

BeagleBone Black



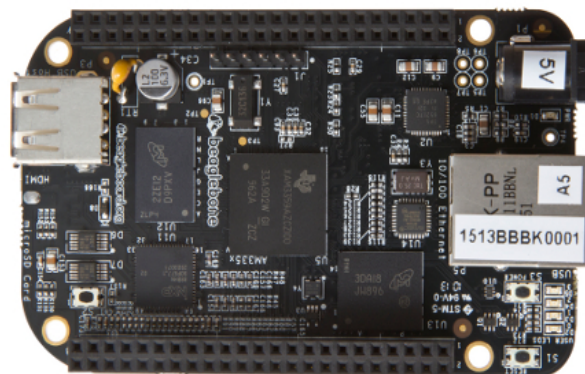
Description:

The BeagleBone Black is a open-source hardware board that combines Raspberry Pi and Arduino-like capabilities into it. The TI Sitara AM335x ARM Cortex-A8 processor runs at 1GHz with 512MB of DDR3 RAM. The 2GB of inbuilt comes pre-loaded with Angstrom Linux, but can support Ubuntu and Android. The BeagleBone Black features two USB 2.0 ports (one of them is a micro USB), a micro HDMI port (supporting up to 1280 x 1024 resolution), a micro SD card slot, and 10/100 Ethernet jack (which, just like the Raspberry Pi, is internally USB). It can be run from USB or from a 5V DC power supply.

The credit card-sized board also features two 46-pin connectors to perform typical microprocessor duties. There are also 30 'capes', which are compatible plugin boards, that support all manner of devices, from LCD touch screens and DMX lighting controllers, to 3D printers and radiation detectors! Of the 64 connections, 65 are digital I/O, 7 are analog, 8 are PWM and 4 serial. This has more connectivity than an Arduino UNO, with the power of a Linux system underneath.

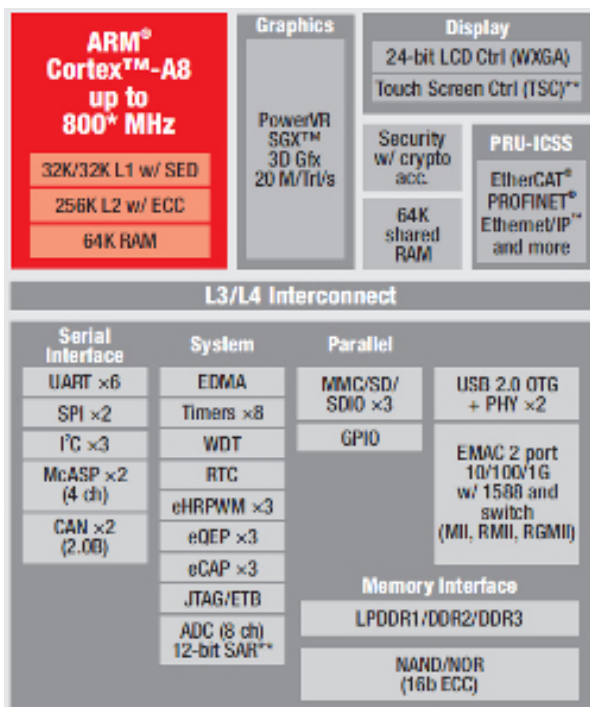
The BeagleBone Black runs Linux or Android on a 1GHz TI Sitara AM3359 processor, doubles RAM to 512MB of DDR3, adds 2GB of onboard flash, and features a new micro-HDMI port.

The Pi offers less I/O than either BeagleBone model, and its ARM11 processor is too slow to efficiently run Android. One of its main advantages over the original BeagleBone, however — its micro-HDMI port — is now moot.



BeagleBone Black SBC

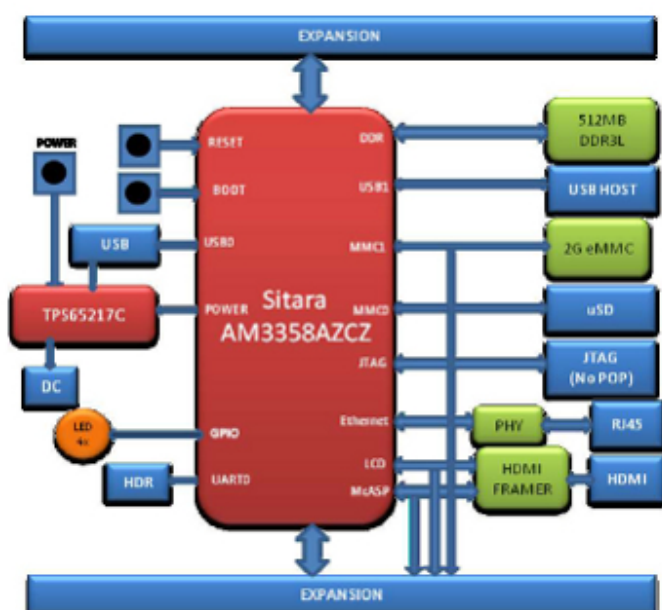
The BeagleBone Black sticks with its ARM Cortex-A8 system-on-chip (SOC), instead of upgrading to a Cortex-A9, as have a number of open-source embedded Linux development single-board computers (SBCs), from the PandaBoard to the Wandboard. It does, however, graduate from a 720MHz Sitara AM3358 SOC to an almost identical new 1GHz Sitara AM3359. The AM335x family block diagram appears below.



TI AM335x block diagram

The industrial-focused processor is notable for its numerous analog interfaces, including PWM, as well as its programmable real-time unit (PRU), which comprises dual 32-bit RISC microcontrollers that enable customization of I/O.

According to BeagleBoard.org cofounder Jason Kridner, interviewed in a Linux.com report today, cost savings also came from removing the default serial port as well as USB-to-serial and USB-to-JTAG interfaces, and including a cheaper single-purpose USB cable. (Three serial interfaces are available via the expansion headers.) In addition, the power expansion header for battery and backlight has been removed.



BeagleBone Black block diagram

Kridner noted that despite doubling RAM to 512MB, due to recent DDR3 price drops, it was still cheaper than the slower DDR2 memory on the original. Also, by adding 2GB of onboard eMMC flash in addition to the existing microSD port, BeagleBoard.org decided it could stop providing a free 4GB microSD card.

The much-requested new micro-HDMI port makes life easier for customers, who don't need to buy one of the BeagleBone Black's LCD touchscreen "cape" add-on boards or otherwise extend the device's LCD interface.

As before, the BeagleBone Black is equipped with a fast Ethernet port, a USB 2.0 host port, and a mini-USB 2.0 client port. The device's dual 46-pin extension connectors are backward compatible with the BeagleBone's over 30 capes, including wireless extensions, touchscreens, motors, and I/O breakouts. Up to four boards or capes can be stacked.

Power consumption appears to be slightly lower than the original, or 210-460 mA at 5V compared to the earlier 300-500mA at 5V. This is about 2.3 Watts for peak kernel loading (460 mA at 5V).

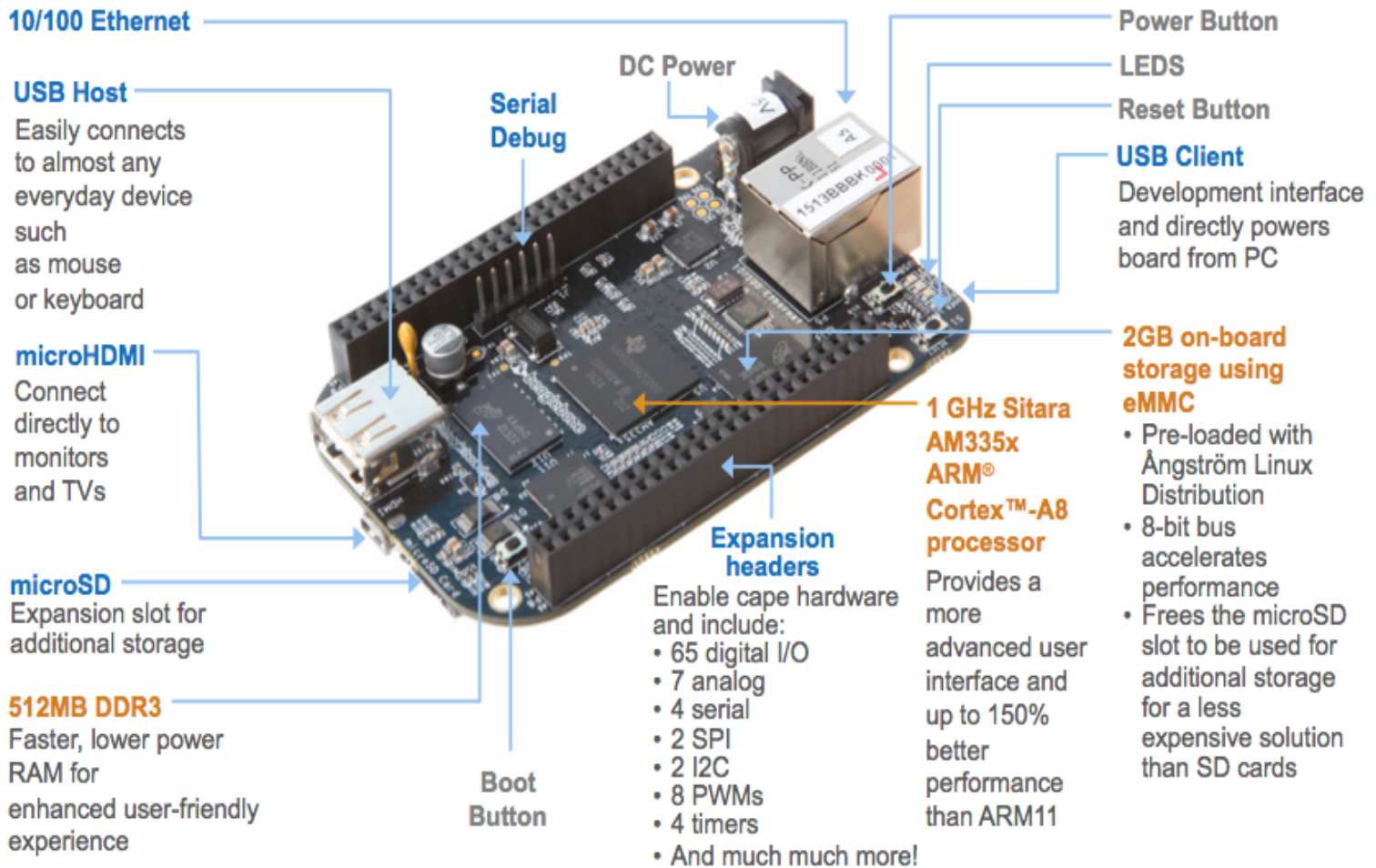
The 2GB of onboard flash is preloaded with an updated, newly Yocto Project compatible version of Angstrom Linux. The flash frees the microSD slot for storage or loading alternate OSes, including Android and supported Linux distros ranging from Fedora to Ubuntu. Among other components, the BeagleBone distribution includes Linaro toolchain, a C compiler, Python, Qt, OpenCD, and the Cloud9 IDE complete with a "Bonescript" Linux/Javascript scripting language.

Specifications:

	Feature	
Processor Graphics Engine SDRAM Memory Onboard Flash	Sitara AM3359AZCZ100 1GHz, 2000 MIPS	
	SGX530 3D, 20M Polygons/S	
	512MB DDR3L 606MHZ	
	2GB, 8bit Embedded MMC	
PMIC	TPS65217C PMIC regulator and one additional LDO.	
Debug Support	Optional Onboard 20-pin CTI JTAG, Serial Header	
Power Source	miniUSB USB or DC Jack	5VDC External Via Expansion Header
	PCB	3.4" x 2.1"
Indicators	6 layers	
HS USB 2.0 Client Port	1-Power, 2-Ethernet, 4-User Controllable LEDs	
	Access to USB0, Client mode via miniUSB	
HS USB 2.0 Host Port	Access to USB1, Type A Socket, 500mA LS/FS/HS	
Serial Port	UART0 access via 6 pin 3.3V TTL Header. Header is populated	
Ethernet	10/100, RJ45	
SD/MMC Connector	microSD , 3.3V	
	Reset Button Boot Button Power Button	
User Input	16b HDMI, 1280x1024 (MAX) 1024x768, 1280x720, 1440x900 w/EDID Support	
	Via HDMI Interface, Stereo	
Audio	Power 5V, 3.3V , VDD_ADC(1.8V) 3.3V I/O on all signals	
Expansion Connectors	McASP0, SPI1, I2C, GPIO(65), LCD, GPMC, MMC1, MMC2, 7 AIN(1.8V MAX), 4 Timers, 3 Serial Ports, CAN0, EHRPWM(0,2), XDMA Interrupt, Power button, Expansion Board ID (Up to 4 can be stacked)	
	Weight	
	1.4 oz (39.68 grams)	

BeagleBone Black

1 GHz performance



Made in China