OMAP/ARM 最新技术与开发工具介绍
- Low Power SoC Overview

讲师: Thomas Mu
Focused Industrial Applications

Electric Power

Machine

Instrument

Smart Terminal
Market Needs & Value Proposition

- **Lower Power Consumption**
  - Saving Energy (National Mandate)
  - Wind tight Shell, no Fan
  - Longer Battery Life

- **Machine Vision**
  - LED → STN LCD → TFT LCD
  - Customized Display Content
  - 3D for same applications

- **Intelligent Control**
  - Friendly Human Machine Interface
  - Higher Efficiency and Precision
  - Higher Real Time Performance

- **Networked**
  - Easy to configure the system
  - Remote operation and software upgraded
  - More and more data Capture, Processing, Display, and Transportation
Low-power applications processors roadmap

- **In Production**
  - OMAP3503
  - OMAP3525
  - OMAP3515
  - OMAP-L138
  - OMAP-L128
  - OMAP-L118
  - OMAP-L108

- **'08 Samples**
  - OMAP3530
  - OMAP3525

- **'09 Samples**
  - OMAP3530
  - OMAP3525

- **Future**
  - OMAP-L137
  - OMAP-L127

- **High Performance**
  - 600 MHz ARM Cortex-A8
  - C64x+ DSP
  - Video Accelerator

- **High Integration**
  - 3D Graphics

- **Time**
  - 2009

- **Performance**
  - SATA, mDDR/DDR2
  - Low Price <$15 (100ku)
Four Low Power Product Lines
More than 15 new processors coming soon

<table>
<thead>
<tr>
<th>Application</th>
<th>C5505™</th>
<th>C640x™</th>
<th>C674x™</th>
<th>OMAP-L1x™</th>
<th>OMAP-L1x™</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Portable instrumentation</td>
<td>0.35mW – 46mW</td>
<td>12mW – 350mW</td>
<td>12mW – 385mW</td>
<td>20mW – 400mW</td>
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<td>• SDR radio</td>
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<td>• Portable data terminals</td>
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<td>• Portable connectivity</td>
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<td>• Public Safety Radio</td>
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<td>• Military radio</td>
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<td>• Diagnostics</td>
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<td>• Portable music recording</td>
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<td>• Music effects</td>
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<td>• Industrial</td>
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<td>• Conference phones</td>
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<td>• Portable medical</td>
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<td>• Portable audio recording</td>
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<td>• Wireless microphone</td>
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<td>• Noise cancellation headphones</td>
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<td>• Medical monitoring</td>
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</table>

**Highly Integrated**
- **Linux/ WinCE**
  - Industry’s lowest power ARM + DSP SoC
  - More than 2X the performance with the same power as existing low power DSPs
  - 20mW – 400mW

**High Performance**
- **Up to 2400MMACs**
  - Low power
  - High Performance

**High Precision and low power**
- 20X lower standby power and 1/3 the power consumption of existing floating-point devices

**Analog integration**
- 1/2 the power consumption of existing C55x devices with FFT coprocessor

**Application processing**
- Industry’s lowest power floating-point DSP
- Industry’s lowest power fixed-point DSP

Up to 2400 MMACs
Software and Pin to Pin Compatibility

<table>
<thead>
<tr>
<th>Applications Software Compatibility</th>
<th>CoProcessor</th>
<th>DSP Processing</th>
</tr>
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<tr>
<td>OMAP-L137</td>
<td>ARM9 300 MHz</td>
<td>C674x 300Mhz</td>
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<tr>
<td>OMAP-L127</td>
<td>ARM9 300 MHz</td>
<td>C64x+ 300Mhz</td>
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<td>C6403</td>
<td>ARM9 300 MHz</td>
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<td>C6747/5</td>
<td>ARM9 300 MHz</td>
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<td>C6408/6</td>
<td>ARM9 300 MHz</td>
<td>C64x+ 300Mhz</td>
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<td>C6748/6</td>
<td>ARM9 300 MHz</td>
<td>C674x 300Mhz</td>
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<td>OMAP-L118</td>
<td>ARM9 300 MHz</td>
<td>Audio CoP</td>
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</table>

SDRAM, McASP
Standby Power – 60mW
Total Power – up to 490mW

mDDR/DDR2, McASP/McBSP, SATA, UPP, VPIF
- DVFS -
Standby Power – 11mW
Total Power – up to 440mW

OMAP-L13x – Float DSP
OMAP-L12x – Fix DSP
OMAP-L11x – CoP
OMAP-L10x – ARM only
NEW OMAP-L137 (ARM9 + C674x DSP) Preliminary
Schedule: TMX – 4Q08; TMS – 1Q09

Features

CPU Cores
- ARM926EJ-S™ (MPU) upto 300 MHz
- C674x™ DSP Core upto 300MHz

Memory
- ARM: 16K I$, 16K D$, 64K ROM
- DSP: 32K L1D, 32K L1P, 256K L2 Cache, 128K RAM
- 1MB ROM

Peripherals (1.8/ 3.3V IOs)
- 10/100 Ethernet MAC
- EMIF1 – Supports 133 MHz SDRAM (16/32-bit)
- EMIF2 – Supports Async/NAND Flash (8/16 bit)
- USB 2.0 - USB OTG
- USB 1.1 – USB Full speed (OHCI)
- UHPI, McASP (3), UART(2), I²C (2), SPI (2), RTC, Timers (3), MMC/SD (2), LCD Controller, GPIO,
  Security Manager - EFuse

- Package - 17 x 17mm BGA (1.0mm pitch) ~256pins
- Pin to pin compatible with C6747
- Power (1.0-1.2V Core, 3.3V IOs)
  - Active < TBD mW @ 300MHz/1.2V/70C (estimate)
  - Standby < 100 mW @ 300MHz/1.2V/25C (estimate)

Applications
- SDR, Portable Catalog, Bar Code Scanners, Portable Communications, Portable Medical, Portable Audio

OMAP-L137 ARM + DSP

Arm Subsystem
- ARM926EJ-S™
- CPU 300 MHz
- L1P 16K
- L1D 16K

DSP Subsystem
- C674x™
- DSP Core 300 MHz
- L1P 32K
- L1D 32K
- L2 256K

Switched Central Resource (SCR) / EDMA

Peripherals
- UHPI
- USB 2.0
- USB 1.1
- EMAC
- SPI (2)
- McASP (3)
- PC (2)
- UART (2)
- SDRAM 32-bit
- Async EMIF 16-bit
- MMC/SD (2)

Connectivity
- WD Timer
- PWM (3)

System

128KB RAM

EVM Available 4Q08
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OMAP-L127 ARM + DSP

**ARM9 Subsystem**
- ARM 926EJ-S™ CPU
  - 300 MHz
  - L1P 16K
  - L1D 16K

**DSP Subsystem**
- C64x+™ DSP Core
  - 300 MHz
  - L1P 32K
  - L1D 32K
  - L2 256K

Switched Central Resource (SCR) / EDMA

EVM Available 4Q08

WD Timer
- PWM (3)

USB 2.0
- USB 1.1

EMAC
- Async
- EMIF 16-bit
- MMC/SD (2)

Serial Interfaces
- SPI (2)
- McASP (3)

Program/Data Storage
- SDRAM 32-bit
Software and pin-for-pin compatibility

- **Applications Software Compatibility**
  - OMAP™ OMAP-L137
  - ARM9 300 MHz
  - SDRAM, McASP
  - Low Price <$15 (10ku)
  - Standby Power – 60mW
  - Total Power – up to 490mW

- **CoProcessor**
  - OMAP-L127
  - ARM9 300 MHz

- **DSP Processing**
  - C674x 300Mhz

- **Floating-Point**
  - OMAP-L137
  - ARM9 300 MHz
  - C64x+ 300Mhz

- **Pin for pin Compatibility**

- **TPX 4Q08**
Power management solution for OMAP-L1x

The TPS65023 allows you to use the power-saving SmartReflex feature of the OMAP-L1x and is capable of providing all of your system power depending on your system’s architecture.
Extend product portability via low power options

> 50% reduction in standby power

< 1/3 the total power consumption

* 1.2V Core, 3.3V IOs at 25°C/300 MHz
OMAP-L137/ C6747 Starter Kit

- EVM board
  - OMAP-L137/ C6747
  - USB Interface
  - AIC32 Stereo Codec
  - Supports SD and other media interfaces
- Emulation
  - On-board XDS510 JTAG controller
- Connectors
  - Daughter Card connectors
  - Expansion Port connectors
- Development tools software including
  - Montavista Linux 2.6.18, C6000 start Kit
  - Code Composer Studio™, DSP/BIOS™
  - RTOS, Compiler, Assembler, and Linker
- Foundation software
- Full set of Linux and DSP drivers

Part Number: TMDXOSKL137

Available Sept. 08

$395
OMAP-L1x Outline

- Lower Power Consumption;
- 300MHz ARM9 plus 300MHz DSP, up to 2400MMACs
- Both Fixed-Point and Floating-Point DSP
- Two USB, USB1.1 and 2.0 OTG;
- Larger On Chip Memory, up to 384K (may save external memory for DSP);
- Automotive level device, high reliability;
- Pin for Pin DSP only or ARM only products, same peripherals;
- Strong roadmap with floating-point;
- Cheaper development tools.
Thank You & Question

www.ti.com.cn/embeddedprocessing