Linux Board Comparison Chart

Legend:

Adequate

Barely Adequate

Not Adequate

Not Relevant

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Specification | BeagleBone Black | Raspberry Pi (Model B) | TS-7250 | Analysis |
| CPU clock speed | 1 GHz | 700 MHz | 200 MHz | Having a higher speed is nice, but not really necessary. |
| ARM version | ARMv7 | ARMv7 | ARMv4 | Doesn’t really affect any of our software. Unless we switch boards part way through the project. |
| Flash storage | 2 GB | N/A | < 256 MB | The BeagleBone is the only one with enough storage on-board to support a file system. Raspberry Pi does have the option of using and SD card. The TS7250 seems to lack the space necessary. |
| Memory (RAM) | 512 MB DDR3 | 512 MB | 256 MB | They are all pretty comparable, and 256MB should be sufficient. Therefore this is fairly irrelevant. |
| USB 2.0 ports | 1 | 2 | 2 | Having less than 2 USB ports is irritating, but is an obstacle that can be overcome. |
| Power Regulation | 5 V, no regulation, DC jack or mini-USB, or header pin | 5 V, no regulation, micro-USB | 5 V, regulated, accepts 8-38V | The BeagleBone and Raspberry Pi lack on-board regulators, but we are provided with a battery source.  However, when using the BeagleBone and Raspberry Pi, we gain another power source, potentially increasing system operating time. |
| Power Consumption | 210 mA | 322 mA | 400 mA | They are all pretty comparable; it is not too much of an issue. |
| Ethernet Capabilites | 10/100 Mb | 10/100 Mb | 10/100 Mb | All boards have the same capability. |
| COM ports | 5(UART) | 1 (UART) | 2 | More is always nice, but one is all that is needed. |
| SD card slots | Micro SD card | SD/ MMC/ SDIO | N/A | The lack of on-board flash or SD card slots on the TS7250 would force the use of external USB storage or forcing a file system into 32 MB. |
| ADCs | 7 12-bit 1.8 V max | N/A | 5 12-bit | Not having any ADCs would be a severe hindrance. |
| GPIO | 65 | 8 | 20 | The Raspberry Pi could be troublesome to work with, with so few GPIO pins. |
| Serial bus ports | 3 I2C, 1 SPI, 1 CAN | 1 I2C, 1 SPI | SPI | They all have 1, should be fine. |
| Extra Features | Has three “Low Power modes” ,  8 PWM outputs,  4 timers, mini-HDMI out. | Camera port, RCA video out, Full size HDMI out, audio out. | Real-time clock, on board power regulation. Peter and Bill are familiar with it. |  |

**Extra Features Analysis:**

HHDMI is usefully for an output screen, but not necessary, the Raspberry Pi and the BeagleBone both include this feature. Low power modes on the BeagleBone could be very useful to conserve battery power. PWM channels from the BeagleBone could be used to control more motors, if connected to a bridge. Timer modules are also really wonderful to have. The camera port on the Raspberry Pi would allow a very simple solution to getting pictures and video. RCA video out is fairly antiquated. Real time clock is not useful at all.

**Conclusion:**

The BeagleBone is the clear choice of preferred Linux platform for several reasons. The Raspberry Pi lacks Analog inputs and has a low number of GPIO pins that could make it difficult to add and implement features. The TS-7250 lacks any sort of large memory storage that makes the installation of Linux and a file system a difficult proposition. There are also no native video out ports, allowing us only to communicate with it via console when debugging. The only thing the BeagleBone lacks is on-board power regulation, which the Raspberry Pi also lacks. However, we do have a battery pack that supplies 5V regulated. Adding this battery pack could extend the operating time of the system as the Linux platform and motor controller board would be operating from separate supplies. The BeagleBone has a bunch of really useful extra features. ;