

Introducing Raspberry Pi Technology

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Abstract- Raspberry Pi is a credit-card sized computer manufactured and designed in the United Kingdom by the Raspberry Pi foundation with the intention of teaching basic computer science to school students and every other person interested in computer hardware, programming and DIY-Do-it Yourself projects. This review paper provides a description of the raspberry pi technology which is a very powerful computer. Also it introduces the overall system architecture and the design of hardware components are presented in details.

Keywords- GPIO, Raspberry Pi.

I. INTRODUCTION

It is one the system on the chip which made easy handling and hassle free operating of the computer programs. It is full featured computer on single board. It generally looks like



Fig1: View of Device

The Raspberry Pi is manufactured in three board configurations through licensed manufacturing deals with Newark element14 (Premier Farnell), RS Components and Egoman.. This small computer features amazing HD (high-definition) quality, video playback, also sports high quality audio and has the capability to play 3D games. The device use the ARM processor which does nearly all of the hard work in order to run the Raspberry Pi. RASPBIAN, PIDORA, OPENELEC, RASPBMC, RISC OS, and ARCH LINUX these are few software's which are used. All this software's can be downloaded easily and these are free from the official forum under the NOOBS (new out of the box software) category. It supports Python as the main programming language for

functioning and coding. It also supports BASIC, C, C++, JAVA, and Perl and Ruby languages

II. RASPBERRY DESIGN

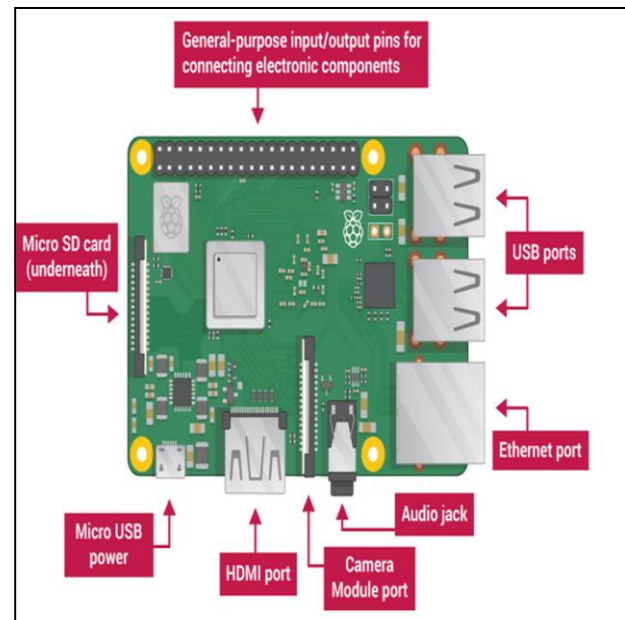


Fig 2: View of Internal Structure

A brief description of the components on the Pi.

Essential components used in RPi hardware are:

1. SD card having Linux Operating system
2. USB keyboard
3. TV or monitor having HDMI, DVI, Composite or SCART input
4. Power supply
5. Video cable suited with the TV or monitor used.

Optional components are:

1. USB mouse
2. Internet connection, Model A or B: USB Wi-Fi adaptor
3. Internet connection, Model B only: LAN (Ethernet) cable
4. Powered USB hub
5. Case

GPIO: General Purpose Input/output Pins are used to connect the electronic components such as LED, Resistors, ribbon cable board, etc.

USB ports: these are used to connect a mouse and keyboard. You can also connect other components, such as a USB drive.

Ethernet port: this is used to connect the Raspberry Pi to a network with a cable. The Raspberry Pi can also connect to a network via wireless LAN.

Audio jack: you can connect headphones or speakers here. Camera Module Port: you can connect camera here for capturing purpose.

HDMI port : this is where you connect the monitor (or projector) that you are using to display the output from the Raspberry Pi. If your monitor has speakers, you can also use them to hear sound.

Micro USB power connector : this is where you connect a power supply. You should always do this last, after you have connected all your other components.

SD card slot: you can slot the SD card in here. This is where the operating system software and your files are stored.

III. MODEL COMPARISON OF DIFFERENT MODELS OF RASPBERRY PI

	Raspberry Pi 1 Model A	Raspberry Pi 1 Model A+	Raspberry Pi 1 Model B	Raspberry Pi 1 Model B+	Raspberry Pi 2 Model B	Raspberry Pi 3 Model B	Raspberry Pi Zero
USB 2.0 Ports	1	1	2	4	4	4	1 (Micro-USB)
Ethernet	None	None	10/100 Mbit/s	10/100 Mbit/s	10/100 Mbit/s	10/100 Mbit/s	None
Bluetooth	None	None	None	None	None	4.1	None
WiFi	None	None	None	None	None	802.11n	None
Audio In	I ² S	I ² S	I ² S	I ² S	I ² S	I ² S	I ² S
Audio Out	I ² S, analog (3.5mm jack), digital (HDMI)	I ² S, analog (3.5mm jack), digital (HDMI)	I ² S, analog (3.5mm jack), digital (HDMI)	I ² S, analog (3.5mm jack), digital (HDMI)	I ² S, analog (3.5mm jack), digital (HDMI)	I ² S, analog (3.5mm jack), digital (HDMI)	Digital (mini-HDMI), analog GPIO PWM
Video In	CSI Camera Connector	CSI Camera Connector	CSI Camera Connector	CSI Camera Connector	CSI Camera Connector	CSI Camera Connector	None
Video Out	HDMI, Composite (RCA)	HDMI, Composite (TRRS)	HDMI, Composite (RCA)	HDMI, Composite (TRRS)	HDMI, Composite (TRRS)	HDMI, Composite (TRRS)	Mini-HDMI, GPIO Composite
External Storage	SD	MicroSD	SD	MicroSD	MicroSD	MicroSD	MicroSD

Fig3: Comparison of Different Models of Raspberry Pi

IV. SOME PROJECTS USING RASPBERRY PI

Now a day’s students are interested to do projects using raspberry pi. The main aim behind this is making the system automated and fast renovation of daily life.

These are some projects which are very helpful in day to day life:

1. Installing google assistance on Raspberry pi
2. Capturing images using USB Camera
3. Surveillance Camera
4. Face Recognition Using Raspberry Pi
5. Weather station
6. Ultrasonic distance meter using Raspberry Pi 2.

V. ADVANTAGES AND LIMITATIONS

Advantages:

1. small in size
2. work as normal computer at low cost
3. security purpose can be achieved
4. Automation can be done

Limitations:

1. It cannot run X86 operating systems.
2. It has a very limited amount of memory

VI. CONCLUSION

For easy automation of the system it gets used. Raspberry pi is one the most widely used technology in foreign countries. It makes anything smart virtually. Data collection and analysing it for environmental monitoring, health applications and many more humanoid uses.

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