One day workshop
On
PSoC mixed signal array microcontroller

Unistring Tech Solutions

By

Embedded group - PSoC division

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Schedule

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Sl no	Time slot	Topic	Speaker
1	0930 – 1000	Registration	
2	1000 – 1115	Embedded system design – Limitations with conventional microcontrollers & PSoC approach for fast and reliable design	K. Vasu
Tea break			
3	1130 – 1230	PSoC designer tool flow – Demo on PSoC board	B. Amit
Lunch break			
4	1330 – 1600	Lab1 Hands on session with PSoC designer software and PSoC board	
5	1330 – 1600	Issues in Embedded Hardware design (with case studies) using PSoC chips	Siva
6	1600 – 1730	Lab1 Hands on session with PSoC designer software and PSoC board	
7	1600 - 1730	Issues in Embedded Hardware design (with case studies) using PSoC chips	Siva

How a typical microprocessor works?

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- A program which is sequence of machine codes will be stored in on chip/off chip in ROM or RAM.
- Microprocessor takes each instruction and performs the appropriate job.
- So a meaningful application is possible by a proper sequence of instructions
- The machine code with is a series of ‘1’ and ‘0’ is difficult to remember and interpret by humans so people have introduced assembly language

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Introduction to embedded system design

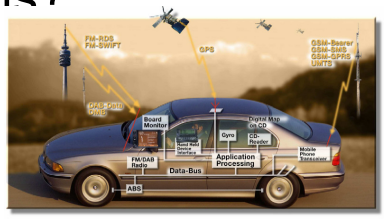
- What is an Embedded System?
- Where are Embedded Systems used?
- Why every one talk about embedded systems ?
- How microcontrollers have relationship with embedded systems ?
- Is embedded system design is easy or complex
- Is embedded system design is software intensive or hardware intensive

How to become a good embedded designer ?

What do we find embedded systems?

Avionics

Communication



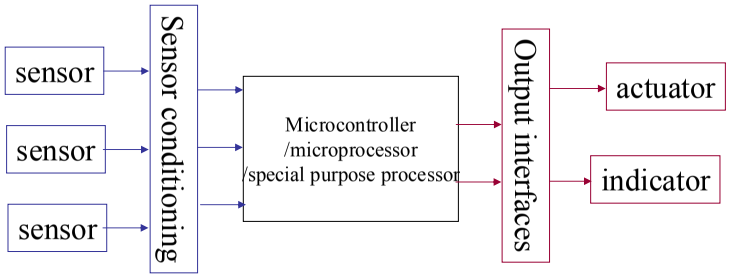
Automobile

Consumer Electronics

Office Equipments

Household Appliances

Embedded System General Block Diagram



ES basic definition

- A special purpose system with a suitable hardware and software to meet a specific requirement.
- Examples
  - Mobile phone, keyboard, mouse, car speed indicator, electronic watch, GPS receiver unit
- Note that PC is not an embedded system (why ??)

ES, Other definitions

- A special purpose computer built into a larger device.
  - *Special purpose:*
    - - Embedded systems have a (more or less) well-defined purpose
    - - Contrast with: general purpose computers (PCs etc)
    - - Both hardware and software is tailored to application(s), which are well defined
    - - However, re-programmability is a requirement
  - *Built into a larger device:*
    - ESs are (usually) part of a larger device, augmenting its capabilities

ES, Other definitions

- Any device that includes a programmable computer but is not itself a general-purpose computer.
- Anything that uses a computer but does not look like one.
- The microprocessor in an embedded system is like an electric motor in a washing machine.

Embedded Systems – Simple classification

Small Embedded systems

Eg: Timers, Alarms, LCD display, LED display

Medium complexity Embedded Systems

Eg: Remote toys, Mouse, Keyboard, small robots

Large complexity Embedded Systems

Eg: Cell phones, Data Acquisition systems, Network Routers, Network switches

Extreme complexity Embedded Systems

Eg: Flight Control systems, On board controller of satellite

Embedded Systems – A different View

Embedded systems with Only H/W design , no S/W design

Eg: 555 Timers, PAS, simple LED display, Simple LCD display

Embedded systems with more H/W design, less S/W design

Eg: Microcontroller based data acquisition and processing Small robots, AM and FM Receivers

Embedded systems with both H/W and S/W design

Eg: Cell phones, Complex Data Acquisition systems, Complex Digital communication receivers, Network processor based routers and switches

Embedded systems with Off The Shelf H/W and more S/W design

Eg: Voice recognition system implemented on a DSP board. Flight control system implemented on a PowerPC board

Typical Embedded Systems Hardware

- Commercial off-the-shelf components (COTS)
  - e.g. wireless radios, sensors, I/O devices
  - Cheap
- Application-Specific ICs (ASICs)
  - ICs tailored to meet application needs
  - Good performance for their intended task(s)
  - Original ESs were ASICs only
- Domain-specific processors & controllers
  - Microcontrollers
  - DSPs
  - Network processors
- Microprocessors
  - General Purpose Processors