Embedded Open Modular Architecture

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About me

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What is EOMA?

- GPL-compliant low-cost open hardware
- Low BOM for a GNU/Linux computer
- Small form-factor Modular Computer (Credit-card size)
What is EOMA?

- PCMCIA as physical form-factor
Interface of EOMA-68

- 24-pin RGB/TTL (for LCD Panels)
- I2C
- USB (USB 1.0, USB 1.1 and optionally USB 2.0 480mb/s)
- 10/100 Ethernet (optionally 1000 ethernet)
- SATA-II (optionally SATA-III)
- 16 pins of General-purpose I/O (GPIO)
User-facing EOMA-68 Options

User-facing end of EOMA-68 Card can have sockets
Space limit is 55mm by 4.8mm

Examples

- HDMI (2nd simultaneous display from EOMA-68 RGB/TTL Interface)
- Audio (SPDIF, Headphones, Mic etc.)
- Micro SD (extra storage)
- USB-OTG (also for Power and Charging)
- Video input (if supported by the CPU)
- Anything else that fits into a 4.8mm height.
EOMA Motherboard

- Mini Engineering Board
- All-in-one Engineering Board
- Laptop Motherboard
- Tablet Motherboard
- LCD Monitor (TV)
- .....

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More complex versions could also have LVDS, more USB Hubs etc.

GPIO, RS232, SD/MMCx2, SPI, SSP etc.
Basically, everything that is not accessible via the PCMCIA or the SD, HDMI and USB-OTG Connectors.
• All-in-one Engineering Board

Connectors:
* PCMCIA
* 3x USB2
* SATA
* DVI
* VGA
* RJ45
* Power
* SD/MMC

On PCMCIA Card:
* HDMI
* Micro-SD
* USB-OTG
* Headphones

Specifications:
* 3x USB2 ports
* SATA-II
* 10/100 Ethernet
* HDMI
* 2nd VGA and DVI
* GPS
* Bluetooth
* 802.11bgn WIFI
* USB-OTG
* Headphones
* Micro SD
* Full-sized SD (as USB)
* GPIO (on header)
* SD/MMC (on header)
* SPI (on header)
* SSP (on header)

GPIO, RS232, SD/MMCx2, SPI, SSP etc. Basically, everything that is not accessible via the PCMCIA or the SD, HDMI and USB-OTG Connectors.

BOM:
* GL832 (USB-SD/MMC)
* 2x GL850G (4-port USB2)
* SN75LVDS83B
* Chrontel CH7036 (DVI+VGA)
* GPS Module (USB)
* RT3070 (802.11bgn WIFI)
* GL532 (USB Audio)
* PCMCIA CPU Module
Laptop Motherboard

ICs BOM for Motherboard:
* PMIC
* GL850G (USB2)
* STM32F (Cortex M3)
* I2C EEPROM

Connectors BOM for Motherboard:
* USB2
* LCD (28/40-pin FPC)
* PCMCIA (68-pin)
* 5V Power
* SIM Socket (optional)
* Battery
* Speakers
* 2x PCI-e

ICs BOM for EOMA-PCMCIA CPU
* Allwinner A10 1Ghz
* NAND Flash
* DDR3 RAM
* AXP209 PMIC
* MII RTL8120 Ethernet
* 3.3v LDO Regulator

Connectors BOM for EOMA_PCMCIA
* Micro-HDMI
* USB-OTG
* Micro SD/MMC
* HP+Mic
* PCMCIA (68-pin)

Battery Connector
Stereo Speakers

USB2
PMIC
GL850G

EM775 3G Modem
RT2070 WIFI

50mm x 90mm
2-4 layer PCB

44 pin Expansion Header

56mm x 90mm
6-8 layer PCB
Laptop Motherboard

- 10in LCD
- 1024x600
- 1200x720 or
- 1280x768

Diagram:
- Motherboard
- EOMA-PCMCIA CPU Card
- 2000mAh Battery
• Tablet Motherboard
Why EOMA

- EOMA is an initiative to separate the platform from the widget
- System-On-Module in standardized 68 pin package
- OEMs receive standard platform that greatly reduces time-to-market
- OEMs no longer need to contract ODMs or have extensive software expertise to make a worthwhile product
- Utilize most of low cost SoC of your choice
Who made EOMA

- Rhombus Tech
  - [http://rhombus-tech.net/](http://rhombus-tech.net/)
- CIC - Community Interest Company
  - Established to serve Free Software Developers, entrepreneurs, enthusiasts and Engineers with access to affordable, modern and importantly GPL-compliant hardware
  - Rhombus plans to reinvest all profits into platform development and improvement
  - Rhombus facilitates upstream integration with Linux and other major OSS projects
The First EOMA-68

- Allwinner A10 – Cortex-A8 1GHz
- 1GB of RAM
- At least 1GB of NAND Flash (possibly up to 16GB)
- MALI 400MP 3D Graphics, OpenGL ES 2.0 compliant
- 2160p (double 1080p) Video playback
- HDMI, Micro-SD, Headphones Socket
Current status

- Preorder at
  [http://rhombus-tech.net/allwinner_a10/orders/](http://rhombus-tech.net/allwinner_a10/orders/)
- Ikcl is working with manufacturers to start production
- News at
  [http://rhombus-tech.net/allwinner_a10/news/](http://rhombus-tech.net/allwinner_a10/news/)
Play with A10

If you can't wait, you can

- Buy A10 dev kit ($1000)
  easy to develop

- Buy a cheap A10 tablet ($100)
  need sd breakout board to get console
  http://elinux.org/Hack_A10_devices

- Buy a A10 TV box ($70)
  need sd breakout board or soldering
  http://rhombus-tech.net/allwinner_a10/hacking_the_mele_a1000/
Play with A10

- All source code available
  u-boot, linux kernel(2.6.36), buildroot, Android 2.3.4
- Mali - open-source, reverse-engineered graphics driver

this Mali driver will be the first ARM graphics hardware with a full open-source 3D-capable stack
Play with A10

- Boot from USB, never bricked
- Boot from sdcard, easy to try new distribution
- Debug mode, get uart/jtag from sd card pin
- Cheap
Thank you

Questions?