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Odroid xu and power solutions

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Abstract Note:

This Document will be providing an introductory information on the Odriod-xu and its applications. Since our final outcome from this project is to be able to run the monitoring system from Also, it will discuss the different methods to power it up, using the car battery.

Overview:

The Odroid-XU is a single board computer with many features that prove to be efficient and helpful to our final product. In addition, it's the world's first big.LITTLE architecture based bare-board computer. It contains many features that are displayed in the following figure:

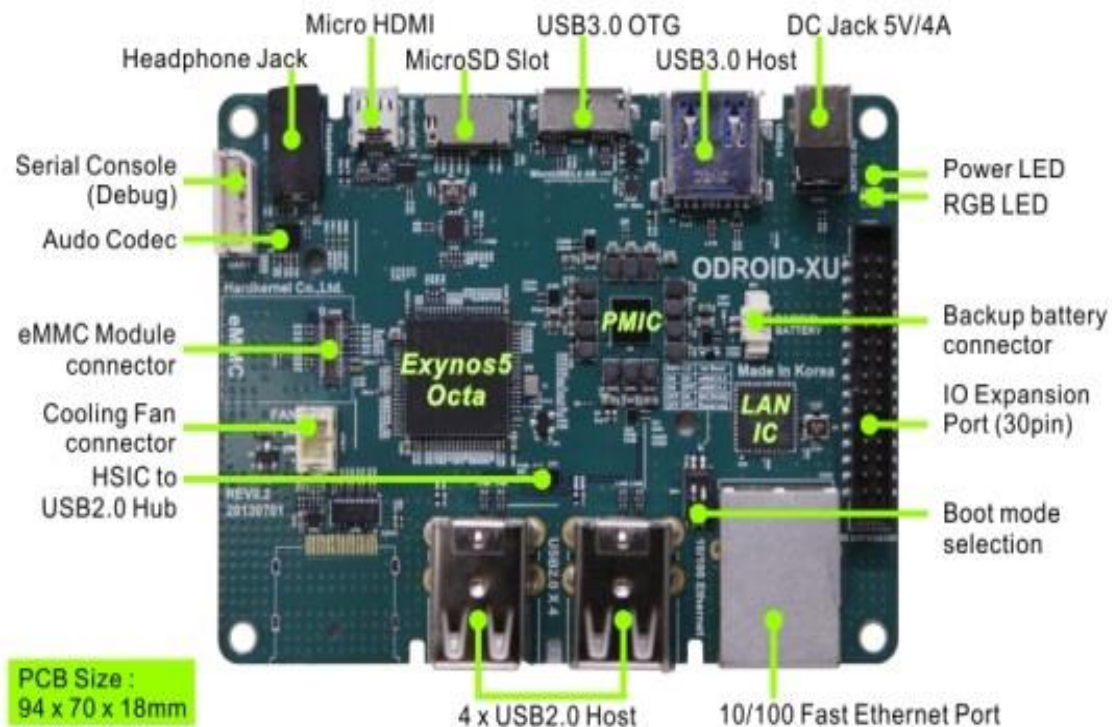


Figure1: the Hard kernel ODROID-XU board

As observed, there are four 2.0 USB that we will be using in our project to connect the four web cams into. Also, there is an additional 3.0 USB port that can come in handy, where we can connect it to a USB hub port to connect additional devices needed to program and set the board, such as: Number pad, Keyboard, mouse and storage USB device.

The DC Jack will be connected to a power supply of 5V/4A via an adapter. Since, our project requires us to operate the device in a Vehicle. We will be discussing the power solutions our team came up with further in this document.

In order to have a display screen to help our customer adjust the cameras, we will use the Micro HDMI port to connect it to an HDMI screen provided from our sponsor.

We will be running the operating system through the Micro SD card. Another features that are great about this particular board, is that it operates from is that it operates on a 1.6 GHz quad core. Also it comes with a heat sink attached to a fan, which is necessary for performance since the heat sink spreads the heat from CPU to PMIC(power management integrated circuit) .

Power connection:

Since the monitoring device we are developing has to operate in a moving car for testing, we had to come with multiple solutions on how to power it up and operate it efficiently and safety without damaging the device. And we came up with 3 methods on how to connect the device and power it up:

Method1:

In order to insure that we are consistently supplying 5V/4A power. The easiest method to achieve this goal is to use a universal DC to AC adapter with intelligent sensor for compatibility similarly to the following figure:



Figure2: DC to AC adapter

The following adapter has many features compatible with out project. Firstly it can intake a maximum of 12V DC and 500mA, which is Ideal since the car battery supplies 12V. Also this device has an intelligent sensor that checks

output/input compatibility, which is helpful to avoid overloading the ODROID-XU board.

Using this adapter will simply help us connect the ODROID-XU power adapter seen in figure 3, without having to calculate and measure incoming from the car battery or worry about frying the ODROID-XU board.



Figure3: 5V/4A adapter XU

Method2:

An alternative method that is similar to the first in simplicity is to use a USB to M barrel cable while connecting it to a 5V/4A USB car adapter, similarly to figure 4:



Figure 4: USB cable and adapter

The differences between these two methods, is that, using USB cable and adapter can cost more, and finding a USB adapter with 5V/4A output is harder than finding a DC to AC adapter. Aside from that it has the feature of providing desired power without extra complications.

Method3:

This method is the most ambitious we have brain stormed, because it involves directly using the car battery.

As an electrical engineer, when it comes to thinking about connecting a small device operating off a small board such as the ODROID-XU to a car battery, one of the main components that appeal is the step down voltage transformer.



Figure5: step down voltage transformer 12V to ~5V

Using the transformer will help us to input a 12V and approximately output a 5 5V.

However, since the transformer doesn't guarantee obtaining an exact output of 5V, the trick to accomplishing such technique, is using a voltage stabilizer.

This method is useful if the testing device and ODROID board is desired to be implemented permanently.

Conclusion:

It is evident after reading the three methods, method one seems to be the most efficient method to use, particularly because, it is safe, affordable, and time efficient. Method three is also ideal; however it does not match out customer desires. Also, attempting to implement it can be quite dangerous for us beginner's electrical engineers.

References:

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