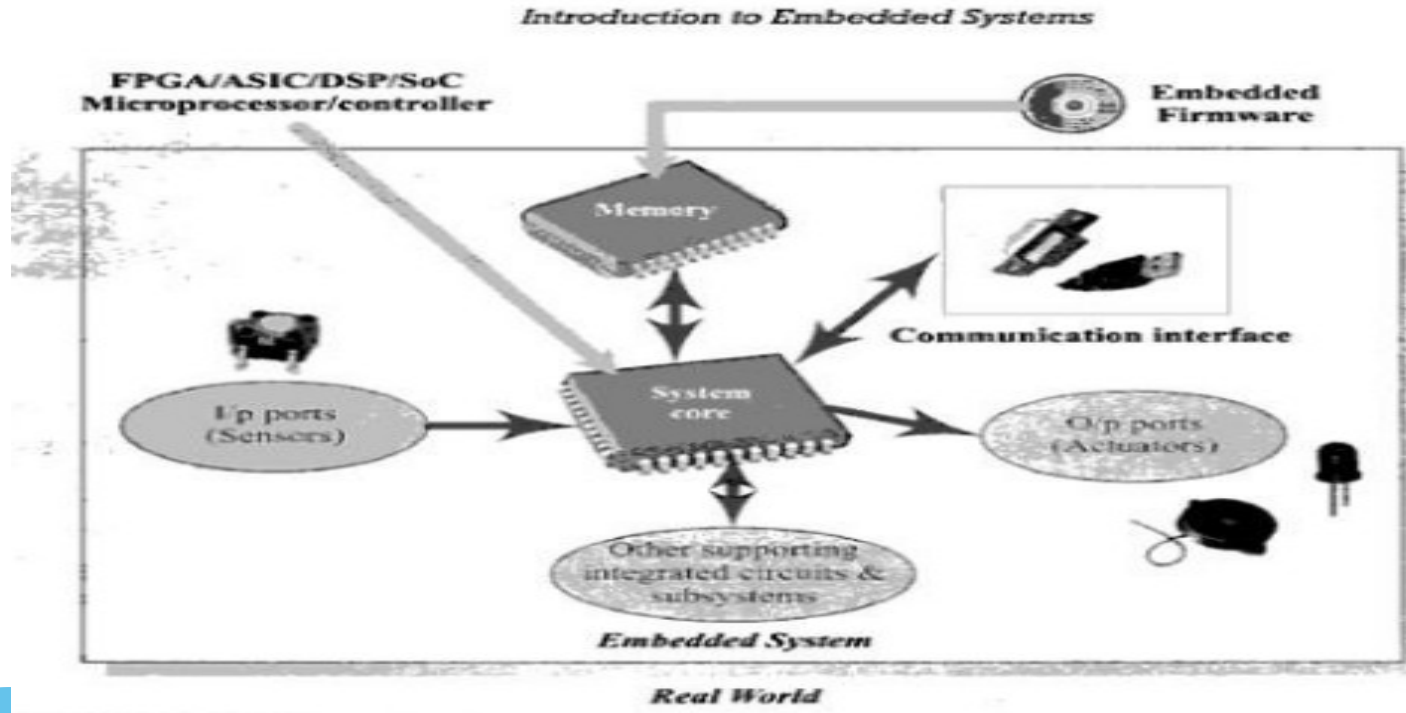




The biggest risk
is not **taking any risk.**

— *Mark Zuckerberg*

Building Blocks of Embedded system



Core of Embedded system

A typical embedded system (Fig. 2.1) contains a single chip controller, which acts as the master brain of the system. The controller can be

- a Microprocessor (e.g. Intel 8085) or
- a microcontroller (e.g. Atmel AT89C51) or
- a Field Programmable Gate Array (FPGA) device (e.g. Xilinx Spartan) or
- a Digital Signal Processor (DSP) (e.g. Blackfin® Processors from Analog Devices)
- or an Application Specific Integrated Circuit (ASIC)/Application Specific Standard Product (ASSP)
- Analog Devices for energy metering applications.

Working of an embedded system

Embedded hardware/software systems are basically designed to regulate a physical variable or to manipulate the state of some devices by sending some control signals to the Actuators or devices connected to the O/p ports of the system, in response to the input signals provided by the end users or Sensors which are connected to the input ports.

Hence an embedded system can be viewed as a reactive system. The control is achieved by processing the information coming from the sensors and user interfaces, and controlling some actuators that regulate the physical variable.

- Key boards, push button switches, etc. are examples for common user interface input devices where- as LEDs, liquid crystal displays, piezoelectric buzzers, etc. are examples for common user interface output devices for a typical embedded system.
-
- Input output systems used depends on the type of the application for which the embedded system is designed.

- Some embedded systems do not require any manual intervention for their operation. They automatically sense the variations in the input parameters in accordance with the changes in the real world, to which they are interacting through the sensors which are connected to the input port of the system.

Memory of the system is responsible for holding the control algorithm and other important configuration details. For most of embedded systems, the memory for storing the algorithm or configuration data is of fixed type, which is a kind of Read Only Memory (ROM) and it is not available for the end user for modifications,

The most common types of memories used in embedded systems for control algorithm storage are OTP, PROM, UVEPROM, EEPROM and FLASH.

- Sometimes the system requires temporary memory for performing arithmetic operations or control algorithm execution and this type of memory is known as "working memory". Random Access Memory (RAM) is used in most of the systems as the working memory.

Various types of RAM like SRAM, DRAM and NVRAM are used for this purpose.

