Case Study: Orange Pi Plus 2

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Abstract: The microprocessors that were introduced in 1970s were the initials in the electronics industry since then the industry has not looked back and is further developing at a good pace. One of the great achievements of the electronics industry is the development of the single-board computer. The following paper is on Orange Pi which is one of the recent and the advanced developments in the field of SBC's. In this project authors focused on setting up an orange pi to operate as a standard personal computer with basic software such as video player, internet browser, terminal, GUI based operating systems.

I.   INTRODUCTION

In the earlier days, due to the absence of the microprocessors the fields of application for the minicomputers were limited but with the advancement in the IC technology the fast microprocessors were developed and that led to the development of our present-day microcomputer and single board computer. A single board computer (SCB) can be defined as the computer which has microprocessors, memory, input and output and all rest features like a normal functioning complete computer but all these components are on a single circuit board. This brings me to our open source single board computer named Orange Pi which is created by Shenzhen Xunlong Software CO. Limited [1-8].
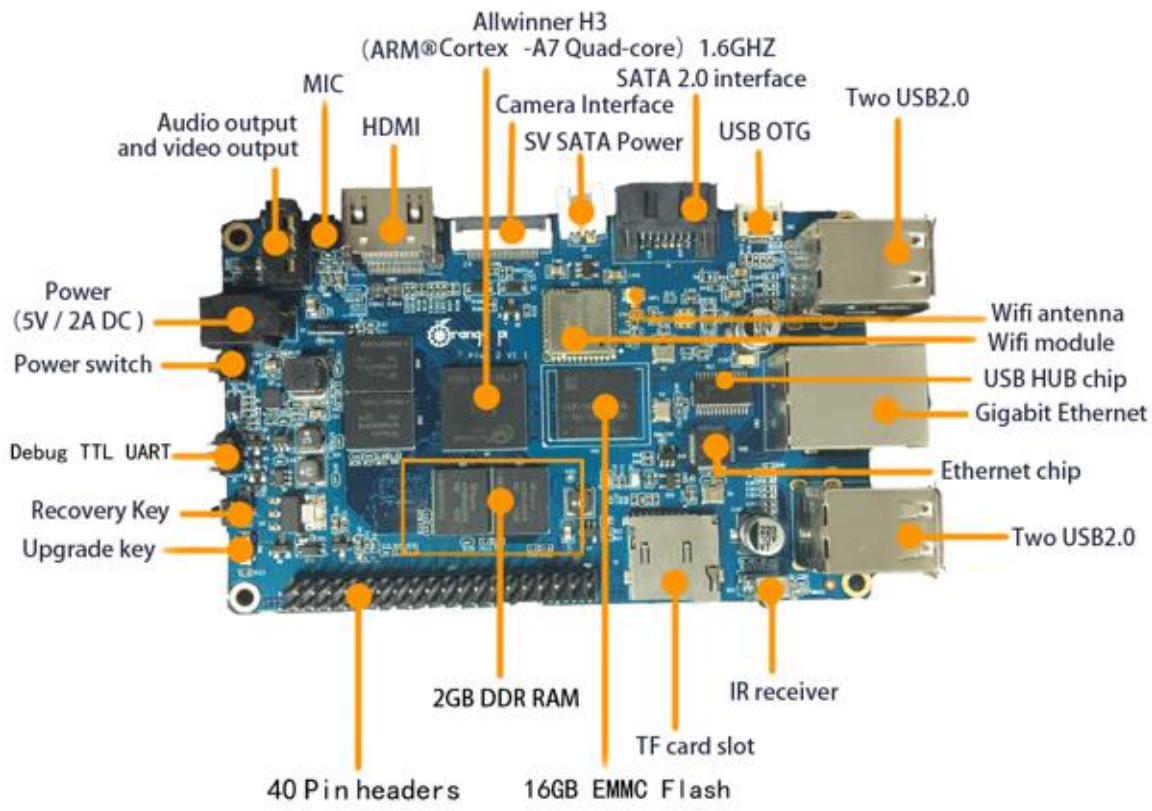
II. ORANGE PI PLUS2

The board here under consideration is Orange Pi Plus2. Since this board is an open source SCB so it can be used by anyone who wants a simple and useful tool to start creating with technology. It can be used to build a wireless server, a computer, games, HD video player, an Android device, a speaker and many more. From the image, we can see that the board is more advanced than many other boards available in the market and is less in coast as compared to other boards with similar specifications. It is also provided with short circuit protection and lacks behind in specifications by only a few boards but is cheaper than them. Orange Pi is compatible with Raspberry Pi [1-8].

A.   *ORANGE PI SPECIFICATIONS*

- The CPU used in Orange Pi Plus 2 is H3 Quad Core A7 H.265/HEVC 4k

- It has a 2 GB DDR3 RAM

- The onboard storage is 16GB

- It comes with a Realtek RTL8189ETV, IEEE 802.11 b/g/n onboard Wi-Fi

- It comes with a CSI input connector camera as video input and has a HDMI video output

- The audio input is MIC and output is a 3.5mm Jack and HDMI

- It is supplied with a DC power source

- It consists of 4 USB 2.0 ports and 1 USB OTG

Top view

Allwinner H3
(ARM®Cortex -A7 Quad-core) 1.6GHZ

Audio output and video output · **MIC** · **HDMI** · **Camera Interface** · **SV SATA Power** · **SATA 2.0 interface** · **USB OTG** · **Two USB2.0**

Power (5V / 2A DC) · **Power switch** · **Debug TTL UART** · **Recovery Key** · **Upgrade key** · **40 Pin headers** · **2GB DDR RAM** · **16GB EMMC Flash** · **TF card slot** · **IR receiver** · **Wifi antenna** · **Wifi module** · **USB HUB chip** · **Gigabit Ethernet** · **Ethernet chip** · **Two USB2.0**
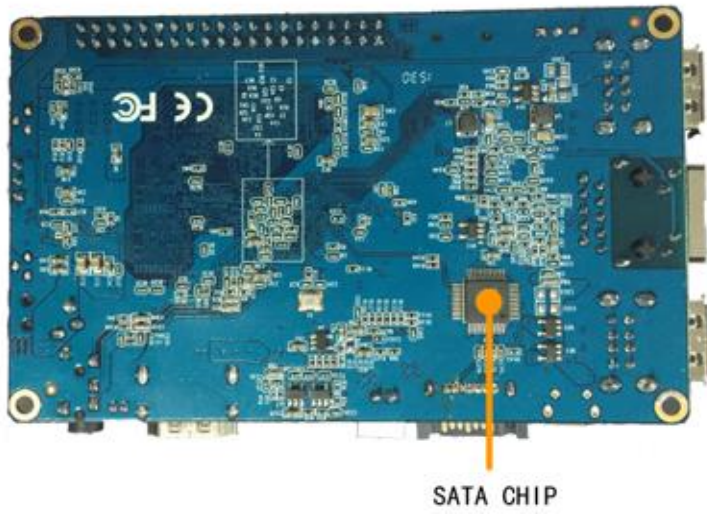
Bottom view

SATA CHIP

Figure 1: Top and bottom view of the Board [1]

- It comes with 40 pins header and one IR receiver

- It supports Orange OS, Android, Ubuntu, Debian, Raspberry Pi Image, Berryboot, XBMC, Fedora, Gentoo, Bananian, Slackware, Chromium OS, Armbian and many more

- And it only weighs 83g

- It has 2 LEDS (Power LED and Status LED) and 3 buttons (Power Button SW4, Recovery Button SW3, Uboot Button SW2)

- The programming languages which it supports are Python, Scratch, C/C++

B. PROCEDURE OF INSTALLATION

Since Orange Pi is a computer so we can install several operating systems. The procedures to install a few are mentioned below [1-8].

Windows

- Insert a SD card whose size is greater than the size of the OS image (generally greater than 4GB) into your computer.

- Download the SD card format tool and format the SD card.

- Download the OS image and unzip it to get the OS image and write the image to the SD card.

- For writing the image to the SD card download a tool like Win32 Disk imager.

- Wait till the writing is complete and then insert the SD card into the Orange pi and enjoy windows on your orange pi.

Android

- Repeat the same steps to format the SD card.

- Download the image.

- For Android, we cannot use Win32 Disk imager so download PhoenixCard.

- Write the image on the SD card with the help of the tool (PhoenixCard).

- Wait till the writing is complete then insert your SD card in the orange pi and enjoy Android on your orange pi.

Ubuntu (Linux)

- Insert the SD card into your computer and format it using the format tool and delete all the partitions of the SD card.

- Download the OS image and unzip it to get the image.

- Write the image on the SD card.

- Wait till the writing is successful.

After the writing of the OS image is complete, insert the SD card into the orange pi, connect the orange pi and the monitor using a HDMI cable insert the keyboard and mouse in the USB slots and finally connect the orange pi with the power cord and power on the orange pi and you will see the boot screen and the desktop of the orange pi. Enjoy your experience of a computer using orange pi [1-8].

Figure 2: Boot screen and desktop of orange pi [1-8].

C. BASIC CONCEPT

- Operating system: It can be defined as the set of software which work as the system software that controls and manages the application software and the hardware connected to the computer. Examples of the operating systems are IOS, Linux, Windows, and Android.

- Android: It is an operating system which is mostly developed for smart phones and tablets having touch screens. It is very user friendly and is developed by Google. The interface consists of virtual keyboard and some real-world gestures like swapping and tapping and many more.

- Win32 Disk Imager: It is software which can read and write the OS images to an external storage device and this ability of the software was used to make the SD card a bootable device for orange pi.

- Phoenix Card: It is small software which allows creating bootable image of Android firmware on a SD card. It allows flashing Android firmware on SD card and creates disk partition.

- SD Card Formatter: It is a specialized software that can format an SD card even in accessing certain protected write areas of the card which cannot be formatted by the system utilities thus allowing wider capabilities for the process.

- Python: It is an open source high level programming language which is designed for ease in use that is easy to read and implement. It is an interactive, interpreted, object oriented programming language which is used to create web applications. It uses fewer lines of code to express the same concept than in any other language such as C++ or Java.

III. CONCLUSION

Here authors focus on how to install different OS on the orange pi by downloading the images, creation of a bootable SD card and further logging in to the mini pc. Orange pi supports Raspberry pi so the programmes of Raspberry pi can also be made to work on Orange pi. It supports several OS and one can install as per the requirements. Orange pi will be very helpful in doing higher end and complex operations.

Conflict of Interest: The authors declare that they have no conflict of interest

Ethical Statement: The authors declare that they have followed ethical responsibilities

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