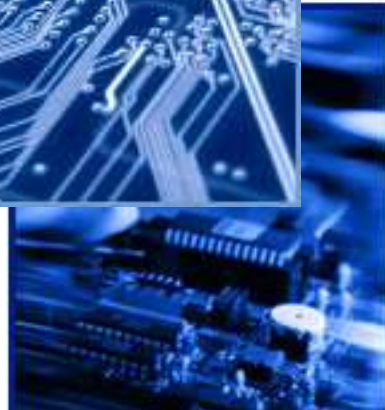
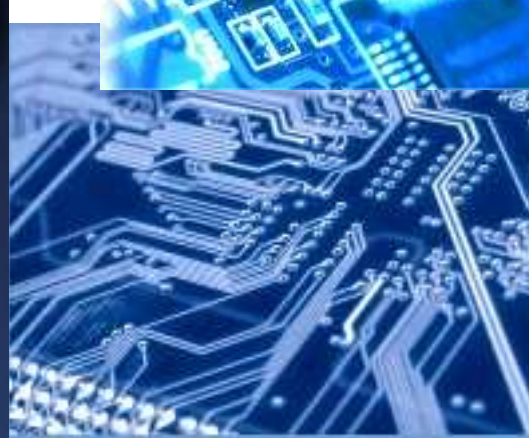
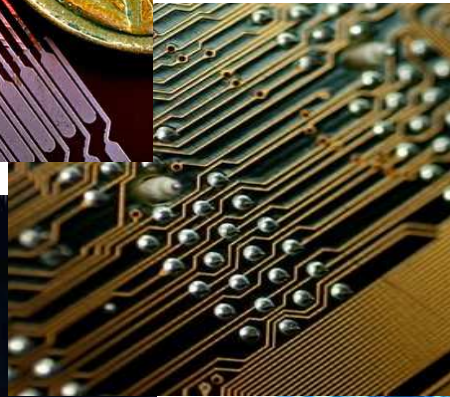
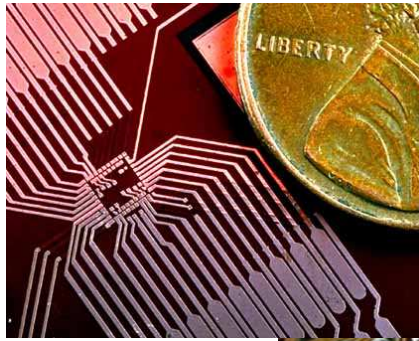




AVR Introduction

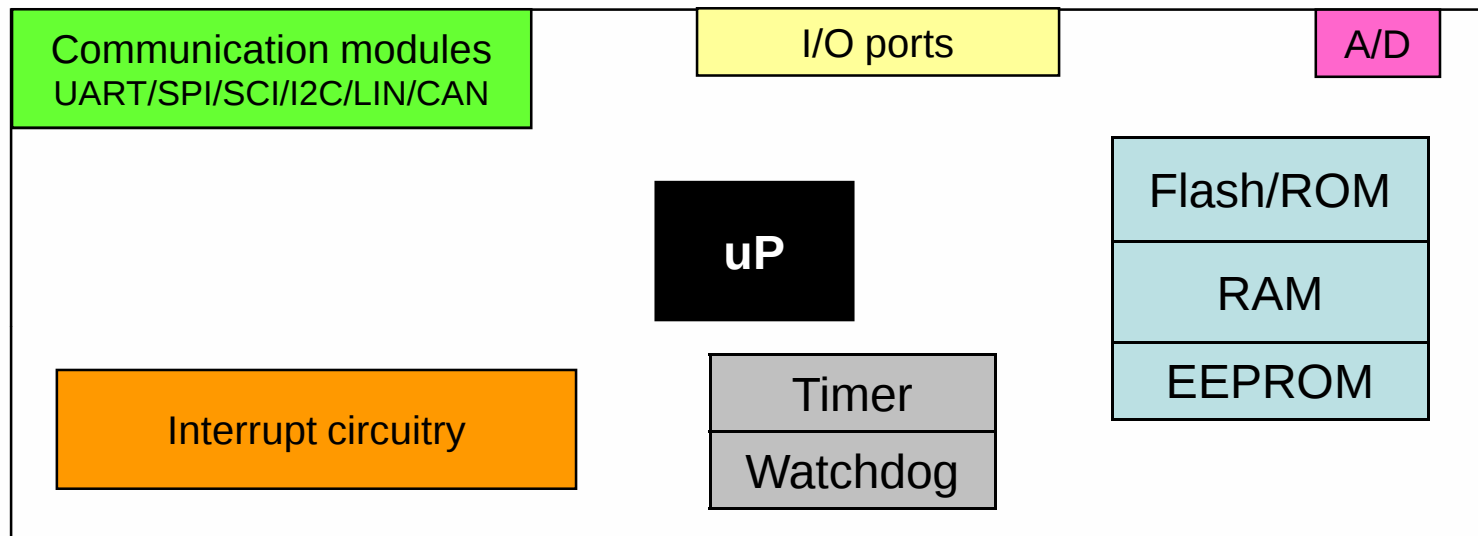
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Agenda

- uP Vs uC
- Different architectures
- Processor Selection criteria
- Why AVR?
- AVR core architecture

uP Vs. uC



Microcontroller



Different Architectures

- Harvard
- Von-Neumann

Processor Selection criteria

- Number of I/O pins required
- Interfaces/peripherals required
- Memory requirements
- Number of interrupts required
- Development environment
- Processing speed required
- Memory architecture
- Power requirements
- Operator training/competence

Why AVR?

- Harvard architecture
- Fast execution. Throughputs up to 16 MIPS at 16MHz
- Rich instruction set.
- 32 General purpose working registers (Accumulators) all of them are directly connected to ALU.
- In-system programmable.
- Backward compatibility.
- Different package sizes and memory sizes.
- Wide operating voltage from 2.7v to 6.0v.
- A simple architecture.
- Free IDE.
- Availability in the Egyptian market.

Why AVR? ...continue

- This code was tested on different targets:

```
int max(int *array)
{
    char a;
    int maximum = -32768;
    for (a = 0; a < 16; a++)
        if (array[a] > maximum)
            maximum = array[a];
    return (maximum);
}
```

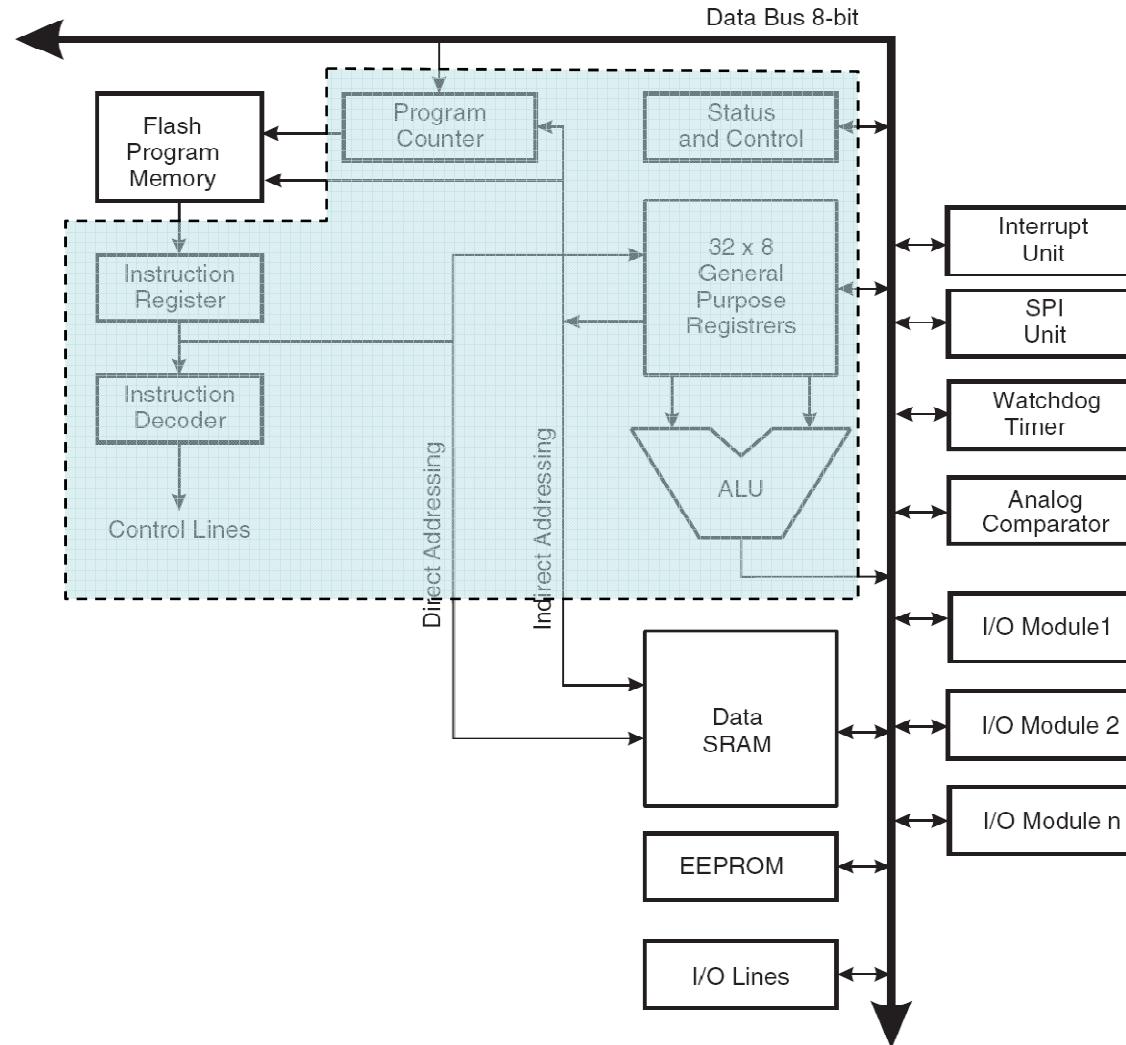
- And the results were amazing:

Processor	Compiled code size	Execution time (cycles)
AVR	46	335
8051	112	9,384
PIC16C74	87	2,492
68HC11	57	5,244

AVR core architecture

- CPU role is to:
 - Perform calculations (Arithmetic/Logical/Bit)
 - Access memories (Read/Write)
 - Control peripherals (Read/Write)
 - Handle interrupts (Internal/External)
- ALU
 - ALU performs operations such as:
 - Bit operations
 - Arithmetic operations
 - Logic operations
 - In AVR: ALU is directly connected to all 32 registers.

AVR core architecture...continue



References

1. <http://en.wikipedia.org>
2. ATmega32 datasheet
3. AVR_DAY_presentation; Dr. Hossam Eldin Mostafa;
4. Programming And Customizing The Avr Microcontroller-Lrn; Dhananjay V. Gadre



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