Introducing BeagleBoard-X15

Enabling *what if*

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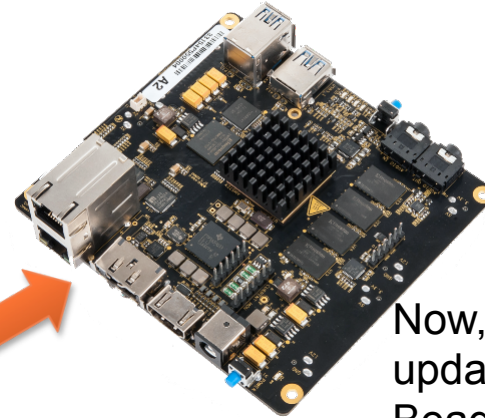
Sitara Applications team member at Texas Instruments

Information under embargo until 8 a.m. EDT on Oct 14, 2015

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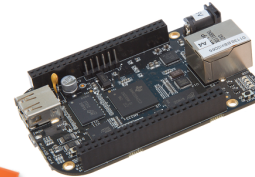
BeagleBoard.org is open innovation
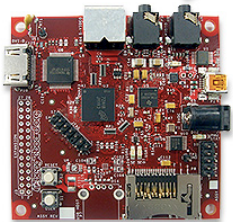
Fanless open computer
BeagleBoard

Now, BeagleBoard-X15, updates the full-featured BeagleBoard line for those wanting everything

In 2010, BeagleBoard-xM provided extra MHz and memory, without extra cost

In 2013, BeagleBone Black again brought developers extra MHz and memory, restored the HDMI and all at a price below $50!

In 2008, BeagleBoard.org introduced the world to personally affordable open computing with the original BeagleBoard, spawning countless want-to-be designs inspired by open community collaboration

In 2011, BeagleBoard.org got down to the bare bones and a single cable development experience with the original BeagleBone at under $90

Mint tin sized BeagleBone

beagleboard.org™

What if I could *connect* to...

- Multiple USB 3.0 devices at 5-Gbits/s
  - more than 10X faster than USB 2.0
- Multiple gigabit Ethernet ports using a built-in high-speed switch
- Dual simultaneous 1080p60+ HDMI displays and LCD touchpanels
- Dedicated eSATA or mSATA hard drives and flash storage devices
- High-bandwidth PCIe devices like GPUs, FPGAs and more
- Without giving up the basics like
  - microSD storage and built-in eMMC flash storage
  - Stereo audio input and output
  - Over 150 GPIOs multiplexed with a variety of embedded serial peripherals
  - USB 2.0 hosts and
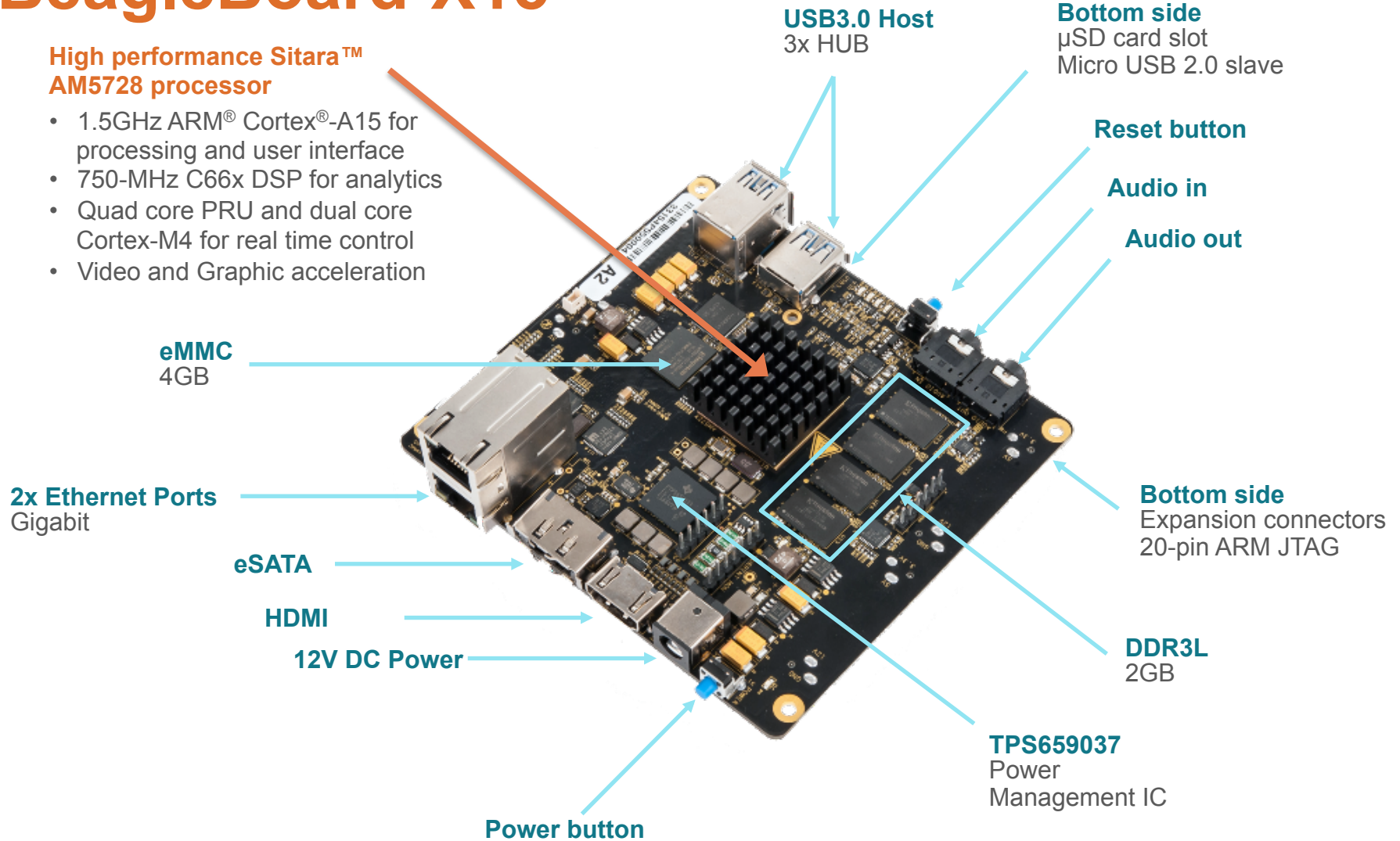 - JTAG or serial debuggers

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And what if I could *process* with...

- Dual 1.5-GHz ARM® Cortex®-A15 central processing units (CPUs)
  - for Linux operating system based hardware abstraction with high-speed data management, raw number crunching and responsive user interfaces

- Dual 700-MHz C66x digital signal processors (DSPs)
  - for analytics, large-scale data transformations

- Quad programmable real-time units (PRUs)
  - for implementing peripheral interfaces in software

- Dual ARM Cortex-M4 microcontrollers
  - for real time control tasks

- Multiple 2D and 3D graphics and video accelerators
  - for recording, playback and display tasks without loading the CPUs

BeagleBoard-X15

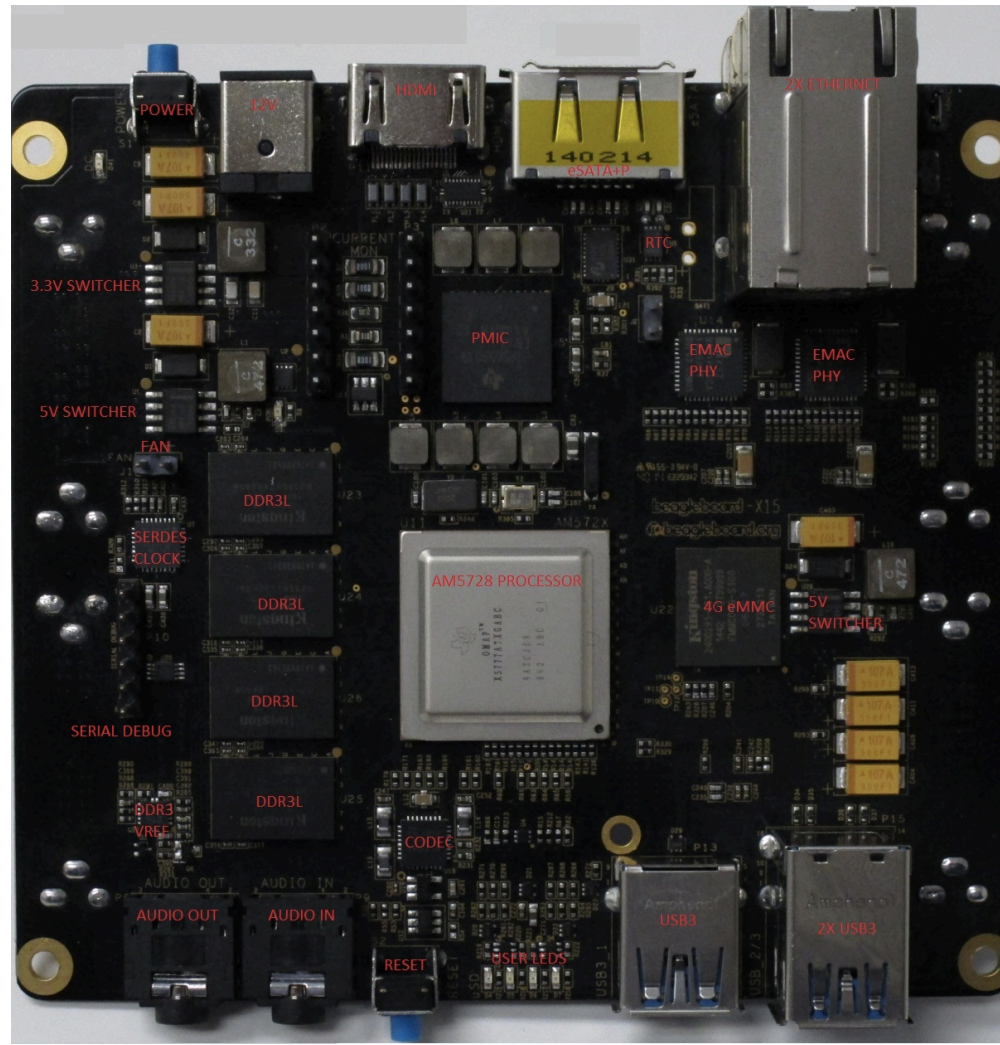**High performance Sitara™ AM5728 processor**

- 1.5GHz ARM® Cortex®-A15 for processing and user interface
- 750-MHz C66x DSP for analytics
- Quad core PRU and dual core Cortex-M4 for real time control
- Video and Graphic acceleration

USB3.0 Host
3x HUB

Bottom side
µSD card slot
Micro USB 2.0 slave

Reset button

Audio in

Audio out

eMMC
4GB

2x Ethernet Ports
Gigabit

eSATA

HDMI

12V DC Power

Bottom side
Expansion connectors
20-pin ARM JTAG

DDR3L
2GB

TPS659037
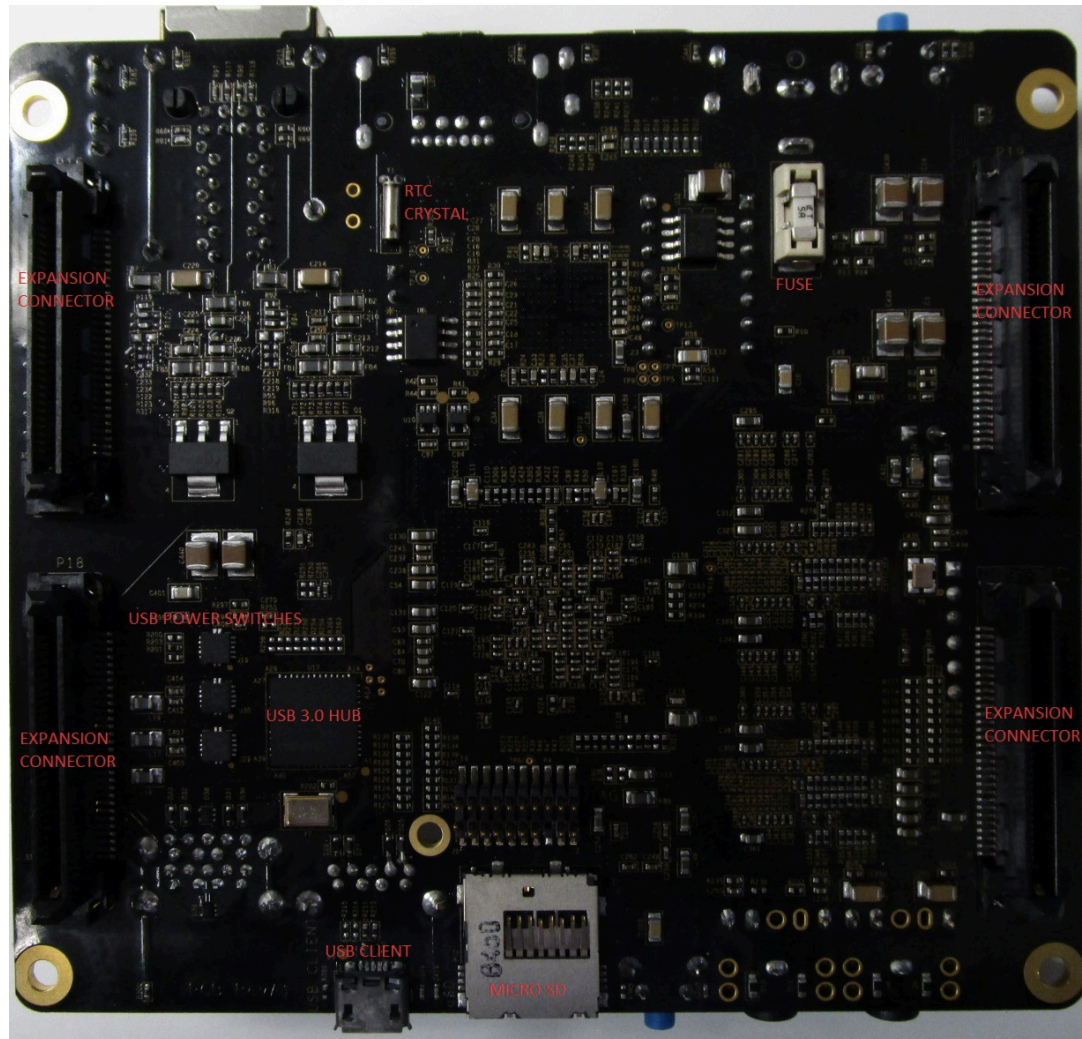Power
Management IC

Power button

BeagleBoard-X15 ships in late 4Q15

BeagleBoard-X15 (top)

BeagleBoard-X15 (bottom)
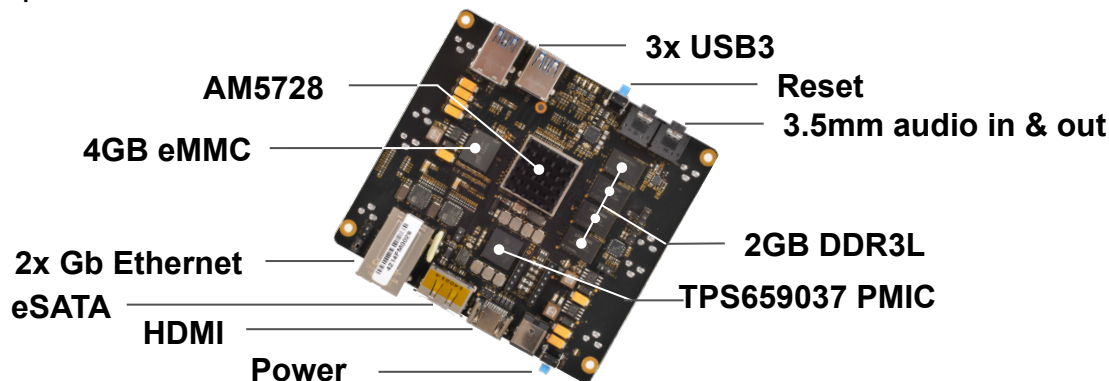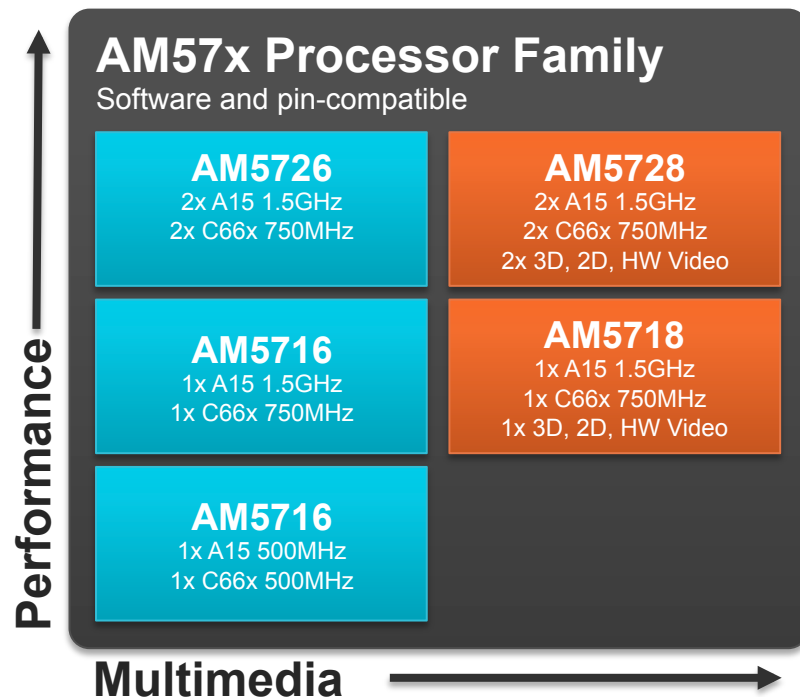
AM57x Cortex-A15 Processor

Highest integrated, generally available ARM Cortex-A15 in the market

Benefits

- Unmatched **performance** in the class
- **Scalable** family with pin-compatible single and dual core devices with single Processor SDK for all Sitara devices
- Accelerated **multimedia**
- **Real-time** control and processing with PRU and C66x DSP
- **Industrial** protocol support
- Tons of **connectivity**: PCIe, USB3, SATA and more!

Software and development tools

- Processor SDK with LTS Linux
- MPEG4 and H.264 supported by SDK
  - more support via partners
- BeagleBoard-X15 and TI EVM available at launch
- Industrial Development Kit available after initial launch

AM57x Processor Family
Software and pin-compatible

AM5726	AM5728
2x A15 1.5GHz	2x A15 1.5GHz
2x C66x 750MHz	2x C66x 750MHz
	2x 3D, 2D, HW Video

AM5716	AM5718
1x A15 1.5GHz	1x A15 1.5GHz
1x C66x 750MHz	1x C66x 750MHz
	1x 3D, 2D, HW Video

AM5716
1x A15 500MHz
1x C66x 500MHz

Performance (vertical axis)

Multimedia (horizontal axis)

3x USB3
Reset
AM5728
3.5mm audio in & out
4GB eMMC
2x Gb Ethernet
2GB DDR3L
eSATA
TPS659037 PMIC
HDMI
Power

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There's a core for that

High-performance computing
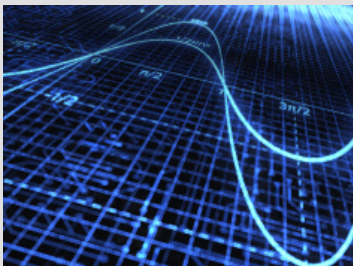### 2x ARM Cortex-A15 cores
- ✓ Fast, responsive applications and interfaces
- ✓ More headroom for applications without compromising data throughput

10,500 Dhrystone MIPS
10,980 Coremark

2x TI C66x DSP cores
- ✓ Excel at math operations and data movement
- ✓ Ideal for machine vision, medical imaging, test & measurement, and other analytical functions

48 GMACs
24 GFLOPs
3,540 Coremark

Multimedia acceleration
2x Imagination SGX544 cores
1x Vivante GC320 core
- ✓ Used for advanced graphical interfaces, video playback or record, and animation
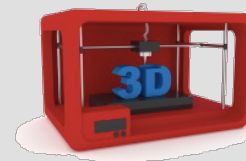

1080p HD video
3D and 2D graphics

Real-time control
4x TI PRU cores
2x ARM Cortex-M4 cores
- ✓ Ideal for real-time, deterministic processing such as motor control, sensor monitoring, and industrial/factory/building automation

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Some of the what if possibilities

- High definition, large-scale LED displays

- Drones, robots and manufacturing machines

- Home media gateways, servers and entertainment consoles

- Medical terminals, analysis and visualization

- Network and data security and forensics

- Automotive and transportation safety, logistics and entertainment

- Video monitoring, analytics, security and network broadcast

- Data acquisition and analysis

- Industrial computing, programmable logic controllers, human-machine interfaces and factory automation and communication systems

Engage the developer community

- beagleboard.org/discuss
  - Review answers to hundreds of queries from the top experts
  - Post your debug logs for support and clarity
  - Share your creations for fame and fortune
- beagleboard.org/chat
  - 24/7 live chat with hundreds of active developers
  - Get and share opinions about all the latest developments

beagleboard.org

Staying connected...

- Visit beagleboard.org/X15 for a list of BeagleBoard-X15 distributors

- Sign up for the BeagleBoard.org Foundation Newsletter to receive monthly updates regarding the community