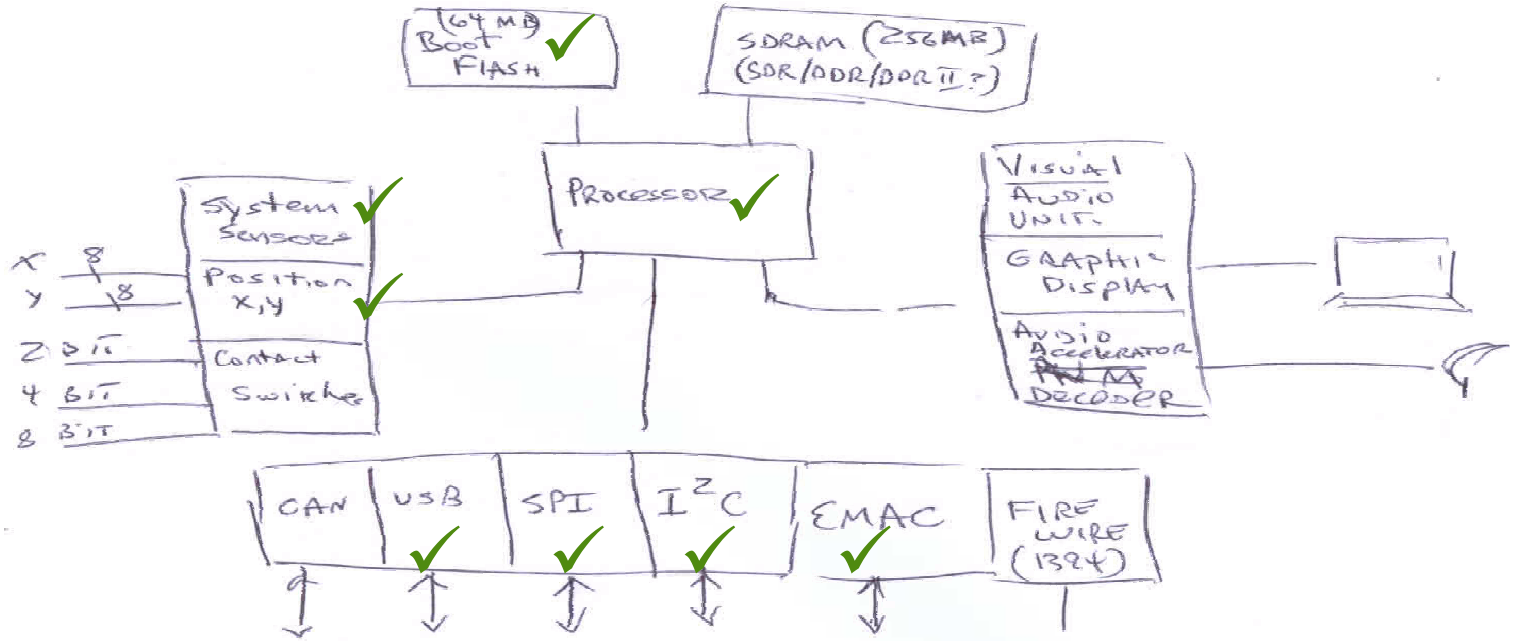
使用Altera嵌入式解决方案，提高性能，降低功耗

议程

- 什么是Altera嵌入式解决方案?
- Nios嵌入式评估套件：演示
- 提高性能，降低功耗
- 资源
- 总结

SOPC WORLD

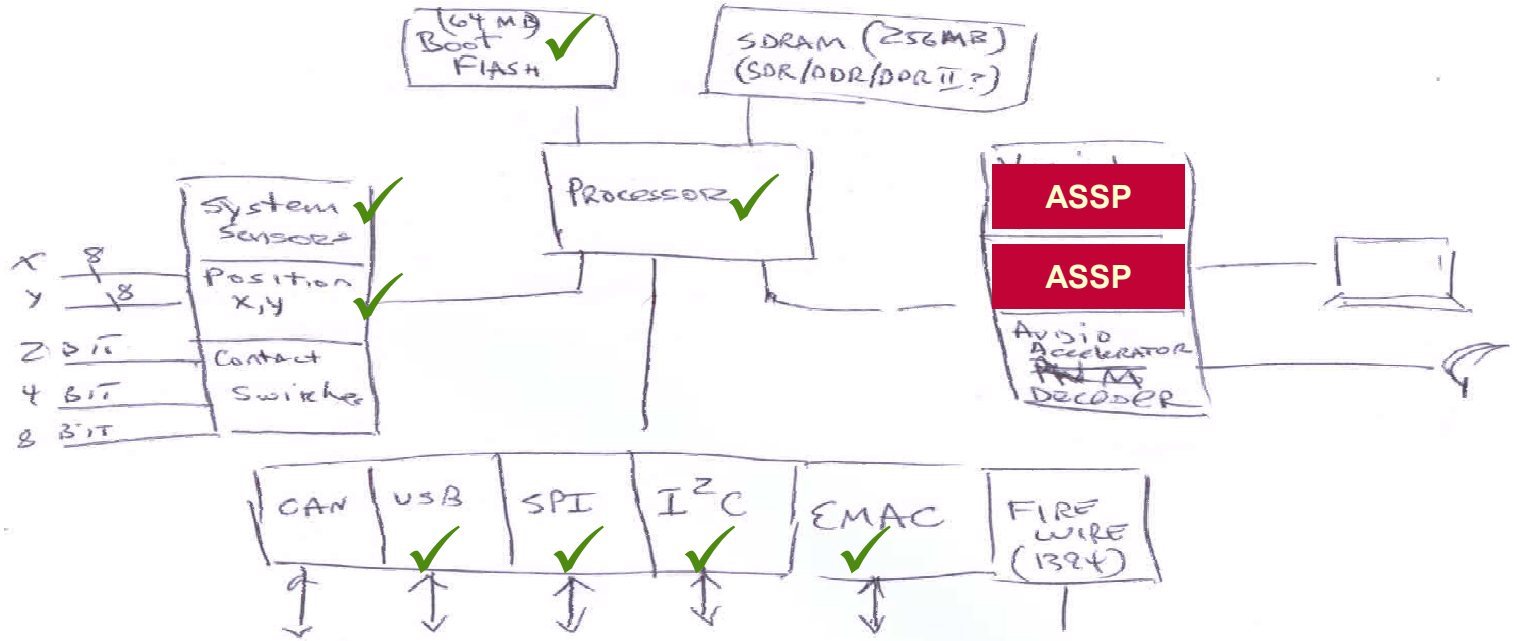
传统的(多芯片)系统

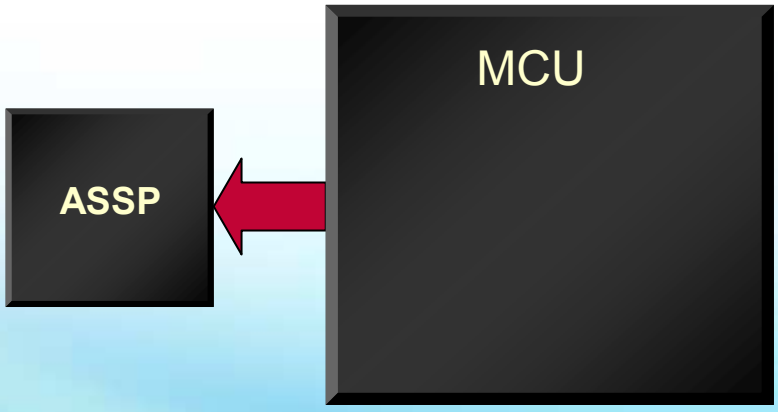


MCU

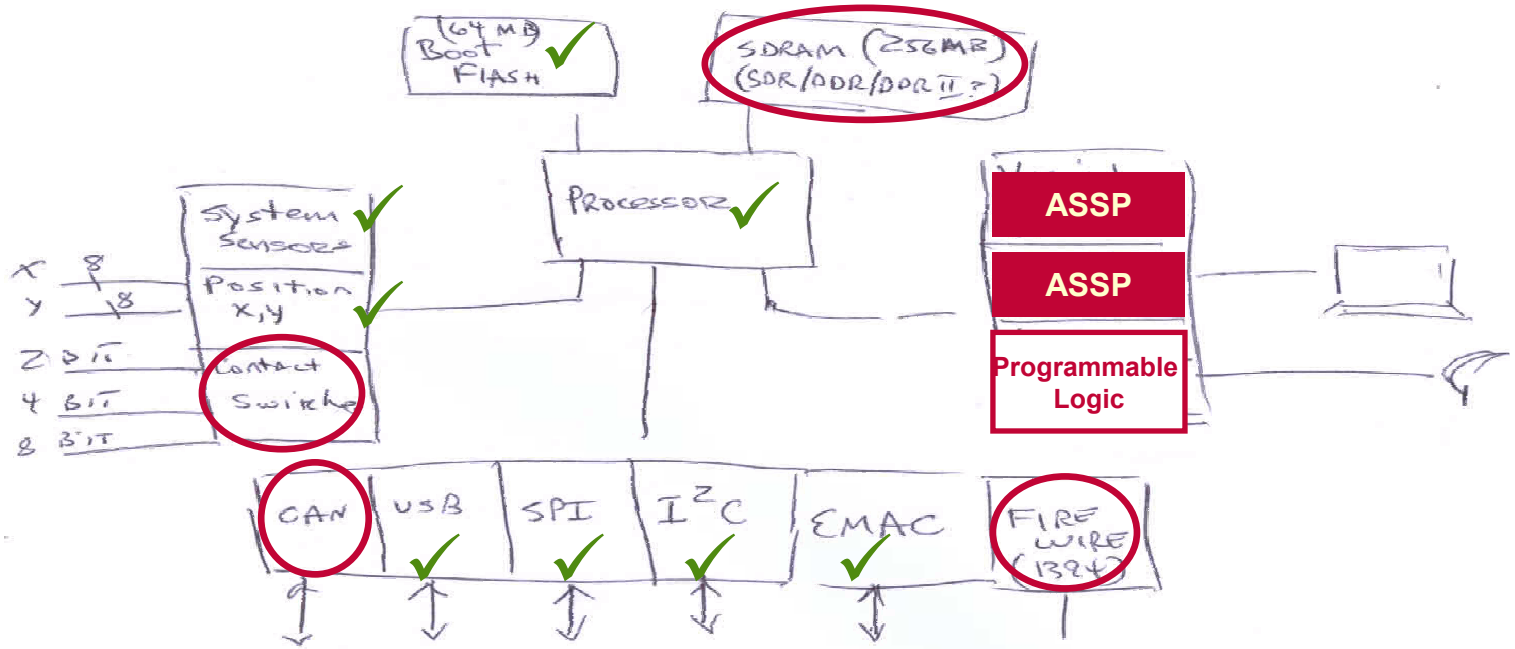
SOPC WORLD

传统的(多芯片)系统





传统的(多芯片)系统



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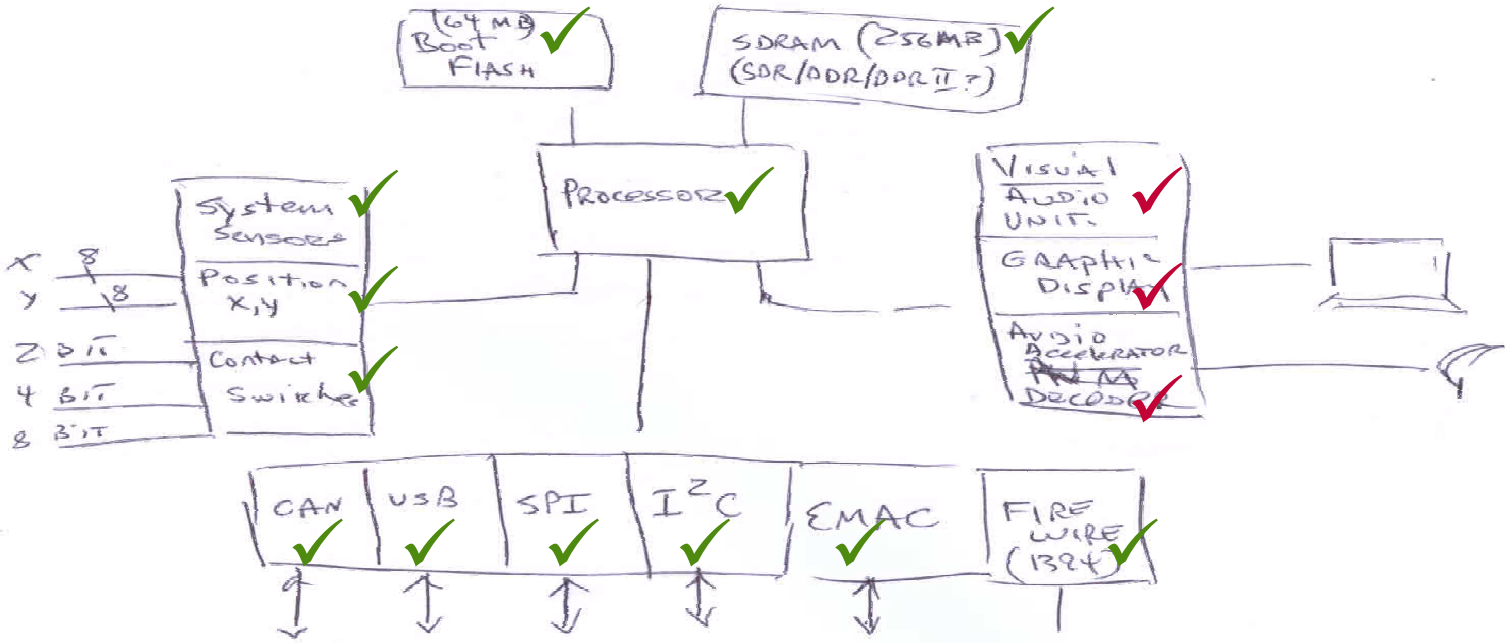
可编程芯片系统(SOPC)解决方案

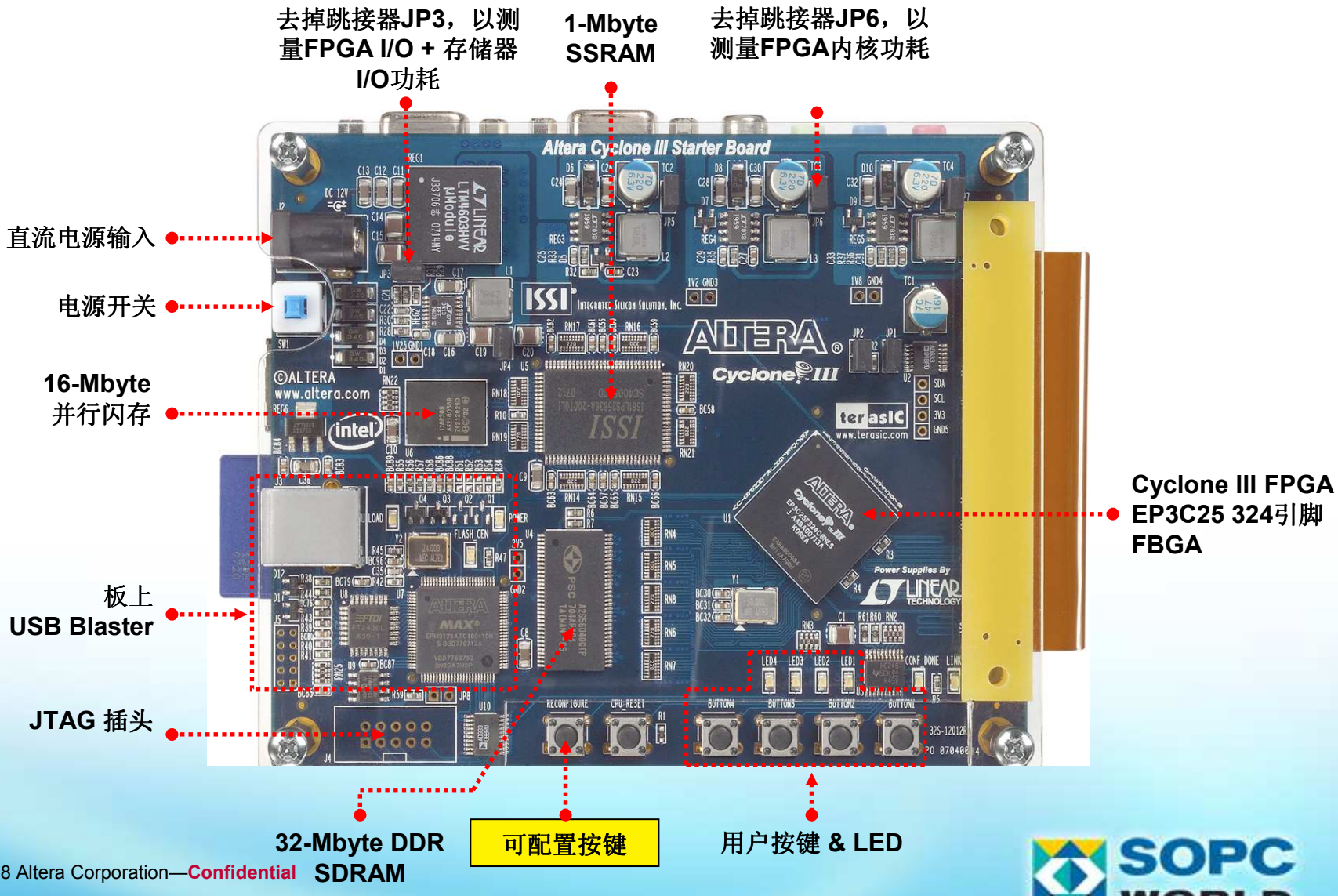


- *最合适的解决方案*
- *降低了系统成本*
- *降低了系统功耗*
- *不会过时*

SOPC WORLD

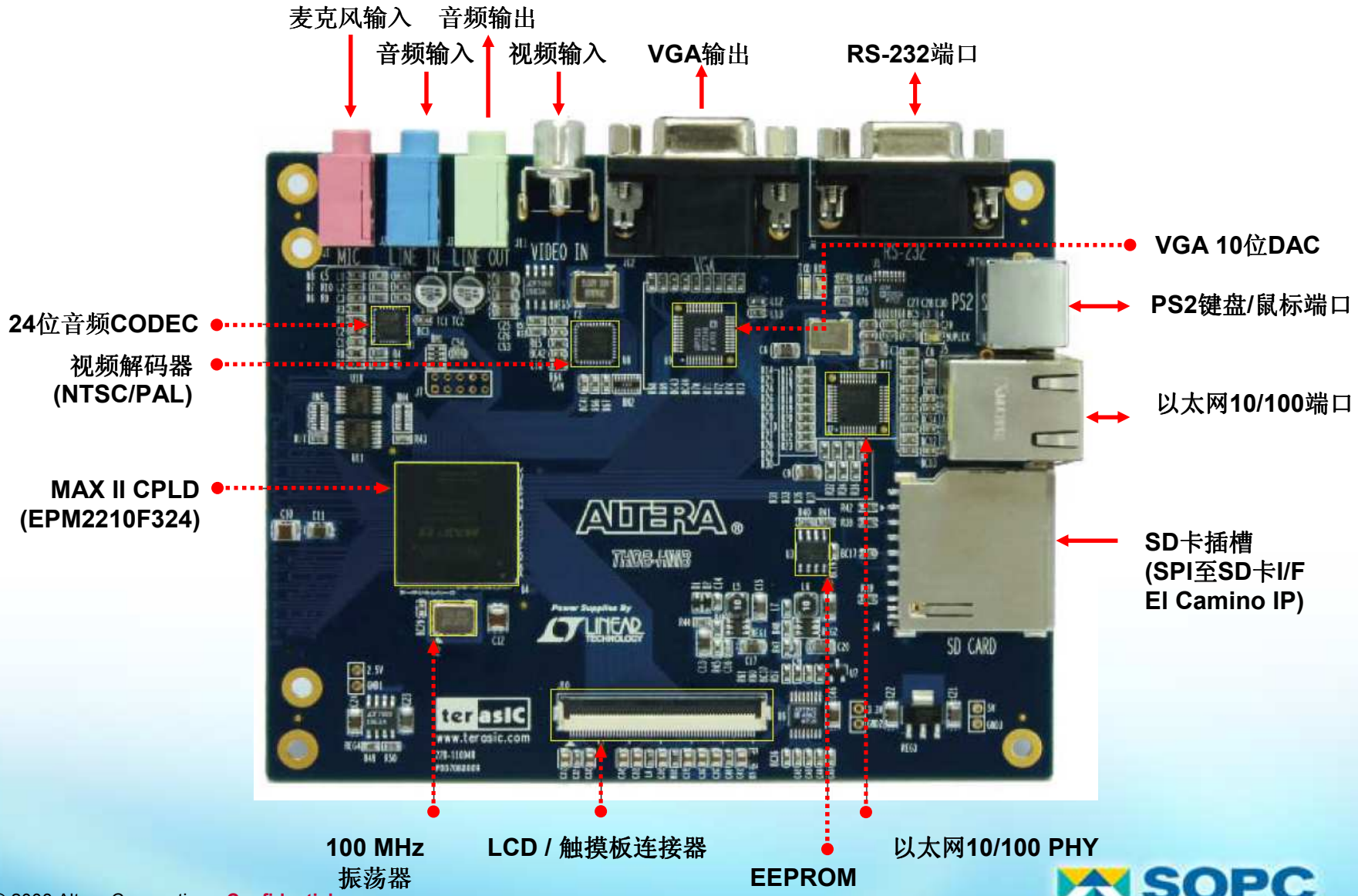
Nios嵌入式评估套件：演示

Cyclone III FPGA基本板

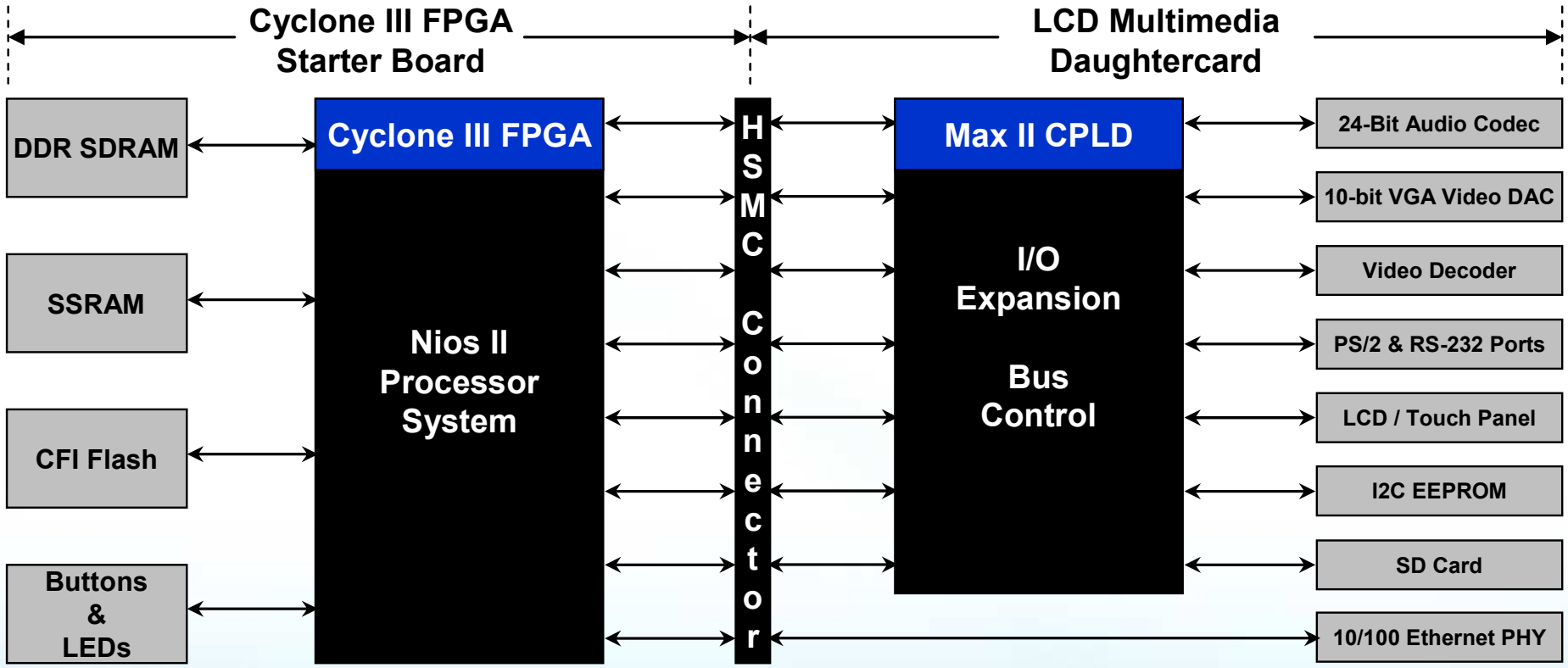


LCD多媒体子卡

LCD多媒体子卡(去掉了LCD)

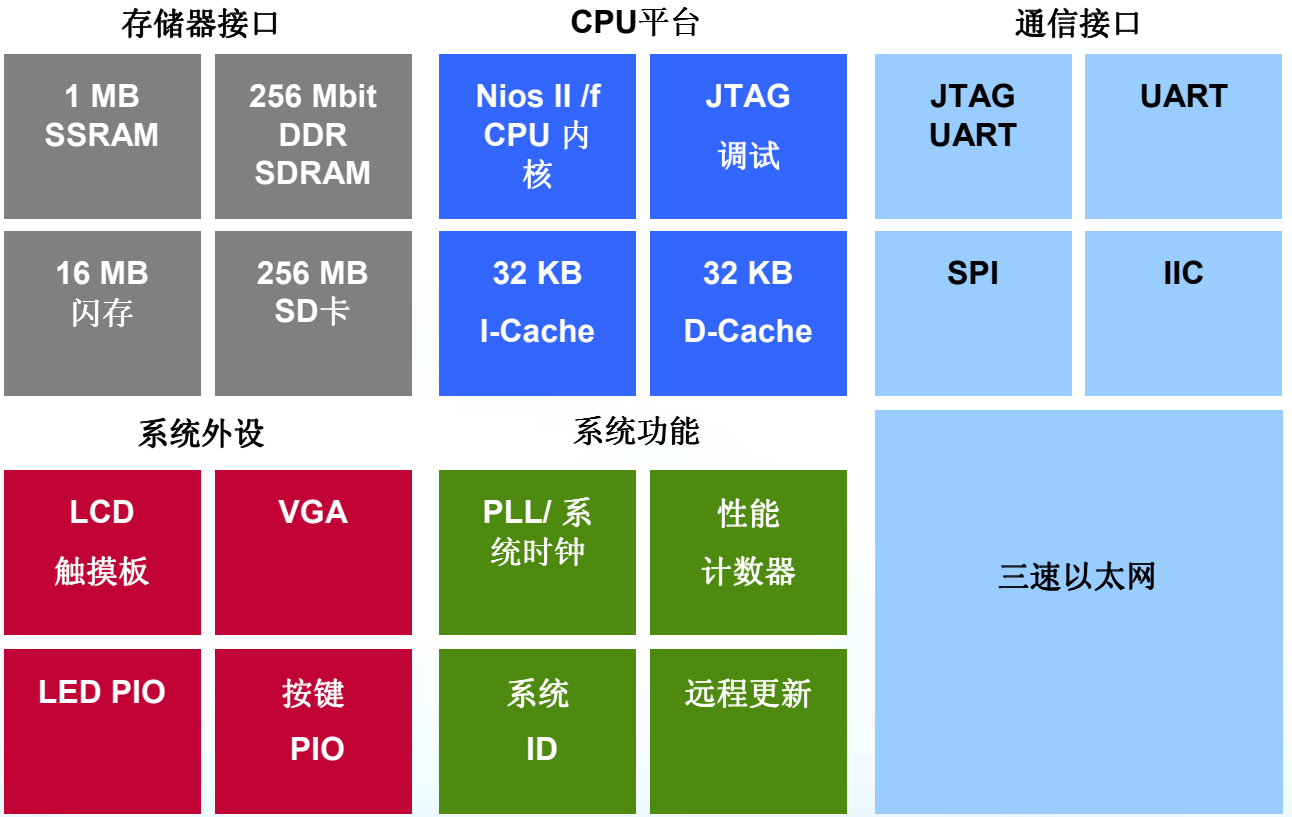


系统级框图



Max II EPM2210F324器件用于I/O扩展、电压转换，以及在EEPROM中存储 MAC ID。

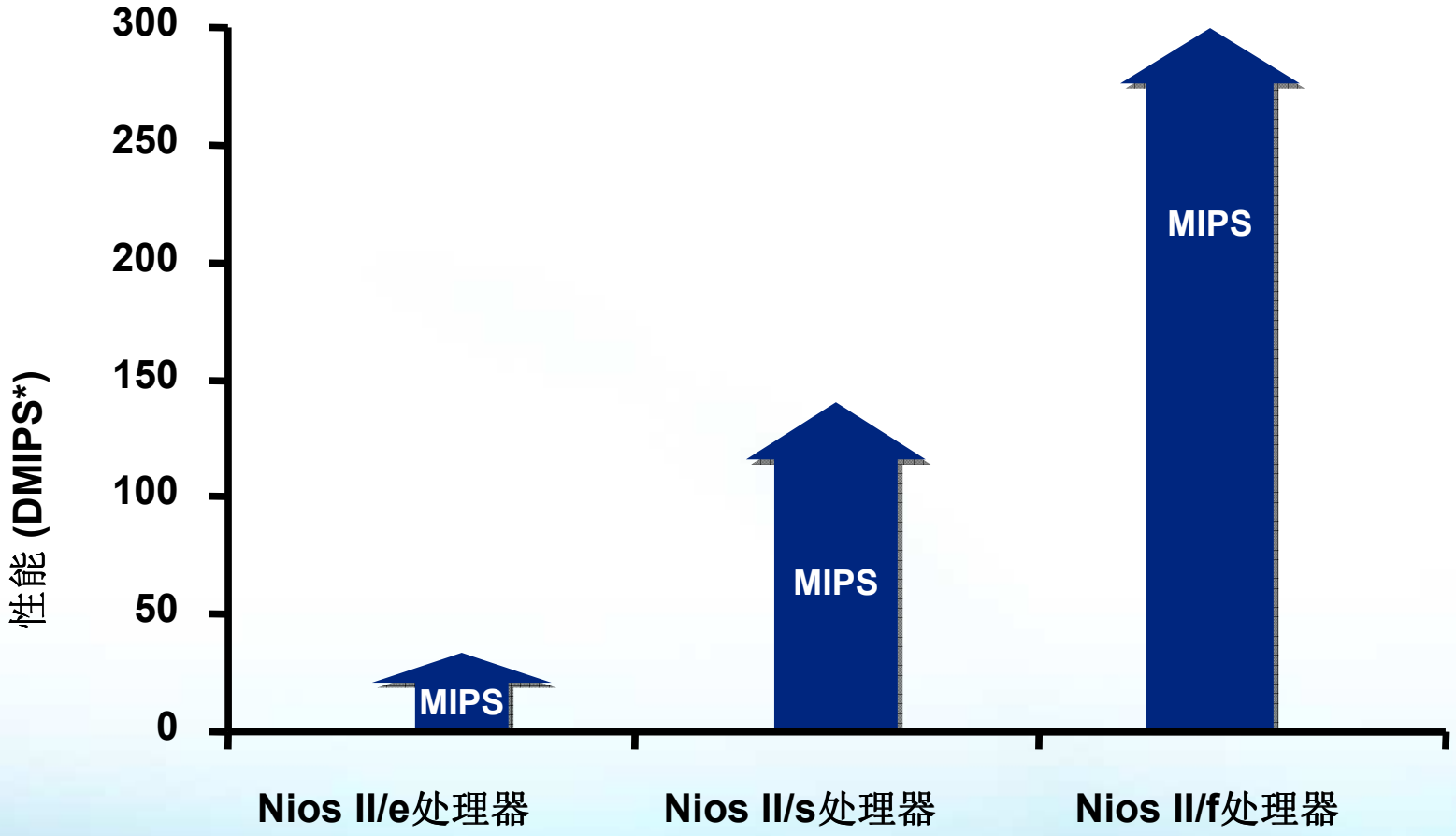
Nios II标准处理器系统



使用了18 K逻辑单元，175 K-bits存储器

提高性能，降低功耗

性能范围



* Dhrystone 2.1基准测试

Nios II处理器性能 (DMIPS)

器件系列	Nios II/f 处理器	Nios II/s 处理器	Nios II/e 处理器
Stratix III FPGA	300	128	50
Stratix II FPGA	251	110	44
Stratix FPGA	168	82	27
Hardcopy® Stratix II	228	129	49
Hardcopy Stratix	166	84	27
Cyclone III FPGA	165	68	17
Cyclone II FPGA	144	55	18
Cyclone FPGA	130	53	17

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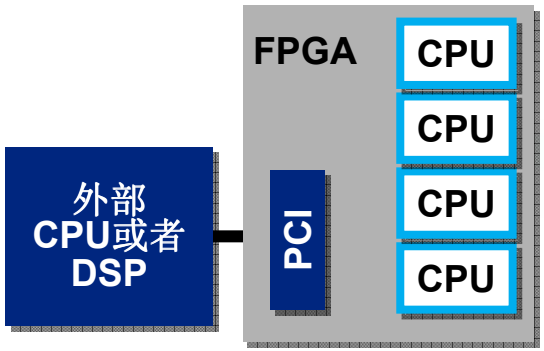
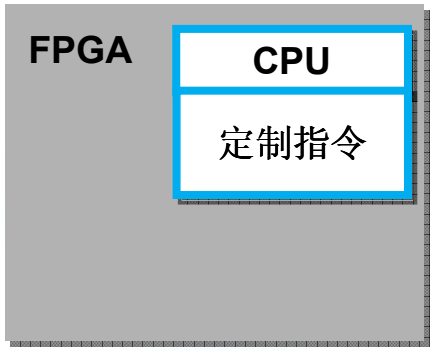
提高性能的3种方法

多处理器系统



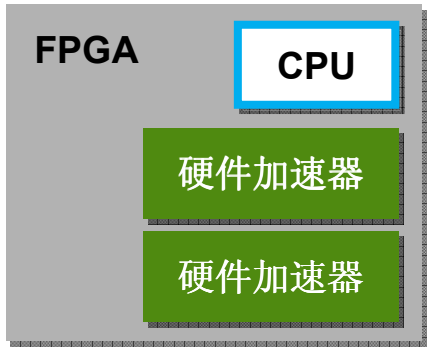
- 加入处理器(内部以及外部)

定制指令



- 加速每个CPU的性能(加入专用指令)

硬件加速器



- 通过专用硬件加速变换算法

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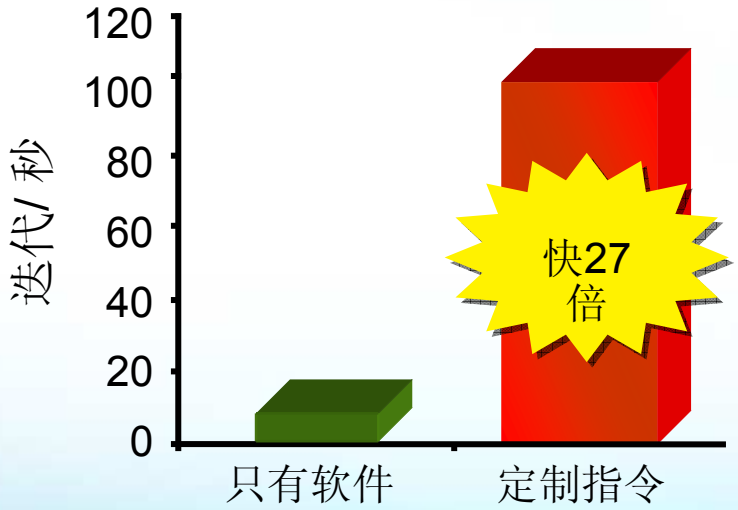
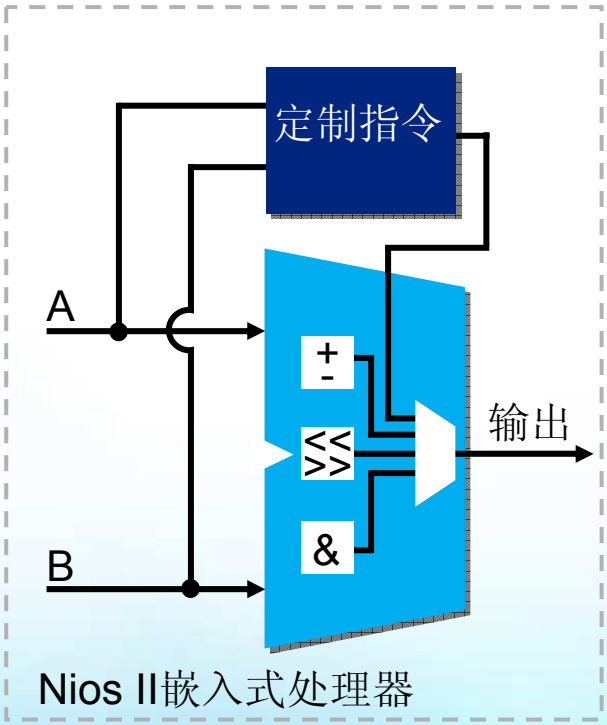
定制指令

- 扩展CPU性能
  - CPU获取数据，存储结果
  - 适合数学和逻辑运算
    - 例如，浮点，位处理
  - 硬件要比软件快得多

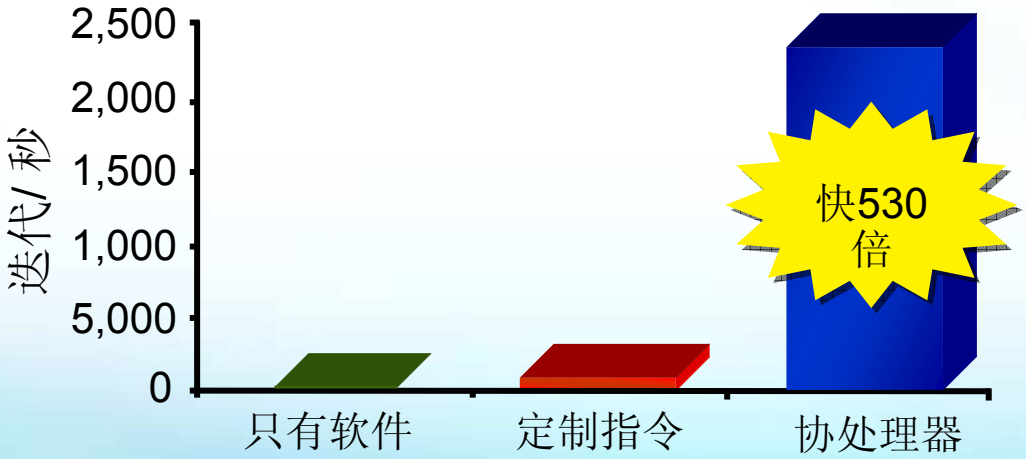


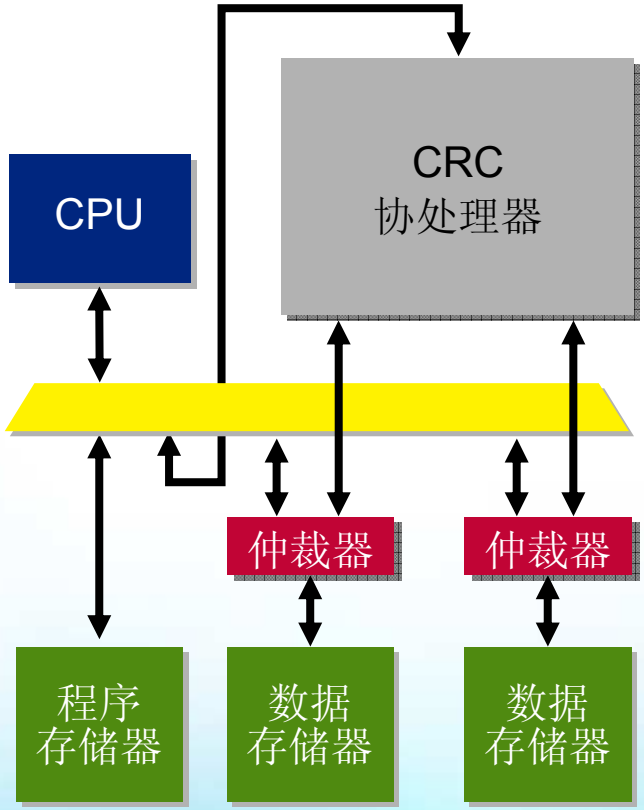


*** 例子：CRC 64kbyte缓冲**

硬件加速器

- 并发数据协处理器
  - CPU启动/停止协处理器
  - 协处理器获取数据，存储结果
  - CPU同时运行应用程序代码
  - 适合大块数据运算

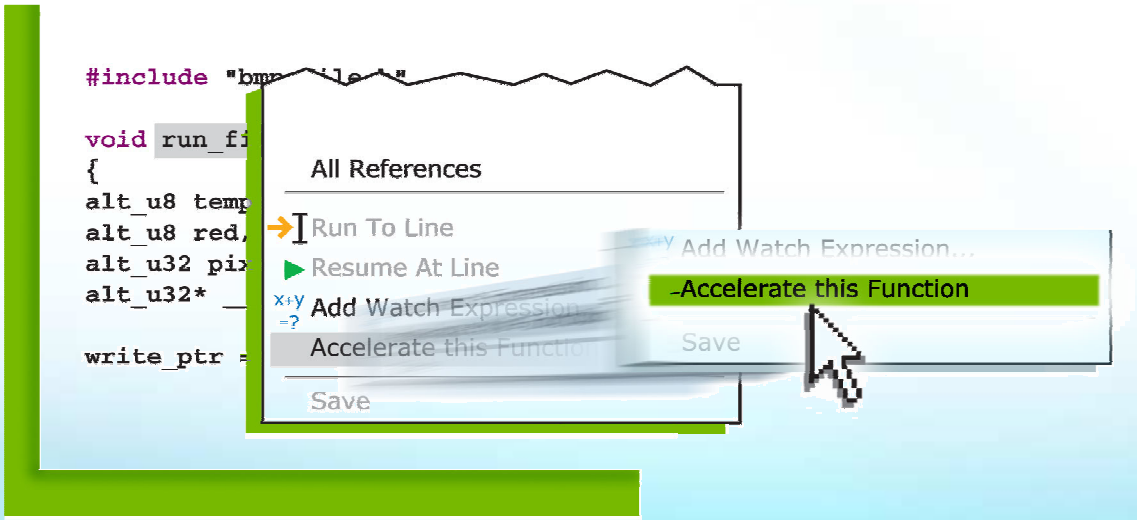




*** 例子：CRC 64kbyte缓冲**

Nios II C语言至硬件加速编译器

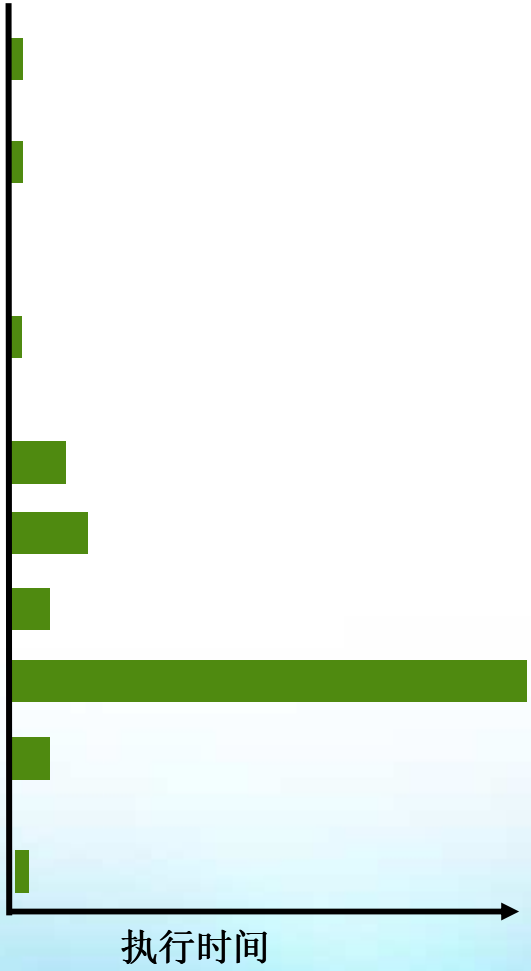
- 自动建立并集成硬件加速器
- 直观的用户界面，简化了C语言加速。
- 使用熟悉的Nios II IDE
- 支持标准ANSI C语言



右键单击加速

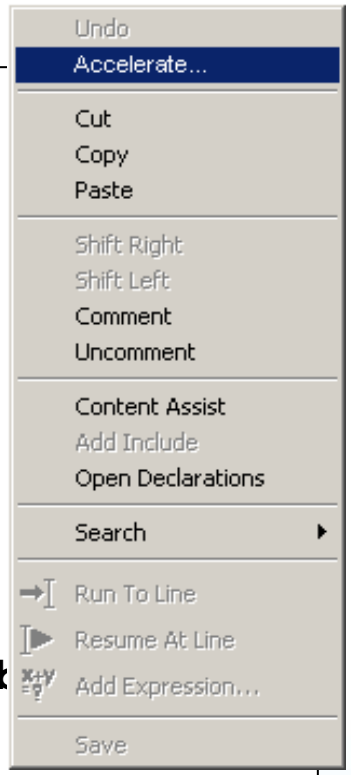
C语言至硬件加速

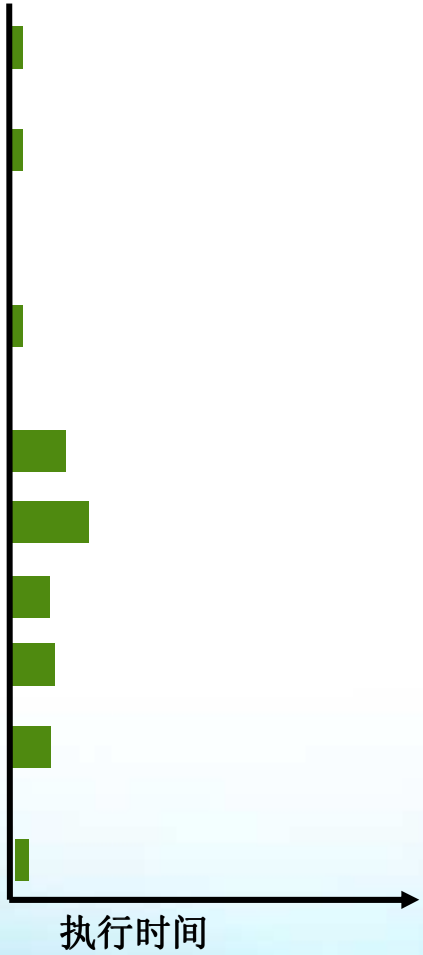
```
main ()
{ …variable declarations…
  init();

  while (!error && got_data())
  {
    do_user_interface();
    gather_statistics();
    if (got_new_data())
      d_transform(in_buf, out_buf);
    check_for_errors();
  }
  cleanup();
}
```



右键单击加速实现函数功能

```
main ()
{ …variable declarations…
  init();

  while (!error && got_data())
  {
    do_user_interface();
    gather_statistics();
    if (got_new_data())
      d_transform in_buf, out_b
    check_for_errors();
  }
  cleanup();
}
```

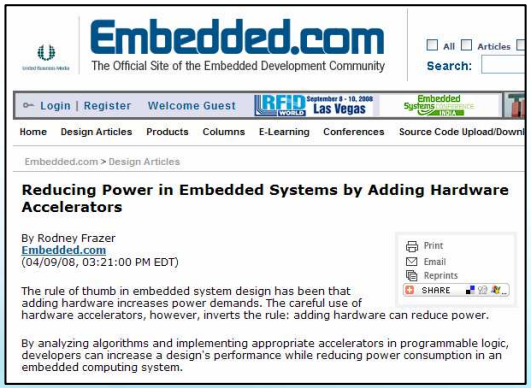


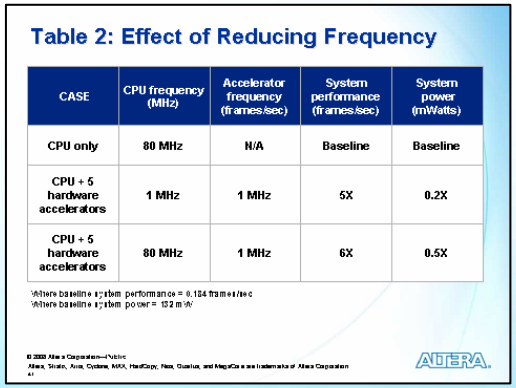


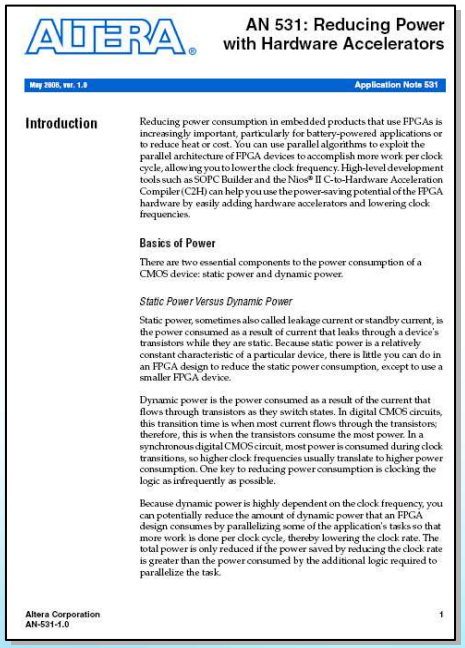
系统功耗

- 去掉分立处理器，降低功耗。
  - *“. . . 我们的元件成本至少降低了20％，而功耗则是以前的五分之一。”*
    –David Main，工程组经理

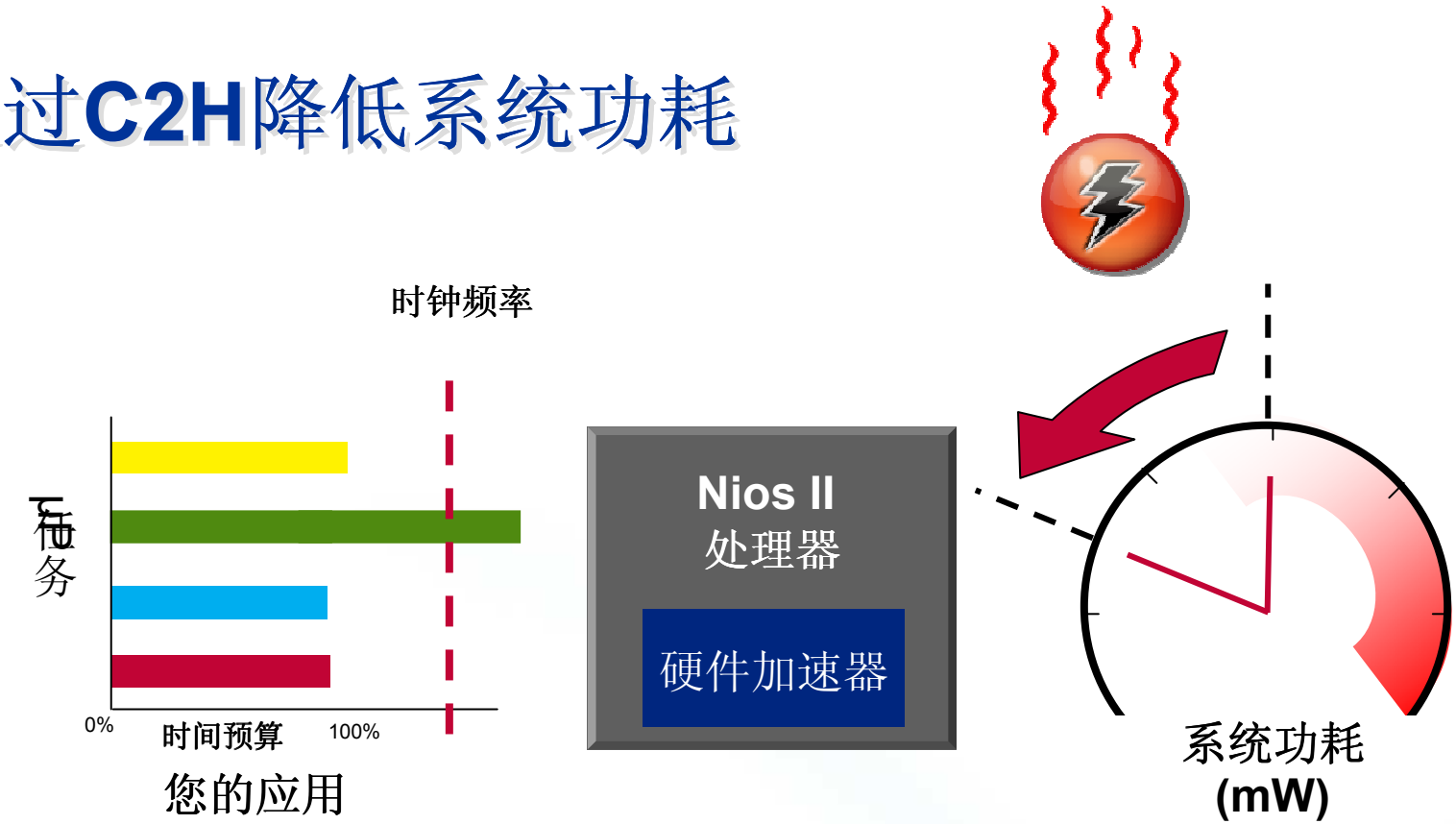
- 以1/5的功耗将性能提高5倍 (C2H)
  - AN531：采用硬件加速降低功耗
  - 下载设计实例







通过C2H降低系统功耗



硬件加速使您能够

- *满足性能要求*
- *降低时钟频率*
- *降低系统功耗*

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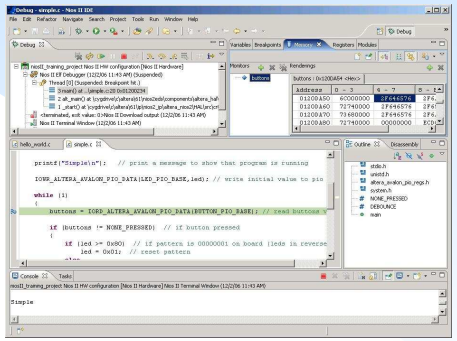
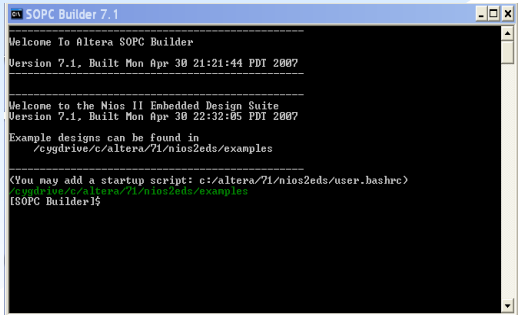
资源

Nios II嵌入式设计包



Nios II IDE：集成软件开发管理，构建，调试



Nios II软件构建流程：通过构建实现快速编译，脚本，全面控制

Nios® II

嵌入式设计包

HAL API

外设驱动器和运行时间软件库

GNU

GNU工具调试器，C/C++编译器

ALTERA

Nios II嵌入式设计包

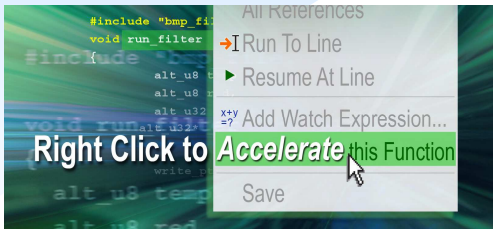
Micrium

µC/OS-II
The Real-Time Kernel

*Micrium的实时操作系统 **

interniche
technologies, inc.

*Interniche的商用级网络堆栈 **



*C语言至硬件(C2H)编译器 **

Nios® II

嵌入式设计包

NIOS II
TRACE32-ICD
LAUTERBACH

FS2
First Silicon Solutions

*FS2和Lauterbach的高级调试工具 **

* 通过套件或者网络下载可进行全面评估试用——许可单独销售

ALTERA

NEEK设计实例

设计实例	汽车	航空电子	消费类	DSP	图形加速	GUI工具	现场更新	启动会话
Altera Application Selector							■	■
Altera Picture Viewer (VGA)			■					
Altia HMI (Blue, Red)	■				■	■		
Graphics Equalizer				■				
Imagem 2D Graphics					■			
Imagem aPhone			■		■			
Imagem Avionics		■			■			
Imagem Instrumentation	■				■			
Imagem Taquin					■			
Imagem Watch					■			

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NEEK设计实例

设计实例	汽车	航空电子	消费类	DSP	图形加速	GUI工具	现场更新	启动会话
MenuDemo PlanetWeb						■		
Micrium uC-GUI Demo						■		
PlanetWeb Photo Frame			■			■		
SLS uCLinux						■		
PlanetWeb SpectraWorks						■		
TES 2D D/AVE 2D Graphics					■			■
UNEEK Presenter								■
Mandelbrot C2H (VGA)								■
Spinning Cube (VGA)								

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谢谢