

# Smart Wake



## Engineering

KEYWORDS :

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### ABSTRACT

Wake-On LAN is a technology that helps in switching ON a computer through the network. This technique needs the support of motherboard. So implementing this technology in old motherboard is not possible. It requires entire motherboard to change for implementing this technology. I introduce an attempt to solve this problem by using the newly introduced small board computer Raspberry Pi and some low-cost hardware. The system uses Bluetooth technology for communication between the target computer and the Raspberry Pi. My aim is to decrease the e-waste by updating the old with the help of new technology hardware.

### I. INTRODUCTION

Switching ON a computer that is connected to the network can be done by using Wake-On LAN technology[1]. The system uses a "magic" packet to switch ON a computer which is connected to the local network. This technology needs the motherboard support. Some of the colleges and industries have old computers. In old motherboards this technology will not work. The proposed system is a solution for the existing problem. A new small board computer called Raspberry Pi which was recently introduced in UK and some low cost hardware are used for this work. A small circuitry with a PIC is attached to the motherboard of the target computer. This circuitry communicates with the Raspberry Pi using Bluetooth technology. Raspberry can control the Bluetooth module via Bluetooth. A relay present in the circuitry that is used for attaching into motherboard controls the power into the CPU. A server running inside the Raspberry Pi helps in controlling it from a remote place.

Section II briefly describes about Raspberry Pi and its configuration. Section III describes about the setting of Bluetooth module that is placing inside the computer. Results is described in Section IV.

### II. ABOUT RASPBERRY PI AND ITS CONFIGURATION

#### A. Raspberry Pi

Raspberry pi is a Small Board Computer (SBC) that was introduced in UK[2]. This computer has all the features that is similar to other computers. It is silent and the Operating System is stored inside the SD card. This computer is of two types : class A and class B. Here I am using class B type that has two USB 2.0 ports, an Ethernet port, RCA video out , HD-

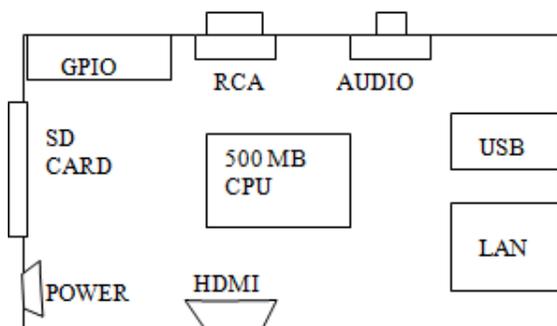


Figure. 1 Raspberry Pi

MI port, Audio out, Micro USB power connector; SD Card Slot, 500 MB CPU and GPIO pins.

#### B. Installing the Operating System

The Operating system used for the Raspberry Pi is Linux-based OS that is optimized for ARM(Processor) architecture. OS is stored in SD Card. First the image file is downloaded from the site [www.raspbian.org](http://www.raspbian.org). This image file is copied into the SD card by using WindowsDisclmager software [3]. Then the card is in-

serted into the Raspberry Pi and it is powered ON. Here Raspbian is used as the operating system.

#### C. Interfacing Raspberry Pi with Bluetooth

The module that is used for connecting to Raspberry Pi is HC-05. HC-05 is a Bluetooth to Serial Port module, designed for transparent serial wireless serial connection setup[4]. HC-05 is connected to Raspberry Pi via GPIO(General Purpose Input Output) pins. Raspberry Pi can send serial data to the module and this data is forwarded by HC-05 via Bluetooth.



Figure 2 HC-05

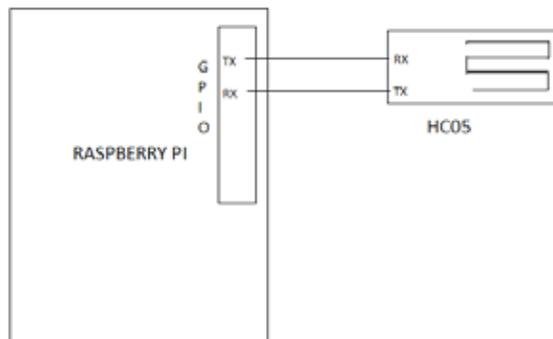


Figure. 3 Interfacing Raspberry Pi with HC05

Webiopi is a framework that allows to control the GPIO from a web browser[5]. Its written in Javascript for the client and in Python for the server. The compressed package is downloaded from <http://webiopi.googlecode.com/files/WebIOPi-0.5.3.tar.gz>.

z. It is then installed into the Raspberry Pi. First the package is extracted using the command `tar xvzf WebIOPi-0.5.3.tar.gz`. Then it is installed by the command `sudo ./setup.sh`. To start WebIOPi at boot use the command `sudo update rc.d webiopi defaults`. To start webiopi service use the command `sudo /etc/init.d/webiopi start`. From any computer that is connected to the Raspberry Pi through network can access the GPIO by providing the Username and Password.

A graphical user interface is provided to the user to switch on the computers that are under the coverage of Raspberry Pi. The

user can search and add the computers under the Raspberry Pi's coverage. Force shutdown is also provided in the interface.

### III. CONFIGURING THE WAKE-UP MODULE FOR MOTHERBOARD

PIC(Peripheral Interface Controller)16F877A[6] is used for receiving and processing the messages from the Raspberry Pi via Bluetooth. PIC16F877A is CMOS FLASH-based 8-bit 40-pin microcontroller..

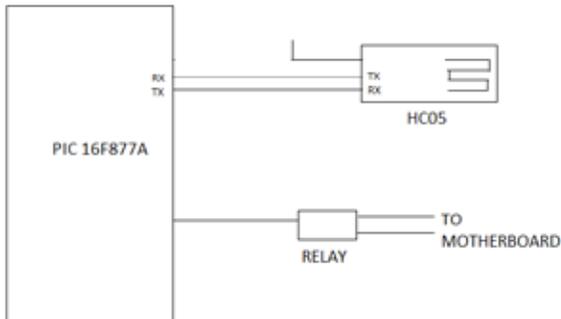


Figure. 4 Module for Motherboard

It features 200 ns instruction execution ,256 bytes of EEPROM data memory, self programming. Its operating voltage is 4.0-5.5V .Its operating speed is 20 MHz. HC-05 module is used for receiving and forwarding data to PIC16F877A. After verifying the message details the relay is powered and system is powered on.

Micro C programming is used to program the microcontroller PIC 16F877A. The UART library provided by the Micro C helps in programming the TX and RX pins. One of the port is set as the output port and relay is connected into it. The relay is connected to the power pins in the motherboard. Whenever the required condition is met relay is closed and the CPU is powered on. If a force shutdown is needed then this can be achieved by a long relay close.

### IV RESULTS

The communication between the Raspberry Pi and the target Bluetooth module was successfully established and the system was switch ON from a remote computer by logging into the server in the Raspberry Pi. Moreover it was able to do a force shutdown from a remote computer connected locally through ethernet.

## REFERENCE

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