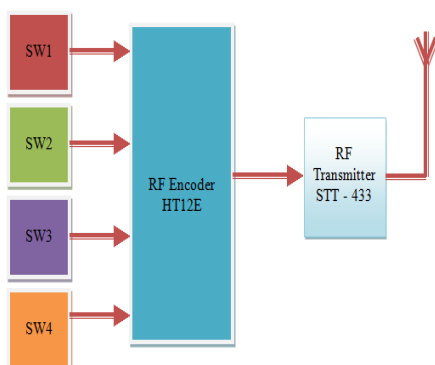
ABSTRACT:

A Robot is a mechatronics device which also includes resourcefulness or autonomy. A device with autonomy does its thing "on its own" without a human directly guiding it moment-by-moment. Some authors would contend that all mechatronic devices are robots, and that this book's restriction on robot entails only specialized software.

Existing system

When the robot is moving on water surface, the system captures things around the robot in the form of video and transmits to television at a remote place. User can monitor the on Television. The RF modules used here are Transmitter, Receiver, RF Encoder and RF Decoder. The four switches are interfaced to the RF transmitter through RF Encoder. The encoder continuously reads the status of the switches, passes the data to the RF transmitter and the transmitter gives the data. The receiver takes the commands and moves the boat as per instructions of the user given through RF remote.

Block Diagram: Transmitter



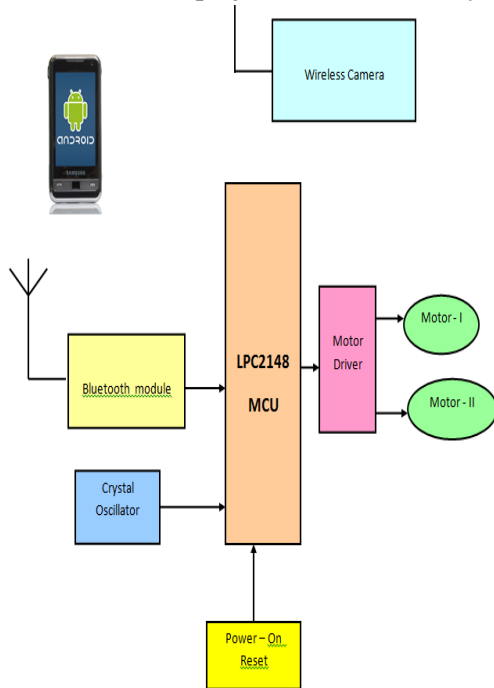
Drawback: Transmitter part is an extra hardware module which increases the cost.

Proposed system

This project is a prototype boat that can travel in water. This robot is powered by 12V rechargeable battery. The direction of the robot can be controlled by an Bluetooth. This can be moved forward and reverse direction using geared motors of 60RPM. Also this robot can take sharp turnings towards left and right directions. This project uses LPC2148 as its controller.

A high sensitive wireless camera is interfaced to the kit. When the robot is moving on water surface, the system transmits images and voice signals around the robot to television at a remote place. User can monitor

the images and voice signals on Television. The Bluetooth module is used here. **Bluetooth** is wireless technology standard for exchanging data over short distances (using short-wavelength radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, building personal area networks (PANs). This project uses 12V battery.



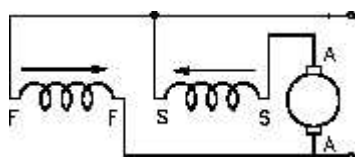
Hardware modules

DC motor

A DC motor is an electric motor that runs on direct current (DC) electricity.

DC Motor Connections

Figure shows schematically the different methods of connecting the field and armature circuits in a DC Motor. The circular symbol represents the armature circuit, and the squares at the side of the circle represent the brush commutator system. The direction of the arrows indicates the direction of the magnetic fields.

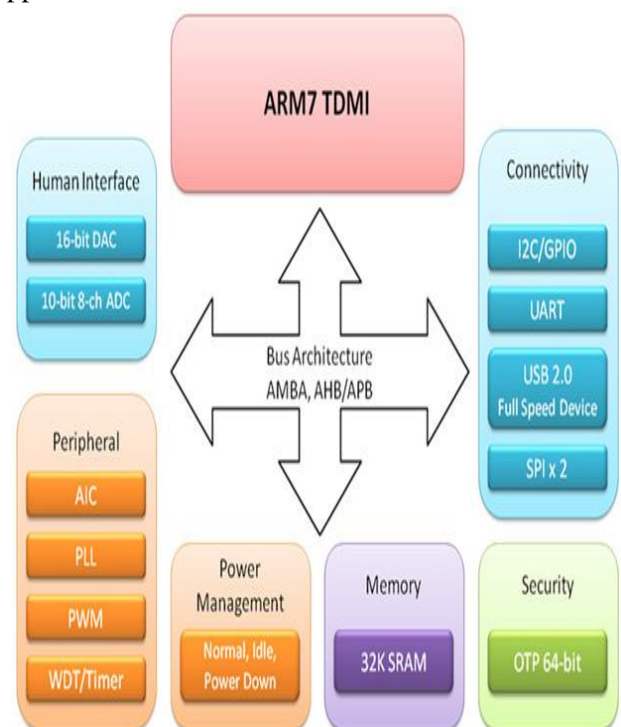


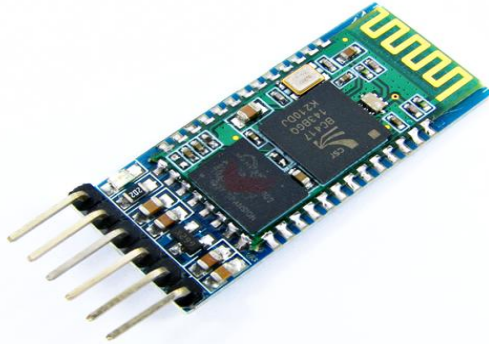
ARM7

The **LPC2148** are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory.

A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT, PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale.

With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.



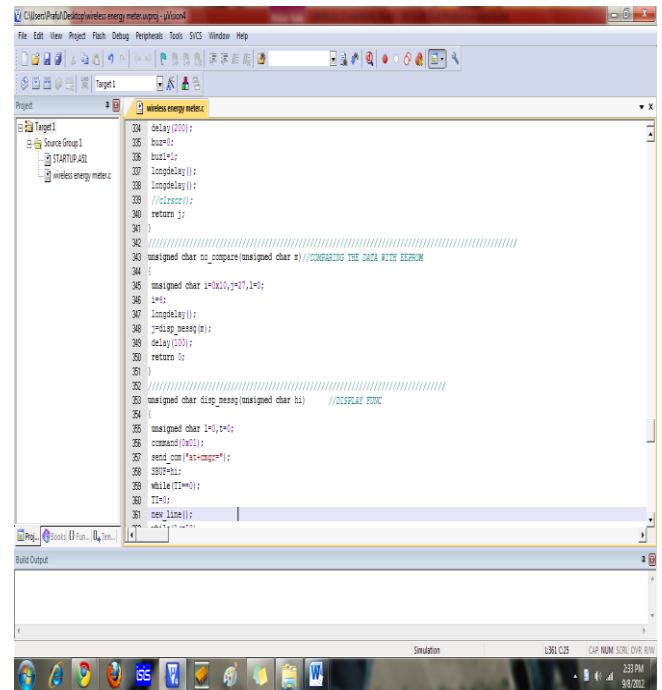


BLUETOOTH

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength radio transmissions in the ISM band from 2400–2480 MHz) from fixed and mobile devices, creating personal area networks (PANs) with high levels of security. Created by telecom vendor Ericsson in 1994, it was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization. Bluetooth dongle is simply defined as an accessory to the computer. By using a Bluetooth dongle a computer can be wirelessly linked to other devices. By using these dongles one can easily connect a computer with any other computer, printer, digital cameras or cellular devices. Actually Bluetooth dongle possesses a small microchip, which makes it capable of connecting and exchanging the data with all other devices which contain such microchips and with all other dongle devices. USB ports are used to connect a Bluetooth dongle with the computer. Just like other USB attachments these dongles also get powered from computers itself. Once we disconnect a Bluetooth dongle it gets deactivated on its own.

Software tools

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.



Flash Magic

Flash Magic is a tool which is used to program hex code in EEPROM of micro-controller. It is a freeware tool. It only supports the micro-controller of Philips and NXP. It can burn a hex code into that controller which supports ISP (in system programming) feature. Flash magic supports several chips like **ARM Cortex M0, M3, M4, ARM7 and 8051**.



Advantages:

- Not blocked by common materials: can penetrate most solids and pass through walls
- Not light sensitive
- Not as sensitive to weather/environmental conditions

Applications:

- In military Applications
- Navy

Future Scope:

This application can be implemented DTMF technology. This is to operate the robot from remote place.

Conclusion

In this project we have studied and implemented a Metal detecting Robot Designed for safety using wireless communication.

References

[1] Adzly Anuar, Salman Yussof, Ismail Said, Jeffrey Tan Too Chuan, "The Development of an Autonomous Personal Mobile Robot System for Land Mines Detection on Uneven Terrain", Advanced Technology Congress 2003, Putrajaya

[2]<http://www.robofest.org.my/uploaded/rules/Survival1/survivalspec.htm>, Survival Robot – Robot Specification, 2004

[3] Uwe D. Hanebeck, Nihad Šaldic, Günther Schmidt, "A Modular Wheel System for Mobile Robot Applications", Proceedings of the 1999 IEEE/RSJ, International Conference on Intelligent Robots and Systems, 1999

[4] Ashari, S., "Line, Gap and Colour Sensors", in Dept of Electrical Engineering, 2004, University Tenaga Nasional: Malaysia. p. 70 C. Castelpietra, L. Iocchi, D. Nardi, and R. Rosati, "Coordination in multi-agent autonomous cognitive robotic systems," in

Proceedings of 2nd International Cognitive Robotics Workshop, 2000.

[5] Y. Ye, S. Boies, J. Liu, and X. Yi, "Collective perception in massive, open, and heterogeneous multi-agent environment," in Proceedings of 1st International Joint Conference on Autonomous Agents and Multi-agent Systems (AAMAS'02), 2002.

[6]. W.B. Miller, J.C. Ricklin, L.C. Andrews, "Log-Amplitude Variance and Wave Structure

[7].Function - A New Perspective For Gaussian Beams", J.O.S.A A, 10,661[1] Adzly Anuar, Salman Yussof, Ismail Said, Jeffrey Tan 7.Too Chuan, "The Development of an Autonomous Personal Mobile Robot System for Land Mines Detection on Uneven Terrain", Advanced Technology Congress 2013, Putrajaya