PSoC在嵌入式系统和工程教学中的应用探讨

THE CYPRESS UNIVERSITY ALLIANCE PROGRAM

嵌入式系统联谊会
www.esbf.org.cn

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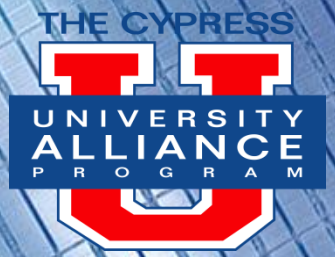
Agenda

- 什么是PSoC
- PSoC的价值和应用
- PSoC如何帮助强化工程教学
- Option1-CYPRESS大学计划简介
- Option2-CYPRESS公司概况
- Q&A

什么是PSoC



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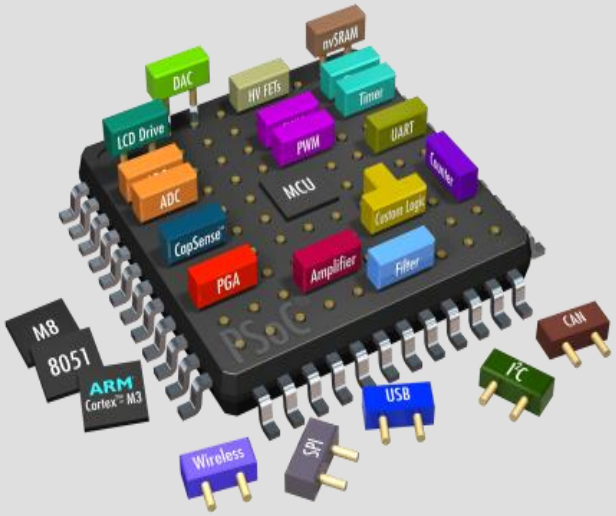
什么是 PSoC?



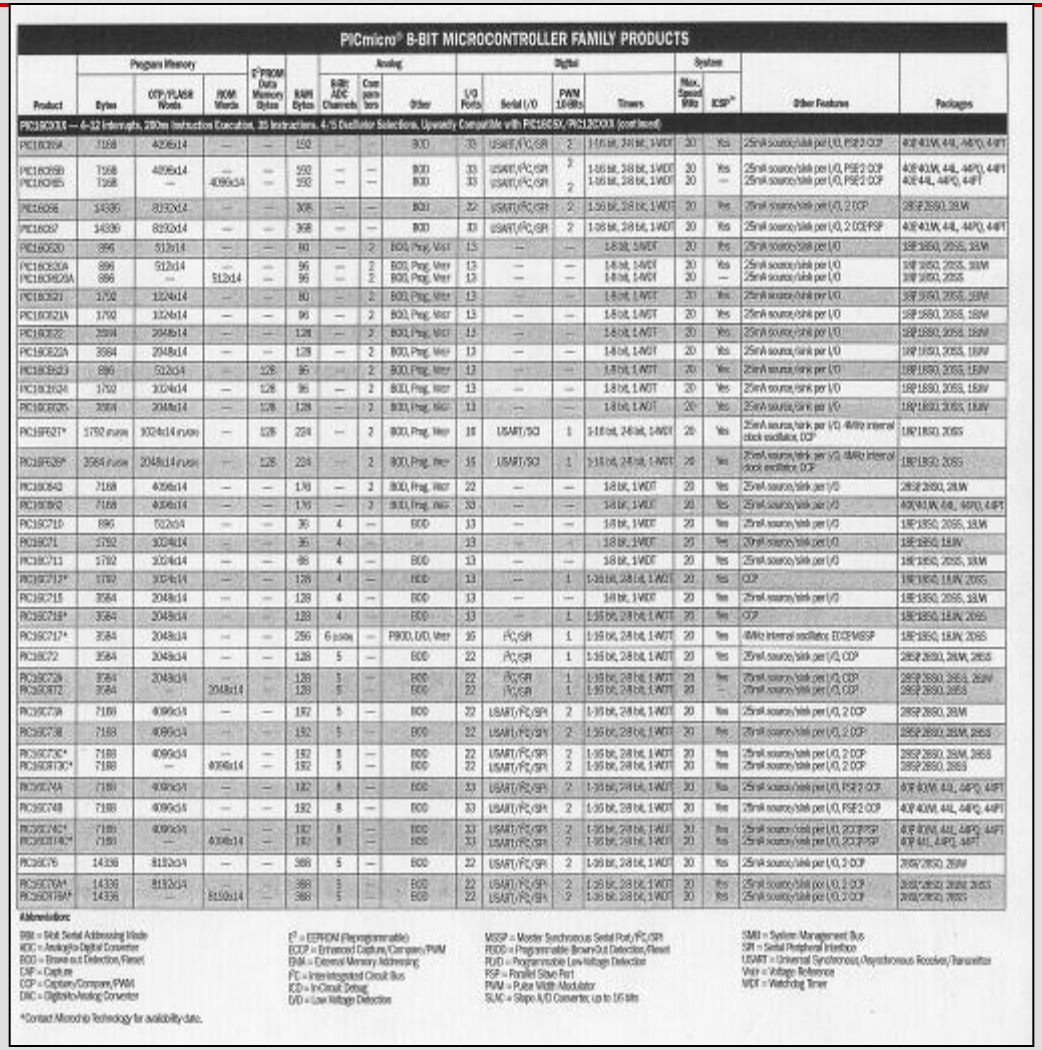
P rogrammable
S ystem
o n
C hip

PSoC 同时具备:

- 业界熟悉的微控制器
- CPLD的可配置特性
- ASIC的功能

PSoC 是一个真正的集成了可配置的模拟和数字外设、 存储器和微控制器的片上可编程系统.

PSoC: 先进的塞普拉斯科技正改变嵌入式系统设计



PICmicro® 8-BIT MICROCONTROLLER FAMILY PRODUCTS

Product	Program Memory: Bytes	Program Memory: OTP/FLASH Words	Program Memory: ROM Words	E²PROM Data Memory Bytes	RAM Bytes	Analog: 8-Bit A/D Channels	Analog: Comparators	Analog: Other	Digital: I/O Ports	Digital: Serial I/O	Digital: PWM 10-bits	Digital: Timers	System: Max. Speed MHz	System: ICSP™	Other Features	Packages
PIC18C601	16384	8192x14	—	—	768	—	—	BOD	70	USART, I²C/SPI	5	1-16 bit, 3-8 bit, 1-WDT	20	Yes	25mA source/sink per I/O, PSP, 2 CCP	80P, 80PT, 84L, 84PT
PIC18C801	32768	16384x14	—	—	1536	—	—	BOD	70	USART, I²C/SPI	5	1-16 bit, 3-8 bit, 1-WDT	20	Yes	25mA source/sink per I/O, PSP, 2 CCP	80P, 80PT, 84L, 84PT
PIC18C858	32768	—	16384x14	—	1536	—	—	BOD	70	USART, I²C/SPI	5	1-16 bit, 3-8 bit, 1-WDT	20	—	25mA source/sink per I/O, PSP, 2 CCP	80P, 80PT, 84L, 84PT
PIC18C658	16384	8192x14	—	—	768	—	—	BOD	52	USART, I²C/SPI	5	1-16 bit, 3-8 bit, 1-WDT	20	Yes	25mA source/sink per I/O, 2 CCP	68P, 68L, 64PT
PIC18C652	16384	8192x14	—	—	768	—	—	BOD	70	USART, I²C/SPI	5	1-16 bit, 3-8 bit, 1-WDT	20	Yes	25mA source/sink per I/O, 2 CCP, PSP	80P, 80PT, 84L, 84PT
PIC18C601	16384	8192x14	—	—	768	—	—	BOD	70	USART, I²C/SPI	5	1-16 bit, 3-8 bit, 1-WDT	20	Yes	25mA source/sink per I/O, 2 CCP, PSP	80P, 80PT, 84L, 84PT
PIC18C801	32768	16384x14	—	—	1536	—	—	BOD	70	USART, I²C/SPI	5	1-16 bit, 3-8 bit, 1-WDT	20	Yes	25mA source/sink per I/O, 2 CCP, PSP	80P, 80PT, 84L, 84PT
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PIC18C652	16384	8192x14	—	—	768

Over 1 Billion PSoC Devices Sold

1 000 000 000

8 Years+ of Explosive PSoC Growth

8,000+ Active PSoC Customers

PSoC is Everywhere!

CYPRESS PSOC TAKES SHARE IN 8-BIT MCU MARKET

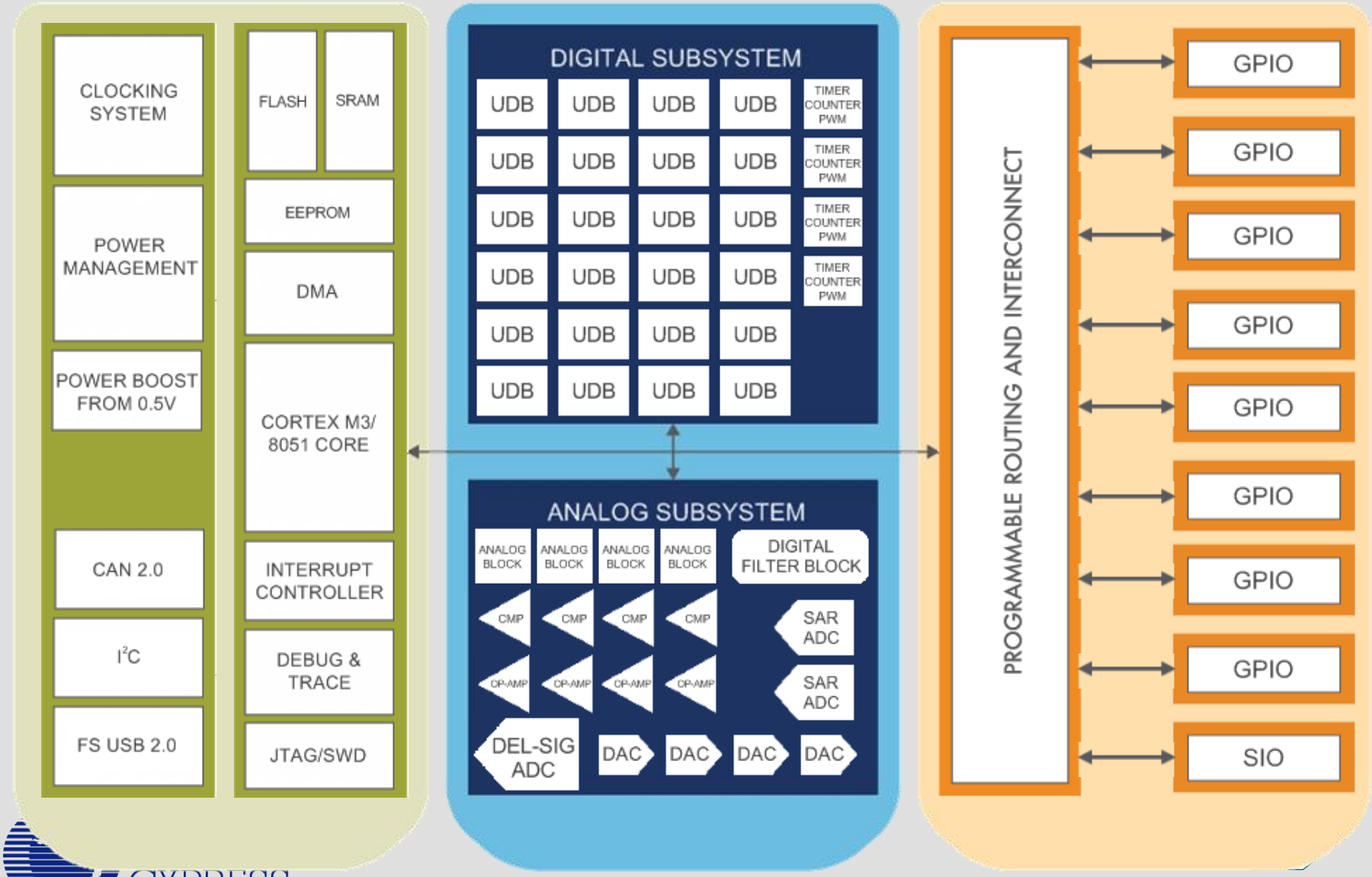
RANK	2003	2004 – 2005	2006 – 2007	2008 – 2009	2010 – 2011 (EST.)
1	FREESCALE	MICROCHIP	MICROCHIP	MICROCHIP	RENESAS
2	RENESAS	FREESCALE	FREESCALE	NEC	MICROCHIP
3	MICROCHIP	NEC	ATMEL	FREESCALE	ATMEL
4	NEC	RENESAS	NEC	ATMEL	ST MICRO
5	ATMEL	ATMEL	RENESAS	ST MICRO	FREESCALE
6	ST MICRO	ST MICRO	ST MICRO	RENESAS	NXP
7	TOSHIBA	NXP	NXP	NXP	**CYPRESS**
8	NXP	TOSHIBA	TOSHIBA	**CYPRESS**	PANASONIC
9	PANASONIC	PANASONIC	PANASONIC	FUJITSU	FUJITSU
10	SAMSUNG	SAMSUNG	FUJITSU	TOSHIBA	SAMSUNG
11	SONY	INFINEON	INFINEON	SONY	DATANG MICRO
12	FUJITSU	FUJITSU	**CYPRESS**	PANASONIC	SONY
13	INFINEON	SONY	SAMSUNG	SAMSUNG	TOSHIBA
14	HYNIX	SUNPLUS	SONY	DATANG MICRO	SILICON LABS
15	SANYO	SANYO	DATANG MICRO	SILICON LABS	JSC SITRONICS
27		**CYPRESS**			
29	**CYPRESS**				

SOURCES: iSuppli (through 2007); Gartner (2008–2010) and Cypress (2011)

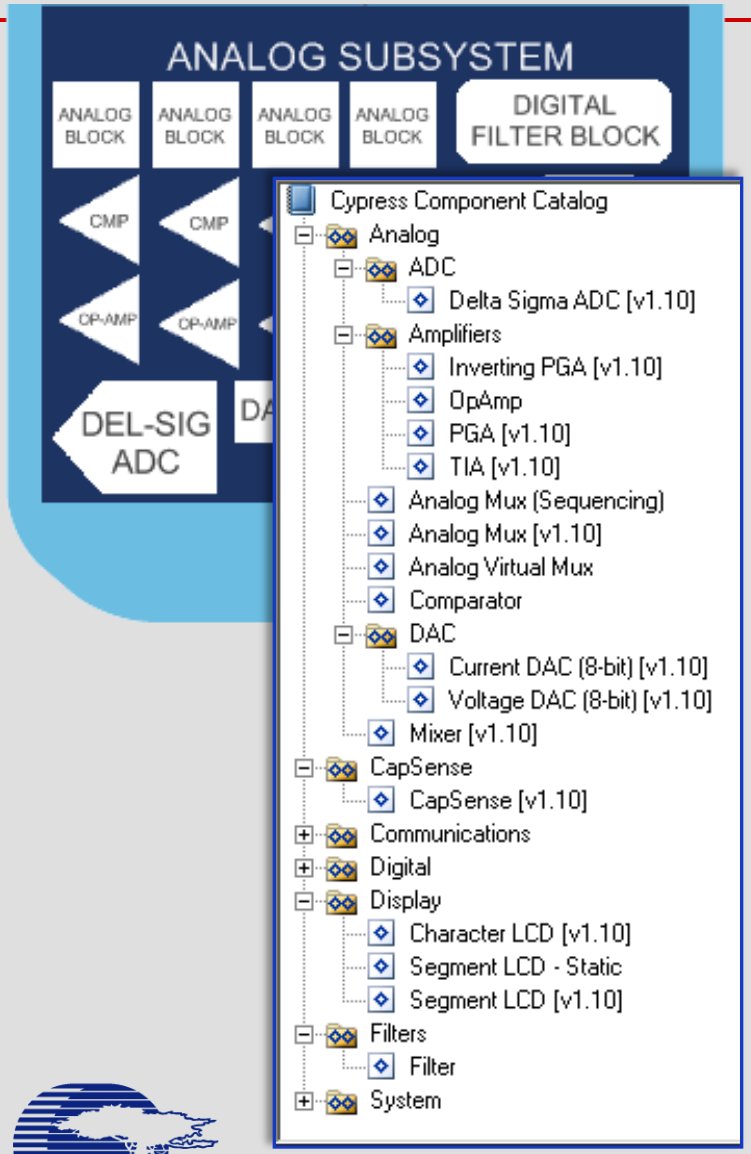
*Estimates as of February 14, 2012

THE CYPRESS UNIVERSITY ALLIANCE PROGRAM
PERFORM
Cypress Perform

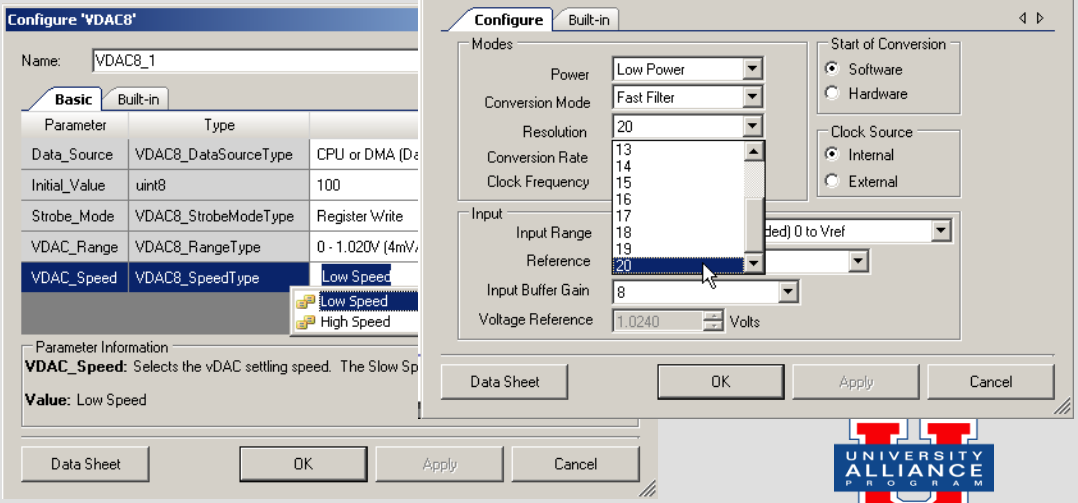
PSoC – Much More Than An MCU…



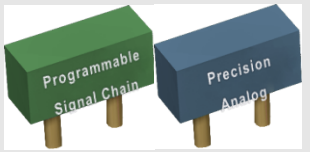
High-Precision Analog



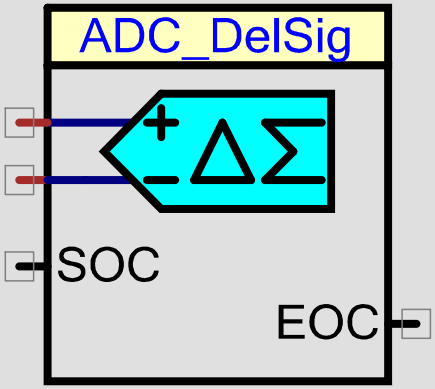
- Best of Both Worlds:
  - High-precision, dedicated analog
  - Flexible, programmable analog
- DSP-like digital filter capability
- Rich library of pre-built, characterized components



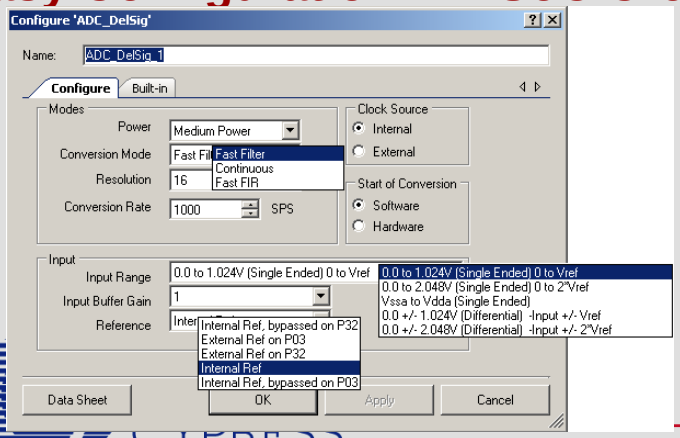
Integrated 20-bit Delta-Sigma ADC



- Configurable resolution 8-bits to 20-bits
- Configurable sample rates up to 375Ksps
- Single & differential input modes
- Up to 62 channels
- Offset less than +/- 100uV
- INL / DNL less than 1 LSB
- Gain Error less than +/- 0.2%



Easy Configuration in PSoC Creator

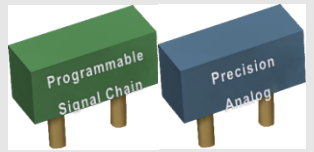


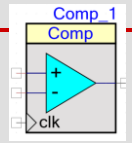
Significant BOM savings through integration

	PSoC 3 or 5	TI ADS1230	PSoC	AD73360
Resolution	20-bit	20-bit	16-bit	16-bit
Sampling Rate	180 sps	80sps	48Ksps	64Ksps
SNR	110dB	110dB	90dB	77dB

THE CYPRESS UNIVERSITY ALLIANCE PROGRAM PERFORM

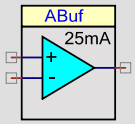
Unmatched Analog Integratior





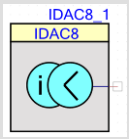
Up to 4x Comparators (~LM338) ~~4x ~$0.08 = $0.32~~

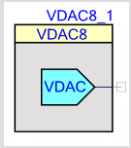
±2mV Input Offset, 75ns response time, Max 32mV Hysteresis



Up to 4x OpAmps (~LMV712) *4x ~$0.28 = $1.12*

0.5mV Input Offset, 6MHz Bandwidth, 25 mA drive capability



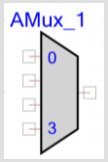


Up to 4x VDACs / IDACs (~DAC084) *4x ~$0.35 = $1.40*

1Msps VDAC or 8Msps IDAC, Adjustable output in 255 steps

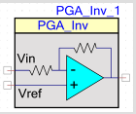
Precision Voltage Reference (~LT1790B) *1x ~$1.00 = $1.00*

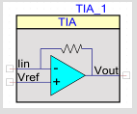
1.024V internal reference with ±0.1% initial accuracy (@ 25C)



Analog Mux (~12X CD4051) *12x ~$0.08 = $0.96*

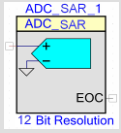
Up to 62 inputs; routing from any pin to all analog components





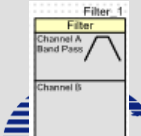
Up to 4x Prog. Analog Blocks (*No Equivalent*) *4x ~$0.35 = $1.40*

Configurable to PGA, TIA, Mixer, and Sample & Hold



Up to 2x 12-bit SAR ADCs (~TI ADS1250) *2x ~$0.80 = $1.60*

Up to 1Msps with INL / DNL less than 1 LSB



Digital Filter Block (~TI ADS1250) *1x ~$0.50 = $0.50*

24-bit filter co-processor; up to 4 HW IIR & FIR filters

> $10.00 of Integratio

可编程模拟部分:丰富的功能

模拟外设

模数转换:ADC
- 一个20位精度ADC
- 二个12位精度采样率在1M的SAR ADC

数模转换:DAC
- 6-12位精度

滤波器Filter
- 多节模拟滤波
- 高速数字滤波模块

调制器

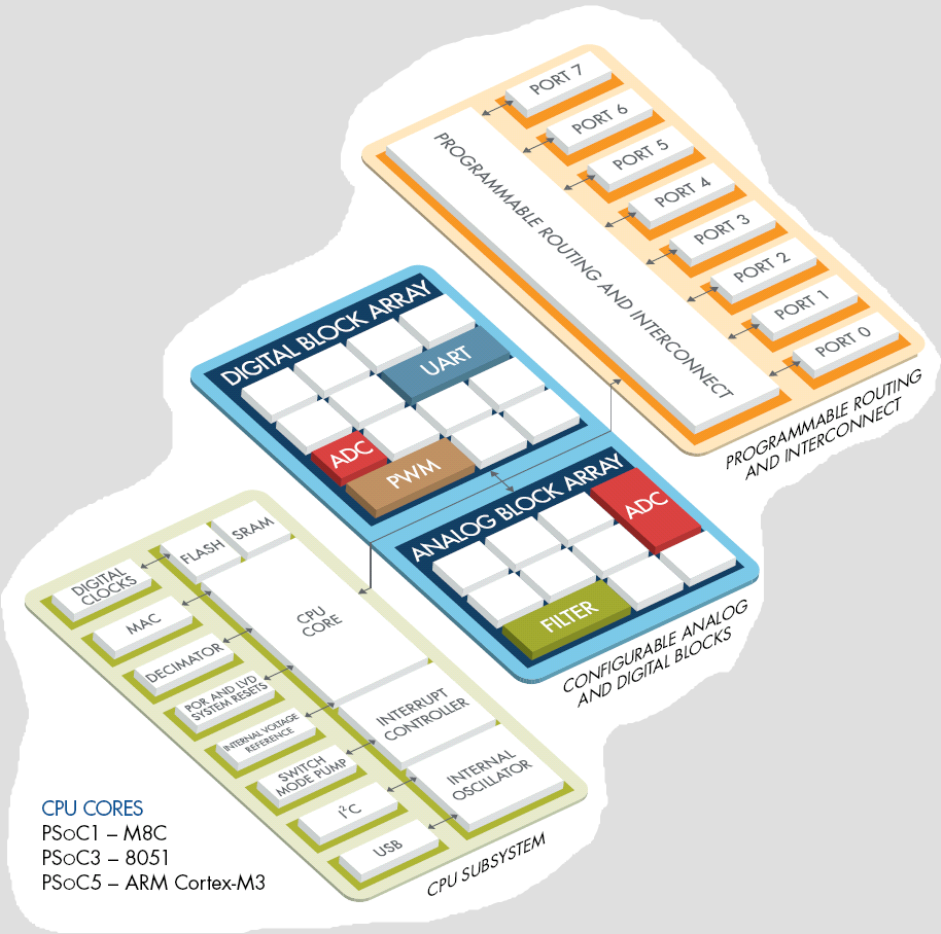
峰值检测

触摸按键检测

电压到电流转换

放大器
- 可编程增益
- 仪表放大器
- 电阻传输放大和转换

低电压比较器



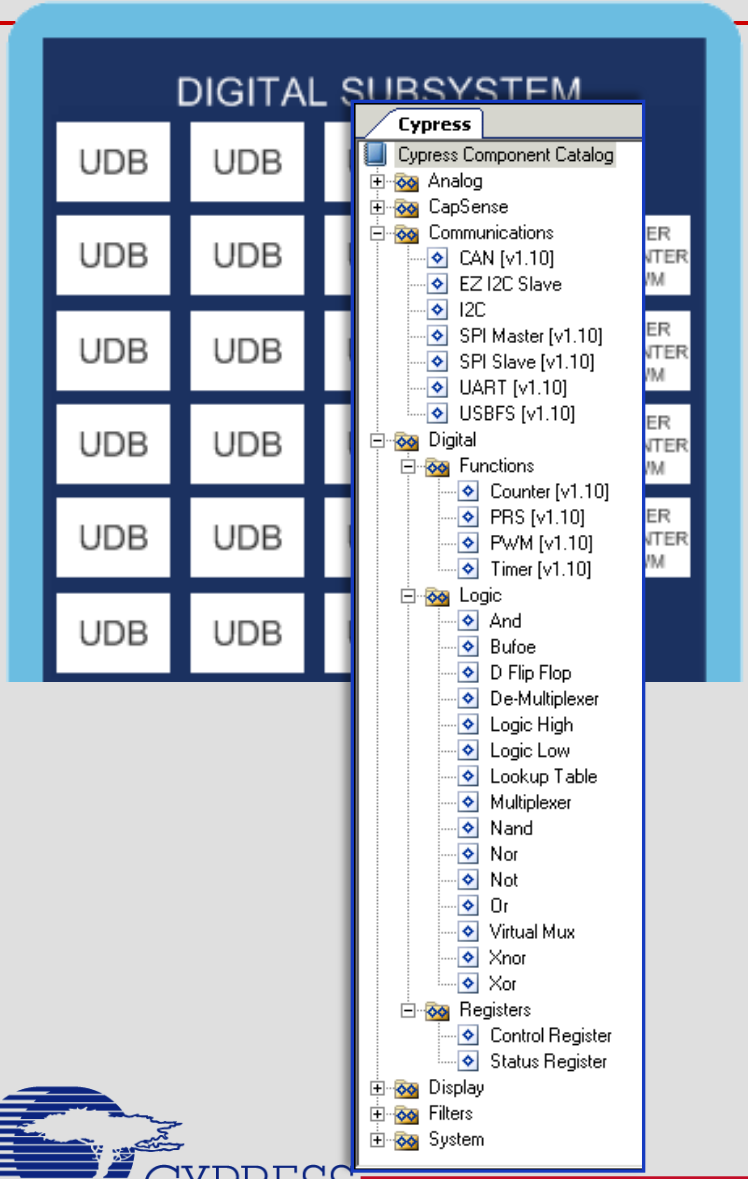
传感器

- 压力
- 湿度
- 电流
- 空气流量
- 加速度
- 红外
- 光线
- 电压
- 温度
- 感应
- 气体
- 液面
- 超声

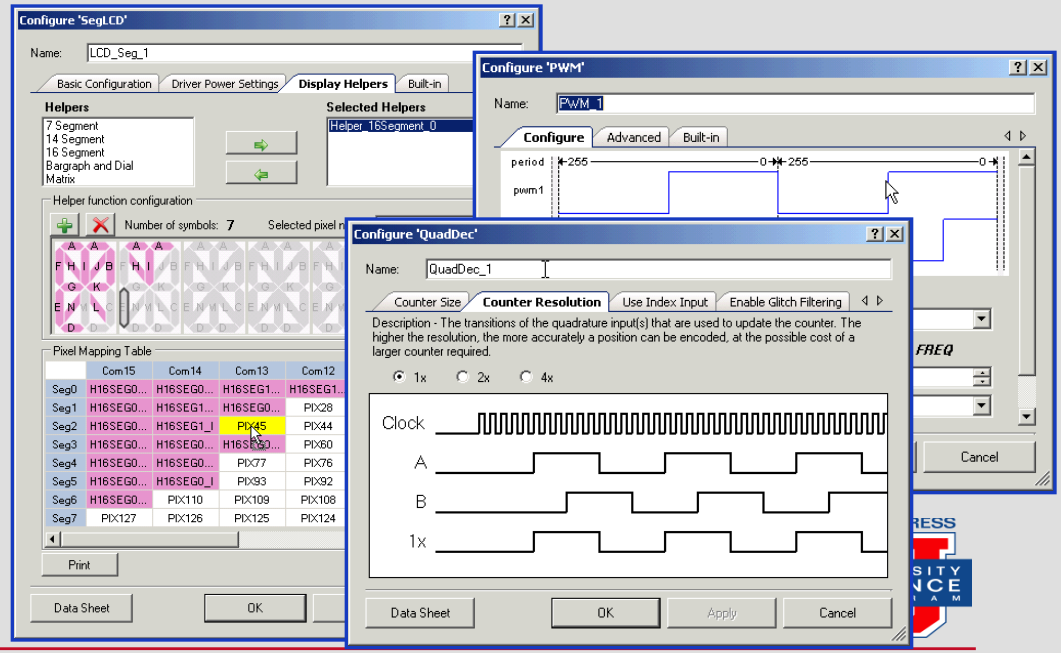
控制

- 交流电机
- 直流电机
- 油泵
- 充电
- 测量

Powerful, Flexible Digital Logic

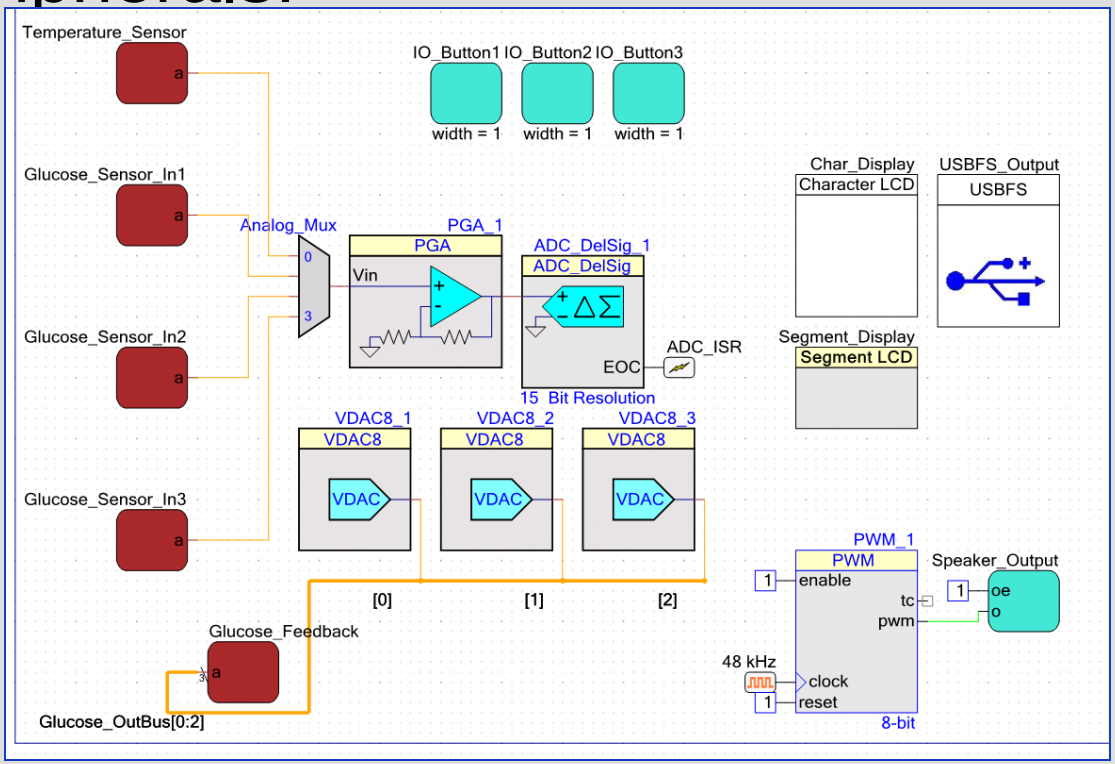


- Powerful PLD-based digital system
- Each UDB ≈ small 8-bit processor
- Optimized 16-bit Timer/Counter/PWM Blocks
- Rich library of pre-built, characterized components

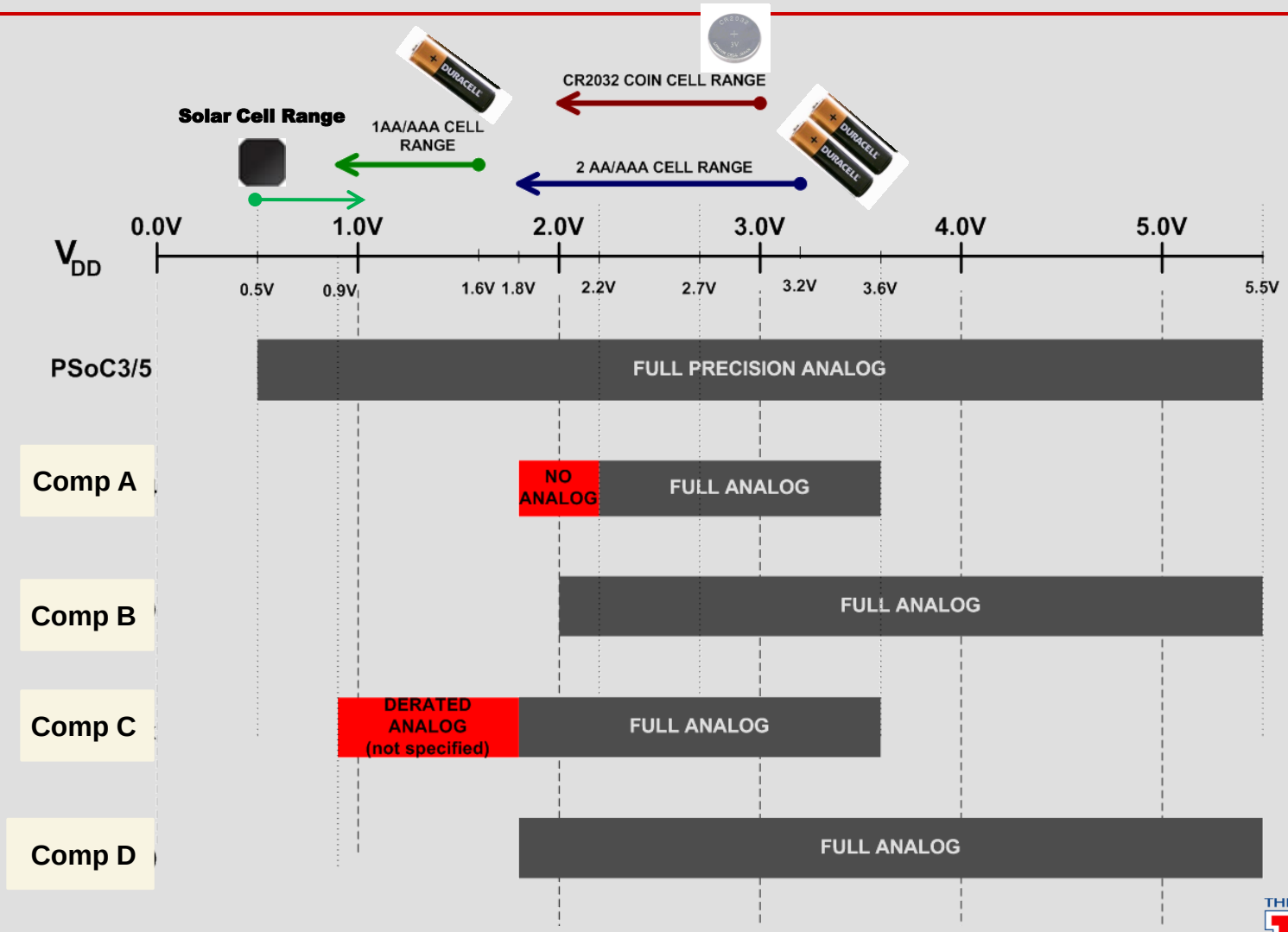


Digital Peripherals

- Sample of Digital Peripherals:
  - Counter
  - Timer
  - PWM
  - PRS
  - I2C
  - USB
  - UART
  - SPI
  - CAN
  - Char/Segment LCD Drive

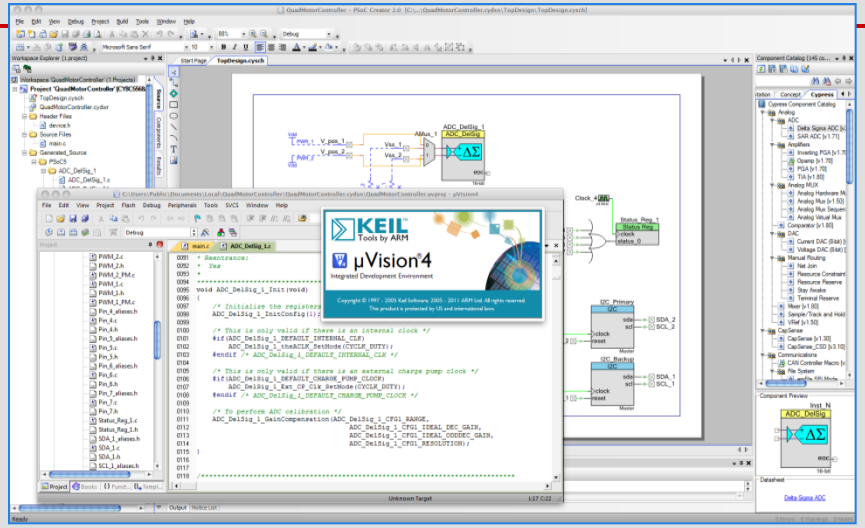


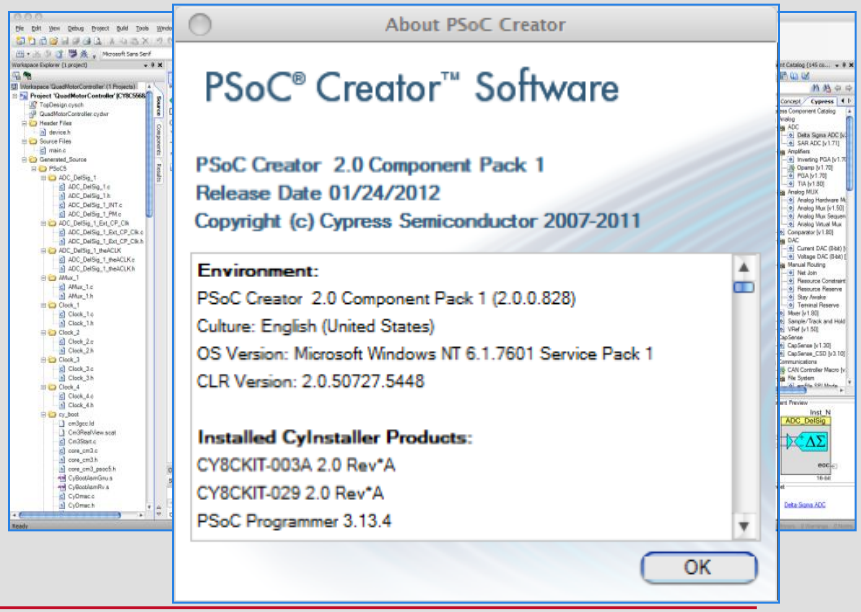
最宽的工作电压范围


CR2032 COIN CELL RANGE
Solar Cell Range
1AA/AAA CELL RANGE
2 AA/AAA CELL RANGE
0.0V
1.0V
2.0V
3.0V
4.0V
5.0V
VDD
0.5V
0.9V
1.6V
1.8V
2.2V
2.7V
3.2V
3.6V
5.5V
PSoC3/5
FULL PRECISION ANALOG
Comp A
NO ANALOG
FULL ANALOG
Comp B
FULL ANALOG
Comp C
DERATED ANALOG (not specified)
FULL ANALOG
Comp D
FULL ANALOG

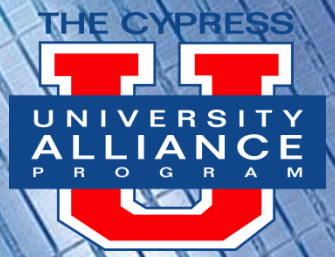
PSoC Creator 2.0

- Integration with Keil µVision 4
  - Seamless export/debug support
  - Same library functions transfer
  - De facto ARM standard IDE
- Introducing Component Packs
  - New peripherals every 8-weeks
  - Smaller, incremental updates and releases of new peripheral sets
  - Equivalent to new Silicon for traditional MCUs
- PSoC Peripheral of the Month
  - Unique capabilities enabled by PSoC
  - Introducing the Digital Filter v2.0





PSoC的价值和应用



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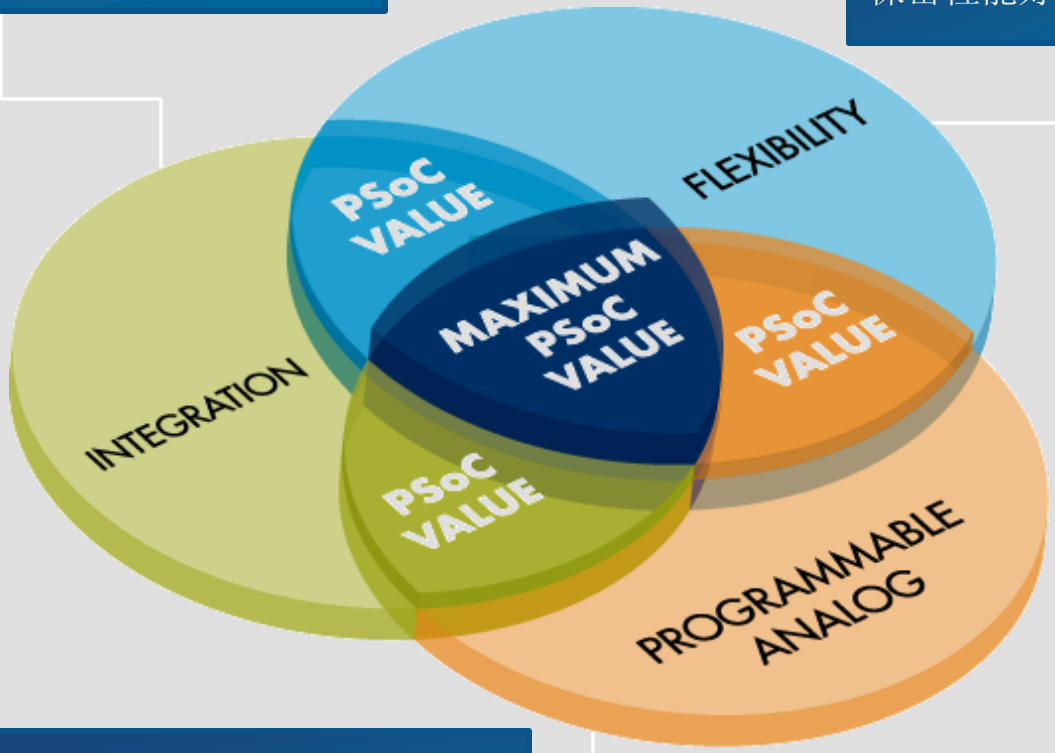
PSoC 价值

整体成本: 包含模拟线路和单片机所有资源
生产成本: 减少芯片数量和线路板体积和层数
提高电源效率

随时改变产品定义
非常短的设计周期
允许你最后一分钟调整硬件
保密性能好



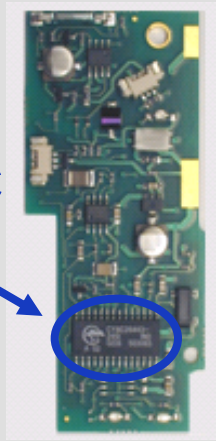
匹配弱且有噪声的信号
复杂的混合信号应用
运算放大, 滤波, 数模转换, 比较, 模数转换

PSoC 的高集成度: 减少料号,提高生产效率

- 减少元件数量
- 通过软件进行修改
- 简化制造流程

90 个元件

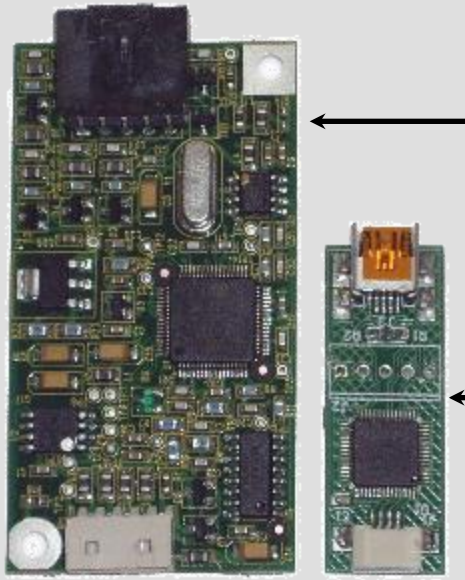
PSoC



28 个元件

使用 PSoC前

使用 PSoC后



典型的触摸屏方案

CapSense™ 触摸屏方案

PSoC Solution in Sequiam SmartScan™ Lock

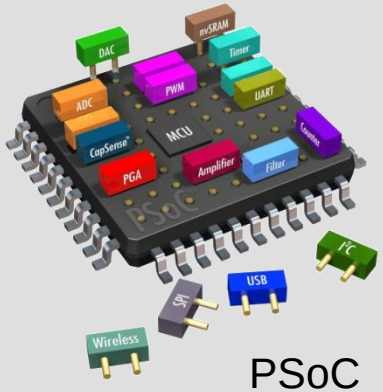
PSoC solution enables keyless entry using biometric data.

SmartScan Lock

- Finger swipe door lock
- Uses authentic fingerprint sensor
- Made for Black & Decker

PSoC Solution Features:

- Battery monitoring
- Serial communications



PSoC

PSoC Device in SignalOne KidSmart™ Smoke Detector

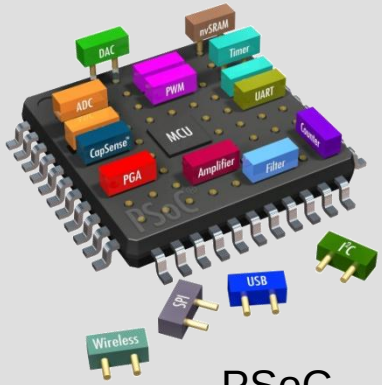
PSoC integrates multiple peripheral functions, saving SignalONE design time, board space and power consumption.

KidSmart Voice Smoke Detector

- Uses specialty voice recorder chip to record 15 seconds of parent's voice to play upon smoke detection – studies show this wakes up children much faster than a beeping alarm
- UL approved and CE listed

PSoC Solution Features:

- User modules include:
  - –Programmable gain amplifier
  - – 24-bit counter
  - – 8-bit delta sigma ADC



PSoC

PSoC Solution in Korg Music Synthesizer

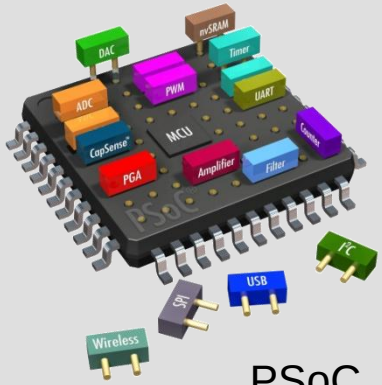
PSoC solution provides joystick sensor and LCD touch panel controls.

Korg M3-61 Music Synthesizer

- 61 key music synthesizer
- Features Enhanced Definition Synthesis sound generator
- Features "Korg Komponent System" concept that facilitates more flexible system construction
- Advanced voicing technology, 1,028 multi-samples, 1,606 drum samples, dual oscillators, 4-level velocity switching/layering and stereo sampling allow for an enormous range of high-quality sounds .

PSoC Solution Features:

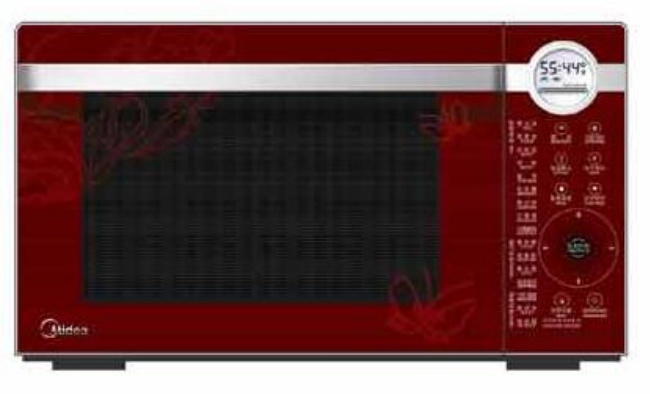
- Joystick Sensor
- LCD touch panel



PSoC

CapSense Device on Midea Microwave Ovens

CapSense provides buttonless interface for operating oven.



Midea Microwave Oven

- Features stylish buttonless interface
- Midea is one of China's largest white goods manufacturers

CapSense Solution Features:

- Capacitive touch-sensing controls
- Attractive and stylish user interface
- BOM reduction

Button replacement with CapSense solution

CapSense Device in Indesit Cooktop

CapSense touch-sensing buttons provide an elegant user interface.

Indesit/Hotpoint Cooktop

- Inductive, radial and hybrid heating elements
- Touch controls
- Modular design for flexibility

CapSense and PSoC Solution Features:

- Elegant, touch-sensing interface
- PSoC enables SPI interface to main board, and modular design for flexibility

Button replacement with CapSense solution

PSoC Device in Haier Water Heater

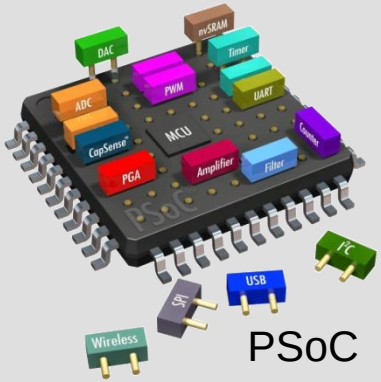
PSoC mixed-signal array and CapSense capacitive sensing technology provide attractive styling, durability, fast design cycles and lower component costs.

Haier Water Heater

- 60 liter water capacity
- LCD display with remote control
- PSoC controls 6 CapSense buttons and I^2C interface with main MCU

PSoC Solution Features:

- Space-saving, cost-saving design with few external components
- Flexibility for firmware/hardware change



PSoC

CapSense Device in Whirlpool AWOE Washing

CapSense provides buttonless interface for controlling machine settings.

Whirlpool Premium Clothes Washers

- AWOE Premium Collection washing machines feature Sixth Sense technology which recognizes the size of a load and automatically adjusts to save time, water and energy

CapSense Solution Features:

- CapSense Plus touch-sensing controls the 6th Sense indicator lighting on the main display
- Provides durable, waterproof interface that is both practical and stylish

Button replacement with CapSense solution

PSoC Device in Haier Washing Machine

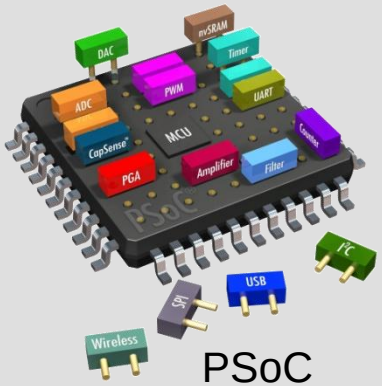
PSoC mixed-signal array and CapSense touch-sensing buttons provide an elegant and durable user interface, fast design cycles and reduced component costs.

Haier HW1/2 Washing Machine

- 8 kg capability
- LED display
- PSoC controls 12 CapSense buttons and GPIO communication with main MCU. Also drives LEDs.

PSoC Solution Features:

- Space-saving, cost-saving design with few external components
- Drives LEDs with extra GPIOs
- Flexible for firmware/hardware changes
- Waterproof design



PSoC

PSoC and WirelessUSB™ Devices

WirelessUSB™ and PSoC deliver Sony a combination of robust radio performance, immunity to interference, and peripheral function control.

Sony VAIO® Keyboard and Mouse
- Reduced time to market
- Reduced system BOM
- Provided extensive design support

WirelessUSB LS Solution Features:
- 2.4 GHz agile DSSS radio

PSoC Features:
- UART control
- Battery control
- Full-speed USB interface

WirelessUSB

PSoC

THE CYPRESS UNIVERSITY ALLIANCE PROGRAM

PERFORM

Complete Cypress HID Solution in Logitech Presenter

Multiple design wins including WirelessUSB, PSoC and enCoRe™.

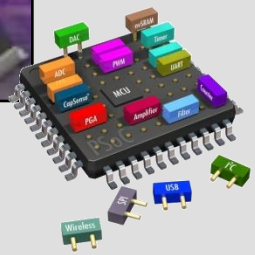
Cordless Presenter tool
- Enables flawless wireless connectivity
- Reduced system cost by component integration
- One-stop-shop component supplier

WirelessUSB LS Solution Features:
- 2.4 GHz agile DSSS radio

PSoC Features:
- LCD controller
- Button and battery control

enCoRe Features:
- Low-speed USB interface

WirelessUSB



PSoC

灵活性：降低研发时间和成本

PSoC的灵活性和可编程性允许你能根据要求迅速改动

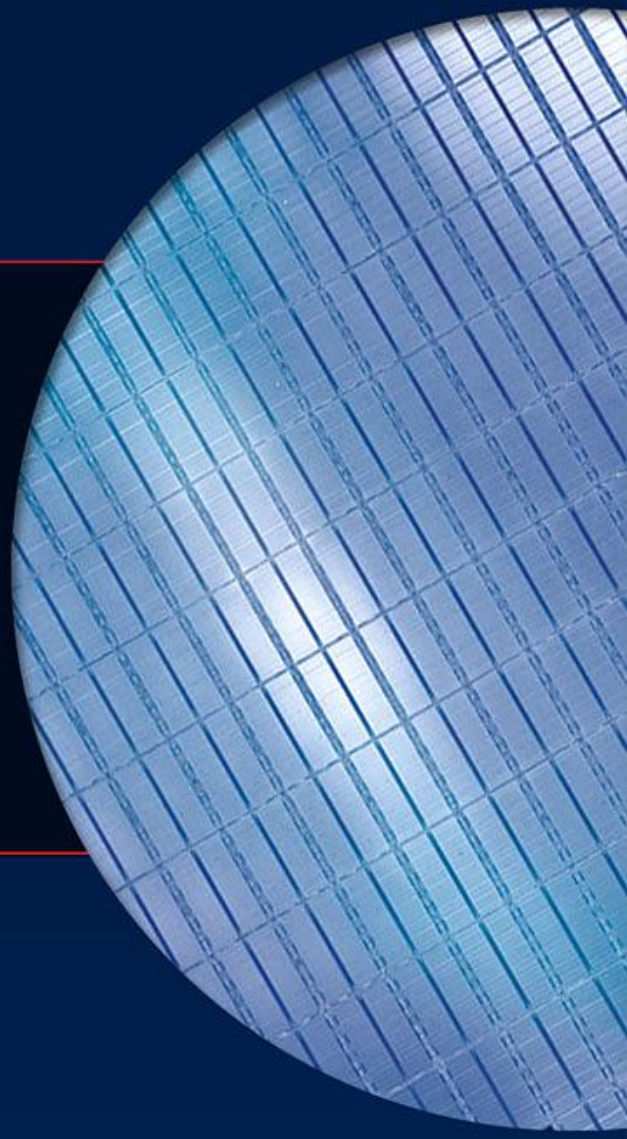
PSoC 建立的是系统价值

在开发和生产中节约成本

快速产生更多的价值

保护你的投资和资产

PSoC在教育界的应用



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PSoC如何帮助强化工程教学1

- PSoC中的三种技术可单独或组合使用
  - 对于运放，滤波器设计以及其他模拟课程，可以仅仅使用模拟模块
  - 对于数字电路原理介绍，可以仅仅使用数字模块
  - 对于汇编或C 语言编程课程，可以使用 MCU
  - 对于嵌入式系统或控制系统，可以同时使用
  - *例如清华大学*

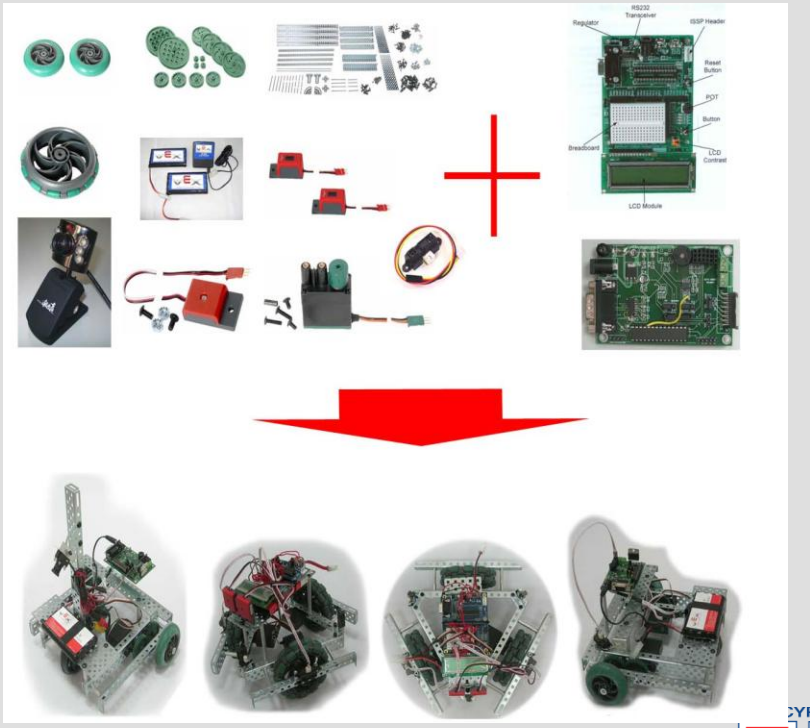
TABLE I
COURSE RELATED TO ELECTRONIC SYSTEM DESIGN

Students	Autumn	Spring	Summer
Undergraduates -freshman	C language	Electric Circuits 1	C language course training
Undergraduates -sophomore	1)Electric Circuits 2 2)Fundamentals of digital electronics	1)Fundamentals of analog electronics 2) Computer theory 3) Signal and system	Electronic Technology Course Design
Graduates		Special Topics on Electronic Technology	

Cypress Perform

PSoC如何帮助强化工程教学2

- 上海交通大学自动化系本科生和研究生机器人教学引入平台，2012年PSoC机器人课程正式成为自动化系必修课。



PSoC如何帮助强化工程教学3

北京交通大学计算机学院已经在小学期相关实践课程教学环节中，在美国Cypress公司提供的CY8CKIT-030开发平台上，完成模拟电子和数字电子课程实践教学环节。

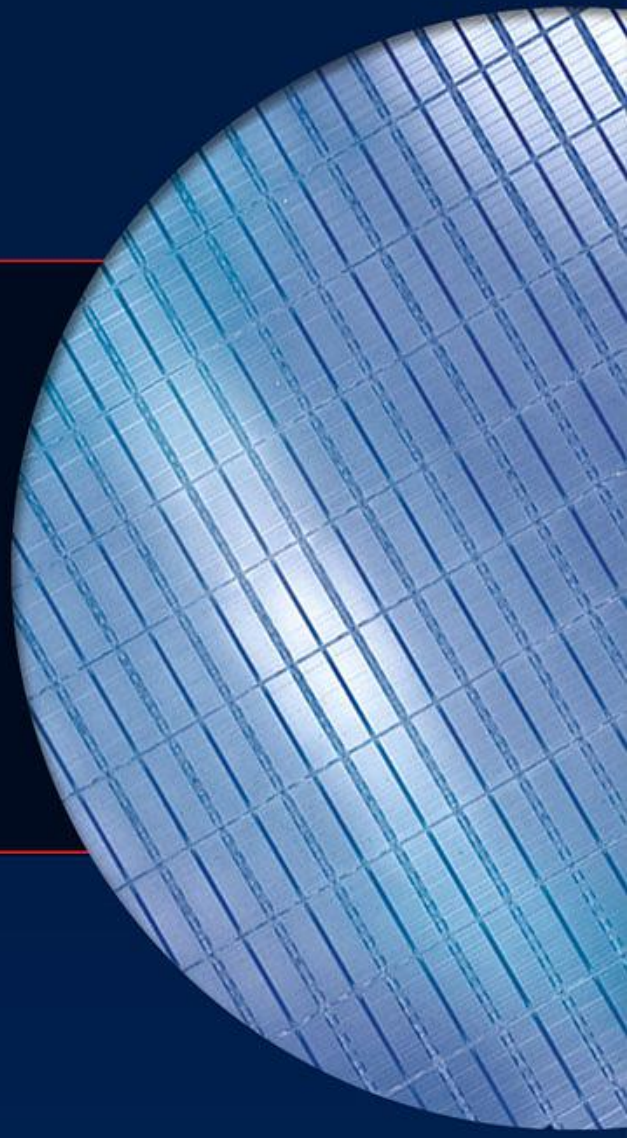
北京理工大学电子学院在电子信息专业学生进行单片机课程教学时，引入该设计平台。其自动化学院也在进行相关课程的准备工作。

PSoC如何帮助强化工程教学4

天津大学基于PSoC的医学物联网项目和教学
台湾科技大学基于PSoC图形化工具教学
台湾科技大学基于PSoC的物联网实验室和课程

More?

PSoC教学资源



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PSoC开发工具和资源

PSoC完整开发软件下载： http://www.cypress.com/?id=2492
PSoC1所有资料下载：http://www.cypress.com/?id=1573
PSoC3所有资料下载：http://www.cypress.com/?id=2232
PSoC5所有资料下载：http://www.cypress.com/?id=2233
Cypress PSoC产品的培训资料下载: http://www.cypress.com/?id=1162&/

Cypress全球技术支持链接：
http://www.cypress.com/myaccount/?id=7&techSupport=1

开发工具和样片申请:

- 填写赠送表格
  http://www.cypress.com/go/university/donation_program_form
- 发送给 rwei@cypress.com

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PSoC: 一个平台, 3 个系列

•PSoC1

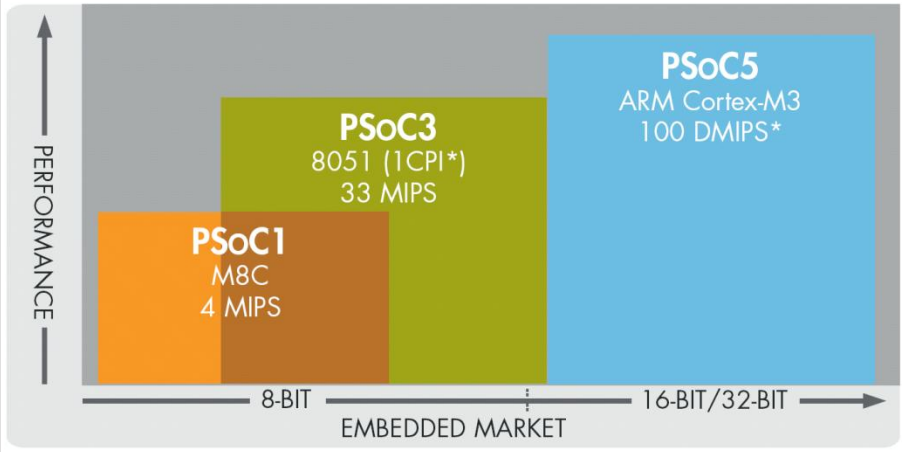
• 高性能,灵活可编程,低成本的8位M8C处理器系统.

•PSoC3

• 单周期,流水线架构8位8051处理器,带有高性能可编程的数字和集成了无与伦比的模拟电路,确保系统的高集成度.

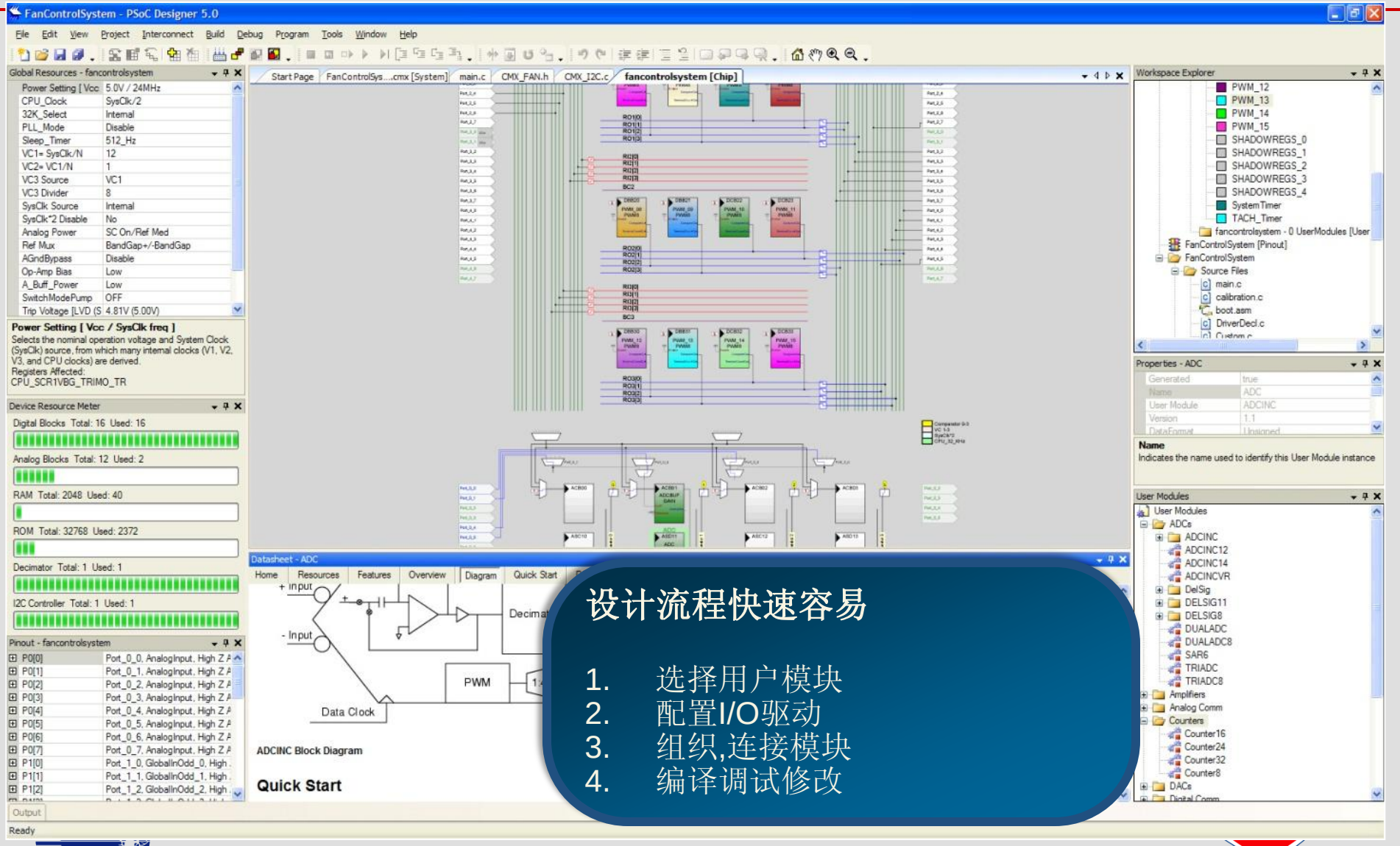
•PSoC5

•32位,80M赫兹的ARM Cortex-M3 核, 应用于需要高性能处理器,复杂,大容量FLASH, SRAM 和实时操作系统支持的场合



*CPI = Cycles Per Instruction
*DMIPS = Dhrystone MIP performance benchmark applicable to ARM processors

PSoC Designer: PSoC1开发环境



PSoC1 开发工具

- 入门工具
- **FirstTouch Kit**

评估板

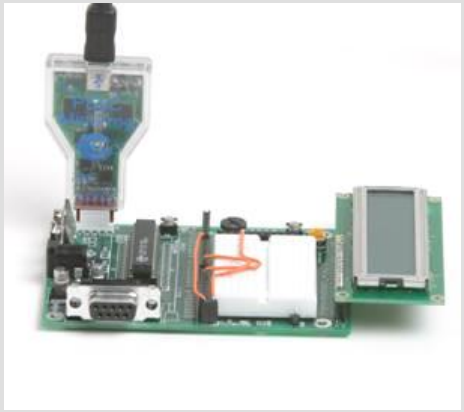
- **CapSense**
- **Sensors**
- **USB**

开发工具

- **ICE-Cube**
- **Programmer**

CYPRESS专为大学提供的打包工具

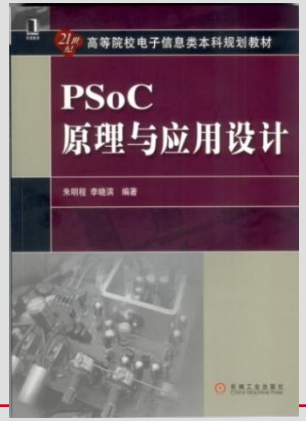
- CY3210-PLOC10
  - 10套装 CY3210-PSoCEval1， 带 C 编译器授权



- CY3210-PLOC10POD
  - 10 套装PODs

PSoC1教材和试验指导书

1. 《系统可配置单片机原理与应用》， 作者：戴国骏; 张翔; 曾虹
   1. ISBN(书号)：978-7-111-26727-0 普通高等教育“十一五”国家级规划教材
2. 《PSoC原理与应用设计》，作者：朱明程；李晓滨，
   机械工业出版社，ISBN: 978-7-111-23404-3
3. 《可编程片上系统(PSoC)原理及实训》，作者：叶朝晖；华成英
   清华大学出版社，ISBN: 978-7-302-17099-0
4. 《PSoC片上系统的原理与应用》，
   上海大学出版社，ISBN: 978-7-81058-585-1
5. 《嵌入式系统硬件体系设计》，作者：怯肇乾
   北京航天航空大学出版社，ISBN: 978-7-81077-976-0

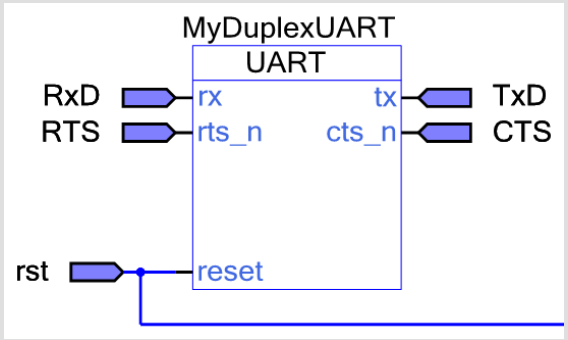


PSoC Creator：PSoC 3&5开发环境 -比IDE更好的开发环境

功能强大

设计你自己的方案

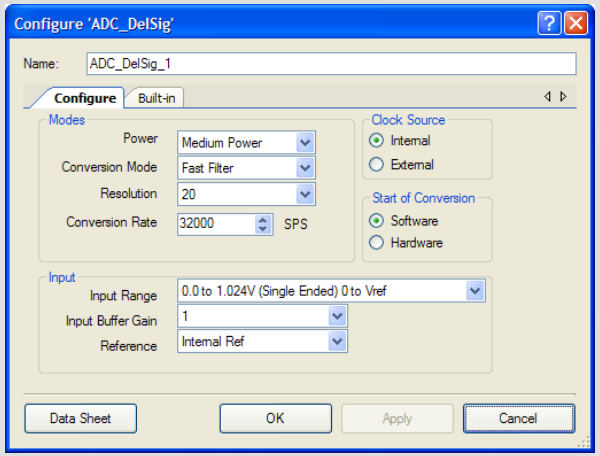
- 入门级图形化设计
  - 基于原器件
  - 连线工具
- 元件库
  - 模拟
  - 通信
  - 数字功能
  - 数字逻辑
  - 显示
- 用户可扩展
  - 简单设计，重新应用



易用

不用了解细节

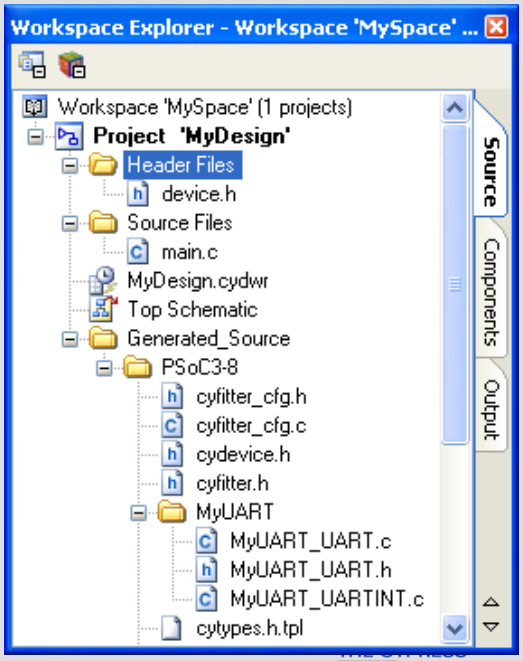
- 目录式的参数编辑
- 自动时钟产生
  - 选择频率
  - 选择数据速率
- 自动软件API函数产生
  - 不用看寄存器
- 自动内部信号连接



灵活

快速变化

- 硬件/软件同时设计
- 自动管脚走线
  - 人工指定管脚就可以了
- 重新改变设计,一蹴而就
- 交叉编译,分钟搞定.



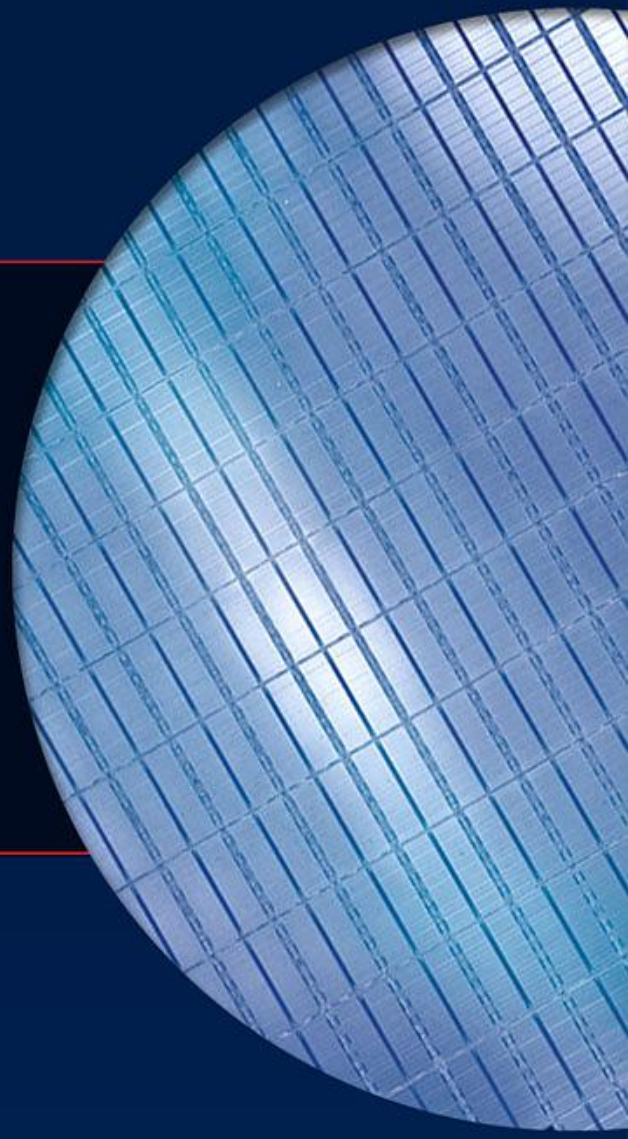
开发工具: 把你的创意变成产品

- **Starter Kit—入门级的开发工具**
  - 有加速度, 温度传感器, 触摸按键和LED输出
- **Evaluation Kits—评估板**
  - 精确电压表
  - 模拟传感器评估板; 电子秤, 热电耦,陀螺仪, 红外, 环境光传感器.
  - 段式LCD驱动
  - 低功耗,低电压
  - 触摸按键+
- **Development Kit—开发板**
  - PSoC3 开发板
  - PSoC5 开发板
  - 支持包括无线的类扩展卡

PSoC3/5教材和试验指导书

1. 《可编程片上系统PSoC设计指南》，作者：何宾，ISBN 978-7-122-11583-6，化学工业出版社
2. 《8051片上可编程系统原理及应用》，作者：何宾，ISBN 978-7-122-12675-7，化学工业出版社
3. 《PSoC模拟与数字电路设计指南》，作者：何宾，2012年6月出版
4. 《ARM Cortex-M3片上可编程系统原理及应用》，2012年10月出版

CYPRESS大学计划



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Cypress 大学合作愿景

与著名大学建立战略合作伙伴关系，使师生们能够在教室、实验室以及研发项目中采用Cypress最前沿的技术。

大学计划合作模式

- **Cypress：**
  - 免费提供开发工具及PSoC样片
  - 基础培训及技术支持
  - 教师、学生购买Cypress产品的特殊优惠折扣
  - 优秀学生的实习、工作机会
  - 每年一次的全球创新设计大奖赛
  - 资助教师出版PSoC相关书籍和教材
  - 共建联合实验室
- **学校：**
  - 开设PSoC课程或在相关课程中植入PSoC理论及实验内容
  - 在学生课外创新活动、毕业设计、研发项目中使用PSoC
  - 编写教案、实验指南等
  - 根据设计项目撰写应用笔记
  - 参加Cypress PSoC创新设计大赛

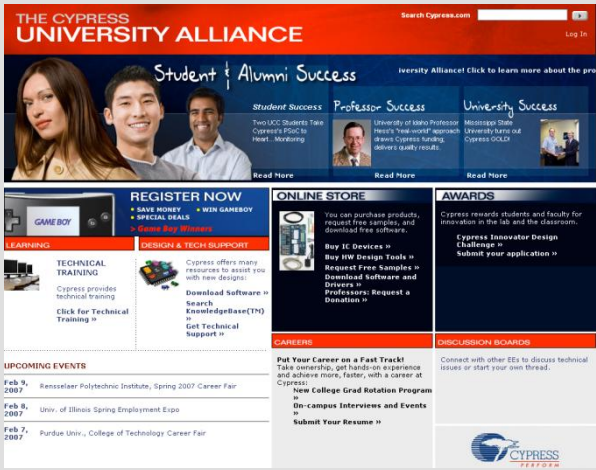
CYPRESS中国大学计划资源

- Cypress 通过大学合作计划将最新技术介绍给大学
- Cypress大学计划网站:
- www.cypress.com/cua

- Cypress大学计划通讯:
- www.cypress.com/cuanews

- CUA China QQ Group: 140589934
- 中国大陆联系人：

Rong (Winny) WEI (魏荣）
CUA China Manager
Shanghai Office
Cypress Semiconductor Corp.
Tel: 86 21 61622604
Fax: 86 21 61632201
Mobile: 86 139 1842 7036
Email: rwei@cypress.com



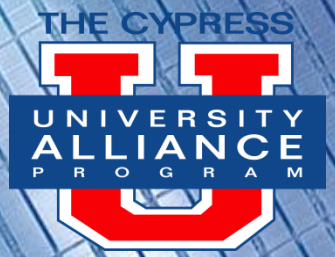
CYPRESS大学联盟的合作伙伴

清华大学科教仪器厂：PSoC大学实验箱和板卡提供商
http://www.qhkj.com/

Digilent China: PSoC大学板卡提供商
http://www.digilentinc.com/alliance.cfm?ID=CYPRESS

友晶科技: PSoC板卡提供商
http://www.terasic.com.tw/en/

CYPRESS概况



CYPRESS

PERFORM

Cypress at a Glance

Founded	1982
Listed	NASDAQ (CY)
Incorporated	Delaware
Headquarters	San Jose, California
Revenue	Q212 $201M
Non-GAAP Income	Q212 $30M
Headcount	3370
Regional Sales	US (18%); EUR (9%); JPN (14%); APAC (59%)

Cypress Worldwide

Cypress Products by Division

Memory Products Division (MPD)	Consumer & Computation Division (CCD)	Programmable System Division (PSD)	Data Communications Division (DCD)
Sync SRAM (#1) Fast Async (#1) µPower SRAM (#1) nvSRAM (#1) MultiPort SRAM (#2) Prog. clocks	CapSense® (#1) TrueTouch® (#1) Large Touch (#1) Trackpads (#3) OvationONS® (#2)	PSoC® 1 (#6) PSoC 3 PSoC 5 Automotive	USB (#1) Full Speed 1.0 High Speed 2.0 Super Speed 3.0 West Bridge® 2.0/3.0 Wireless USB

Blue = programmable product

Representative Customers

Consumer / White Goods

BARNES & NOBLE BOOKSELLERS, SAMSUNG, Apple, SONY, Whirlpool, Haier, TOSHIBA, Canon, FUJITSU, LG, PHILIPS

Data Processing

hp invent, IBM, Logitech, ASUS, Microsoft, DELL

Contract Manufacturers

FLEXTRONICS, CELESTICA, Benchmark electronics, PLEXUS, SMART Modular Technologies, Jabil CIRCUIT, SANMINA-SCI

Wireline Infrastructure

HUAWEI, tellabs, BROCADE, CISCO, Juniper NETWORKS, ZTE中兴

Handsets

MOTOROLA, Sonu Ericsson, NOKIA, PANTECH, NEC, FUJITSU, RIM, LG, htc, SAMSUNG

Wireless Infrastructure

ALCATEL, FUJITSU, ERICSSON, NORTEL, Nokia Siemens Networks, MOTOROLA, HITACHI Inspire the Next, NEC

Military

LOCKHEED MARTIN, GENERAL DYNAMICS, Raytheon

Industrial / Medical

Baxter, Abbott, ABB, TOSHIBA, JOHN DEERE, Rockwell, Honeywell, Johnson & Johnson, SIEMENS

Automotive

Continental, DENSO, BOSCH, Visteon, TEMIC, harman international

CYPRESS

UNIVERSITY ALLIANCE PROGRAM

PERFORM

Flexible Manufacturing: Assured Supply

CY FAB 4 – MINNESOTA
- 50,000 8” wfrs/qtr
- 90nm to 0.35µm
- 65nm capable

CY ASSY & TEST – MANILA
- Equip. capacity: 93 MU/qtr
- Building capacity: 185 MU/qtr
- Autoline technology

OUTSOURCED WAFER FAB

GRACE SEMICONDUCTOR MANUFACTURING CORPORATION

UMC

tsmc

GLOBALFOUNDRIES

OUTSOURCED ASSEMBLY & TEST

ASE GROUP

JCST

KYEC

Deca Technologies

Amkor Technology

ChipMOS

OSE A partner you can count on

Multiple site manufacturing for assured supply

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Q&A

CYPRESS

PERFORM

谢谢！

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