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Banana Pi M1 Single Board Computer

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Abstract - *This Paper is about new technology Banana Pi M1 Single Board Computer. The Banana Pi M1 is an Open Source hardware platform. Banana Pi M1 a dual core, Android 4.2 products which is much better than the Raspberry Pi. The Banana Pi BPI-M1 hardware runs Android, Debian Linux, Ubuntu Linux, Open Suse Linux, and images that runs on the Raspberry Pi B and Cubieboard. Banana Pi BPI-M1 has a Gigabit Ethernet port and SATA Socket. It can run with Android 4.2.2 smoothly. The Size of Banana Pi M1 is the same size of Credit Card. It can easily run games as it supports 1080P high definition video output. The GIPO is compatible with Raspberry Pi and can run Raspberry Pi images directly.*

***Key Words*: Banana Pi, Single Board Computer, Linux, Android, IR Sensors, , Raspberry Pi, Android.**

1. INTRODUCTION

The Banana Pi M1 is a business card sized and low power single board computer. It features high performance dual core SoC at 1 GHz, 1GB DDR3 SDRAM, Gigabit Ethernet, SATA, USB, and HDMI connections. The board layout is similar to the Raspberry Pi board, though it's 10% larger and the relative spacing of some connectors varies. Not all Raspberry Pi accessories will fit as a result.

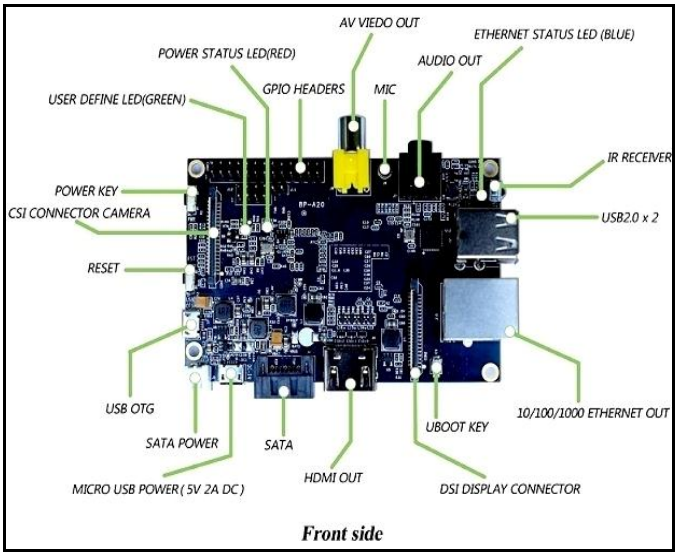

Fig-1: Banana Pi M1 Single Board Computer Structure [5]

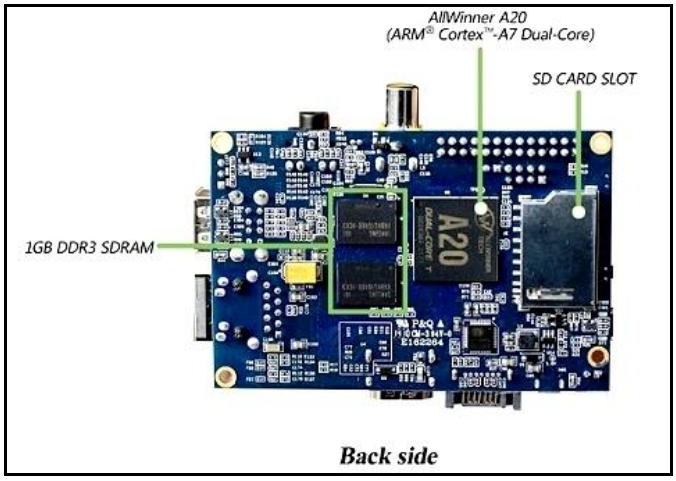

Fig-2: Banana Pi M1 Single Board Computer Structure **[5]**

2. PERFORMANCE

Before the Raspberry Pi, the Banana was intended to improve the performance. Raspberry offers four cores clocked at 700 MHz, while Banana offers two cores clocked at 1 GHz.

Table-1: Comparison Table **[1]**

Compare Table

	BananaPi	RaspBerry	CubieBoard
Size	8.56cm×5.60cm	8.56cm×5.4cm	10cm×6cm
Processor	ARM Cortex-A7 Dual-Core	ARM11Series	Cortex A8
ClockSpeed	1GHz	700MHZ	1GHZ
RAM	1G DDR3	256MB	512MB/1GB
Flash	Up to 64GB on SD slot, up to 2T on 2.5 SATA disk	SD / MMC / SDIO card slot	4GB Nand
Eeprom			
Input Volvage	5V	5V	5V
Min Power	N/A	700mA(3.5W)	N/A
Digital GPIO	26	8	96
Analog Input	N/A	N/A	N/A
PWM	1		
TWI/I2C	1	1	1
SPI	1	1	1
UART	1	1	1
Dev IDE	Android,Firefox OS, Linux etc.	Debian GNU/Linux, Fedora, Arch Linux	N/A
Ethernet	10/100/1000	10/100	10/100
USB Master	2 USB 2.0, 1 micro USB	2 USB 2.0	2 USB 2.O 1 min USB 2.0
Video Out	CVBS and HDMI, RGB/LVDS	HDMI,Composite	HDMI
Audio Output	3.5 mm jack	3.5 mm jack	N/A

Banana Pi is improve the speed using 1 GB DDR3 Ram, in Raspberry Pi used 256 MB RAM so speed too slow. In Banana Pi used 26 GPIO pins and Raspberry Pi used 8 pins. Raspberry relies on USB or Micro SD for storage, the Banana Pi is best with SATA port that allows a faster, more permanent option

for connecting mass storage devices like hard disks. That could make large difference in accessing drive to read and write parallel. Both have Ethernet ports for wired network connectivity, but gigabit available in the Banana Pi. [1][3]

The Banana Pi allows you to take prototyping to the next level. With an operating system directly on the board and access to the **general purpose input output (GPIO)** pins, can't setup home theatre PC, but build the next great product using one. [1] The GPIO pin allows writing code on the device that interacts with hardware like LED's, resistors and switches. This means you can build your idea and get working of it.

3. APPLICATION OF BANANA PI

3.1 Web Server:

The Banana Pi is use as Web Server. It means that we learn languages such as Ruby, PHP and Python directly on board from your computer to the pi which can act as local development server. [3]

3.2 Linux and the Command Line:

Linux is one of the most popular operating system in the world. Linux powers most of the home network routers, web servers, and even some of electronics. So in that we will prepare to work with operating system available for the Banana Pi, as the most of them are Linux or Linux Based.

3.3 Programming on Pi:

In that going to learn about some editors and the programming languages that are available on the Pi and Linux also focus is on the different languages that are available and the tool is use to them. We will concentrate on some languages such as Ruby and Python. Different languages are good for different things.

3.4 Hardware for Pi:

Some of the programming languages that are available on Banana Pi, so we can start getting into the hardware side of things. Writing of code is use to interact with LEDs and motors. Hardware Prototyping is made easy when you have a tool like the Banana Pi. [1]

3.5 IR Receivers:

The Banana Pi has a built in IR receiver. This sensor is that listens for and IR signal that is sent from a device such as a remote. [2]

This allows to turn the Banana Pi into something like and HTPC for TV. For that need some software, that why install LIRC, which well read the signal and allow to perform different actions.

Fig-3: Remote with built in IR Sensor

3.6 Internet Radio

Using Banana Pi we will explore a couple of new hardware components and build and Internet Radio Player. This is able to listen to streams on the internet, such as podcasts and music. This will implement on LCD display and setup the software and some other hardware components.

Fig-4: Internet Radio **[5]**

3.7 Building Home Server:

Now that explored a lot of hardware and some programming, start to make another popular use of Banana Pi: Home Server. [1] The cost of running Banana Pi is much less than the cost of running a pc since we are powering the device with USB. Some of the servers will explorer include a web server for local development and web pages, own cloud Servers to run local cloud drop box alternatives, and NAS server.

Following image shows Banana Pi server.

Fig-5: Banana Pi Server [5]

3.8 Gaming on Pi:

One of the cool things about the Banana Pi is that it allows to basically doing what you want. One of the application o the Banana Pi is it can be used as media device, and is not restricted to Movies and Music. The Banana Pi has much more robust hardware than the Raspberry Pi. The Banana Pi allows playing games on Android and Linux, which is something that the Raspberry Pi can't handle. We found that retro game emulators built for android works great. [1]

The following picture shows Mario game played on the Banana Pi that runs on Android:

Fig-6: Game on Banana Pi

4. CONCLUSIONS

This technology is open source hardware platform. The Banana Pi allows to taking rapid prototyping. It used as web server. It can easily run the game as it supports 1080p high definition video output on Android. Popular tools are available for Banana Pi. Octaprint (Used to control 3D

Printer) is also compatible with the Banana Pi. Couple of new hardware and build an Internet Radio using Banana Pi. Using Banana pi create a cost effective security system.

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