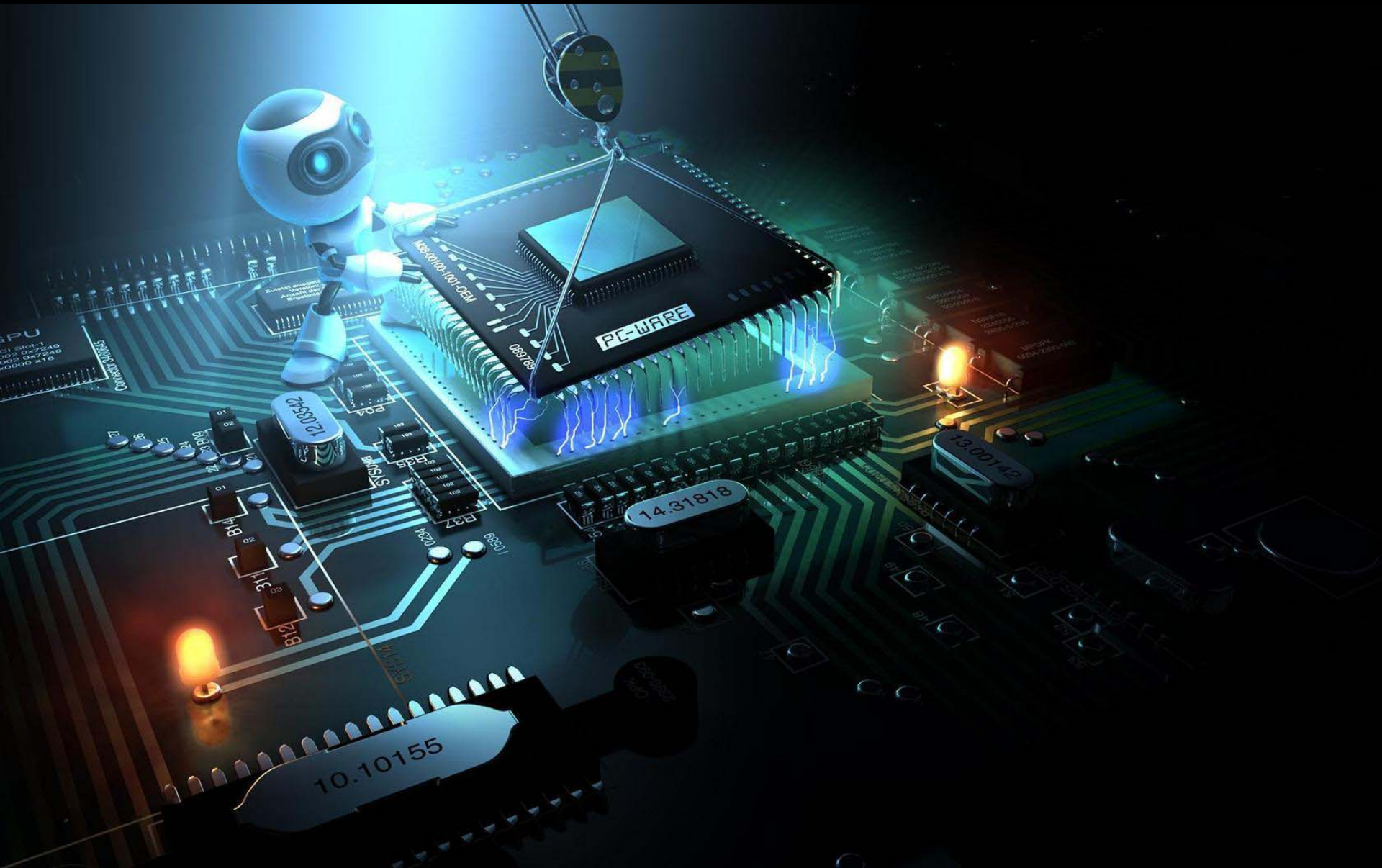
Computer & Systems Engineering Department

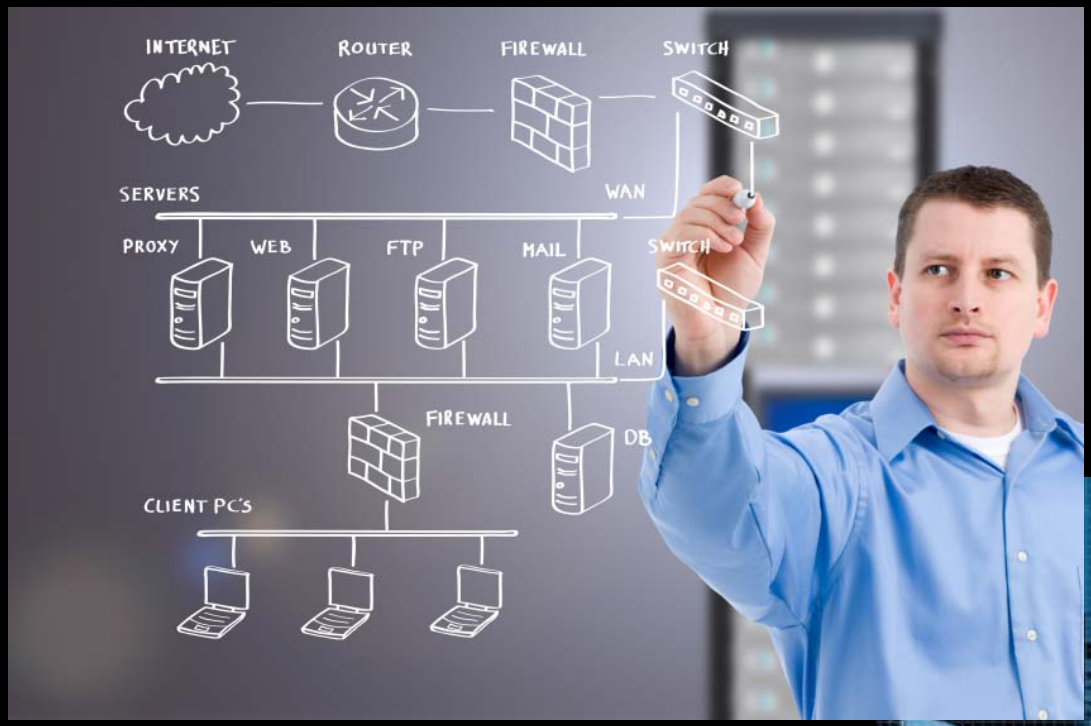


Computer Engineers

Work on both Hardware & Software

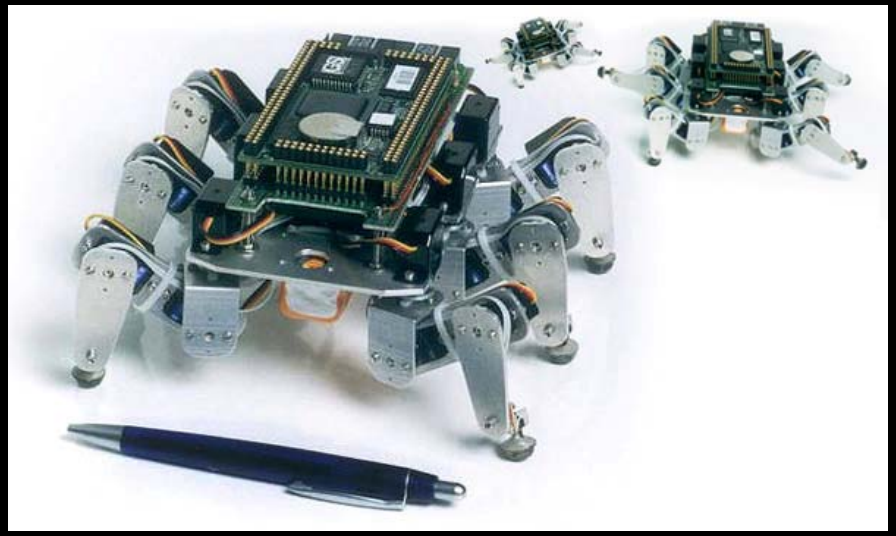
Computer Engineers

Work on Computer Networks

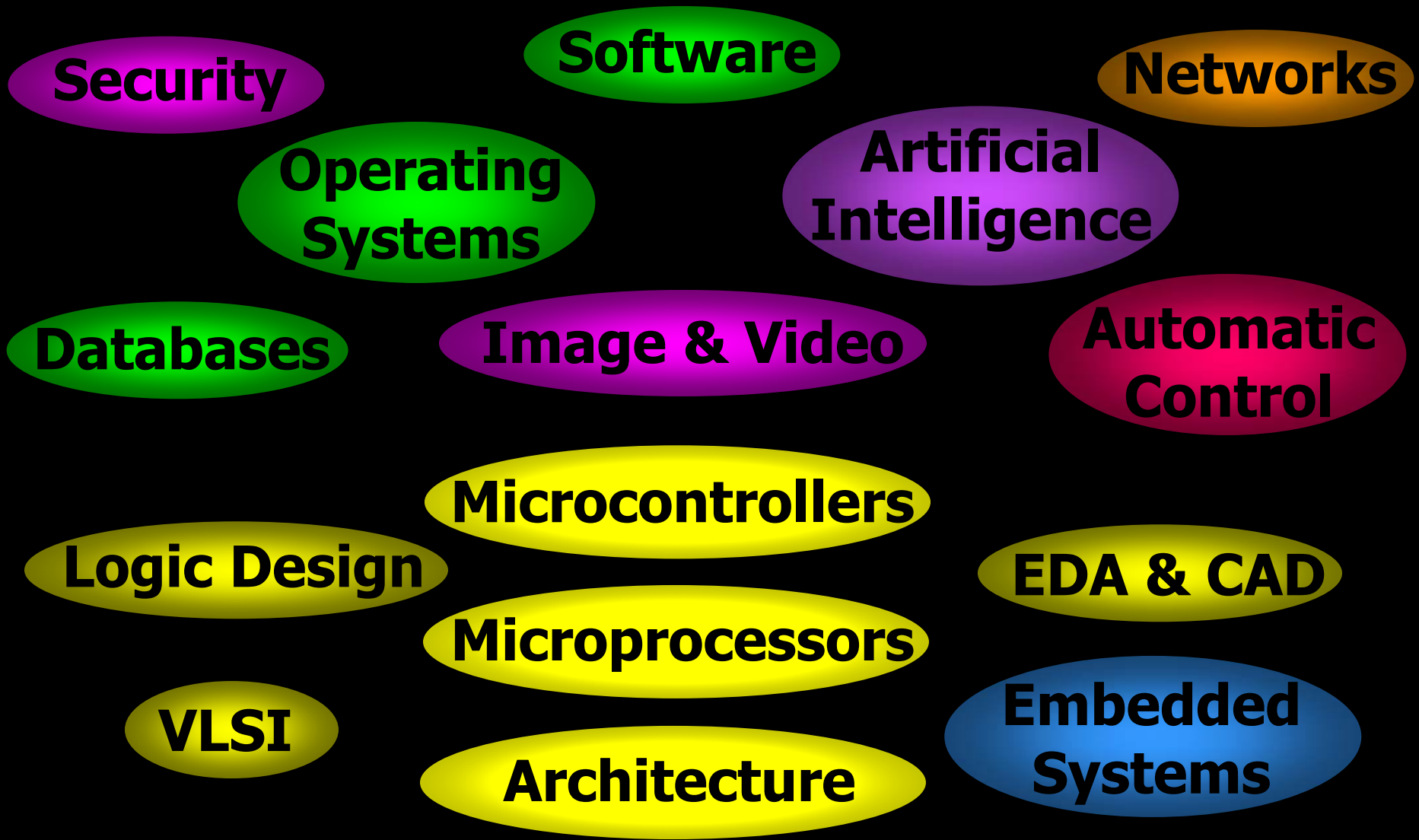


Computer Engineers

Work on Embedded Systems



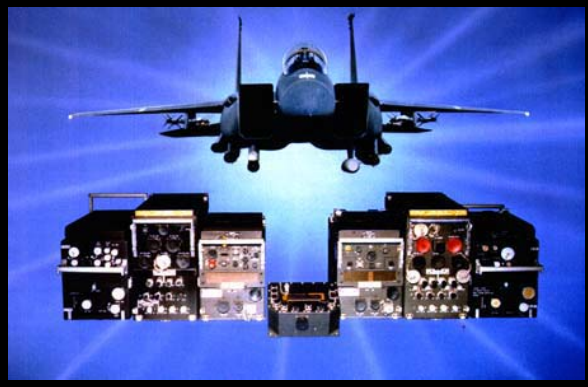
Computer Engineering
(The big picture)



Companies where you can work

Type of Work

- Computer Engineers design, develop, and implement computer technology in consumer, industrial, commercial and military applications.
- Computer Engineers are challenged to develop computer applications that improve the quality of life.
- They must be sensitive to manufacturing and distribution costs.



Type of Work

- Computer Engineers work on hardware, software, and the interface between the two.
- They work in teams with other engineers, and others from other areas.
- They work in offices or laboratories in comfortable surroundings

Type of Work

- Computer Engineers usually work about 40 hours a week.
- However evening or weekend work may be necessary to meet deadlines or solve specific problems.
- Given the technology available today, telecommuting is common for computer professionals.

Earnings

- According to the bureau of labor statistics the median monthly income of a computer engineer starting his career is 4000 EGP.
- Within 3 years they can easily reach 6000-7000 EGP.
- The increase depends on performance, experience, supervisory responsibility, accountability of projects.

Computer Engineering vs. Science
(Computer Engineering)

- Concerned with applying existing computer technology, both hardware and software, to solve practical problems.
- Computer Engineers have expertise in all aspects of computers, from the hardware transistor circuits right up to the successful design of software user interfaces.
- Students of Computer Engineering take core courses offered in both Electrical Engineering and Computer Science.

Computer Engineering vs. Science (Computer Science)

- Concerned with the efficient application of computing technology, through the design of efficient algorithms and data structures.
- The emphasis is to cope with hardware constraints using software techniques and to focus mainly on the software organization of computer systems.
- CS deals with programming, while CE engineering deals with the creation of new products. E.g., A CE works to design new motherboards; a CS would design the programs to work with them.

Examples

Product: Motorola Q
Pocket PC Phone

Microprocessor:
TI OMAP (ARM+DSP)

OS: Windows Mobile 5.0
(Windows CE OS)

Product: Sonicare Elite toothbrush.

Microprocessor: 8-bit

Has a programmable speed control, timer, and charge gauge

Product: Cannon EOS 30D Digital Camera

Microprocessor: DIGIC II Image Processor

Automotive Embedded Systems

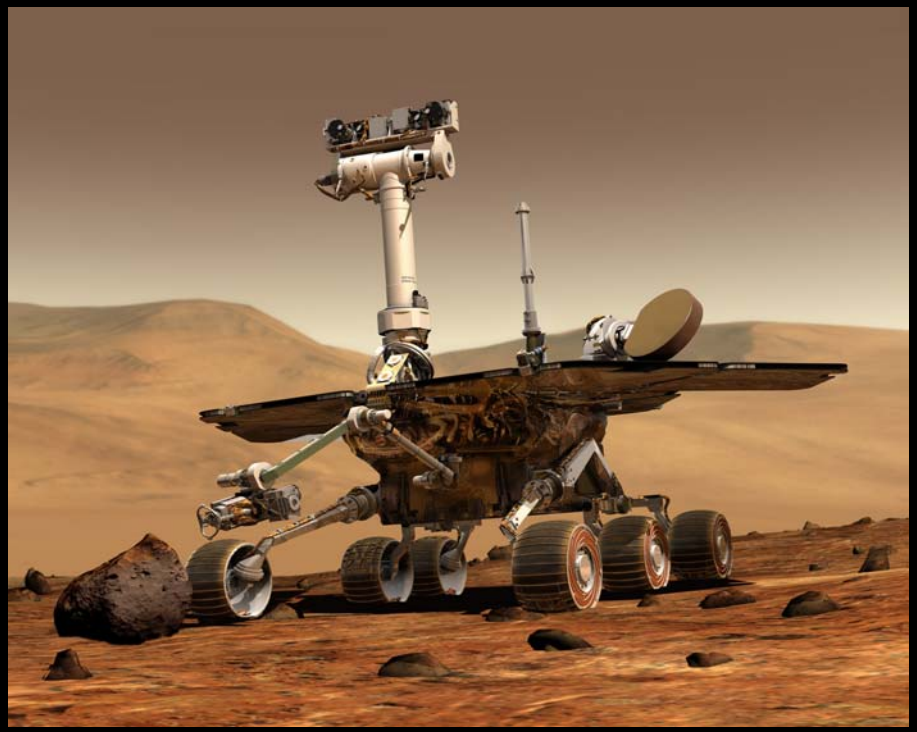
Today's high-end automobile may have 100 microprocessors:

- 4-bit microcontroller checks seat belt;
- Microcontrollers run dashboard devices.
- 16/32-bit microprocessor controls engine

Product:Vendo Vue 40 vending machine.

Microprocessor:
Two 16-bit Hitachi H8/300H Processors

A robot hand dispenses items



Product: NASA's Twin Mars Rovers.

Microprocessor: Radiation Hardened 20Mhz PowerPC

Commercial Real-time OS

Software and OS was developed during multi-year flight to Mars and downloaded using a radio link

Product: Sony Aibo ERS-7 Robotic Dog.

Microprocessor: 64-bit MIPS R7000.

OS: Aperios - Sony's Real Time OS

Used in Robocup Soccer Teams

Product: High End Systems DL2 Digital Media Server

Microprocessor: X86

OS: Windows XP Embedded

Used for lighting effects in shows and rock concerts

Product: Dresser Wayne
Ovation iX Gas Pump

Microprocessor:
Marvel Xscale (ARM)

OS: Windows CE

Displays video ads &
is networked to a gas station's
back office computer system.
Also has remote maintenance
features.

Kuka robot arms welding a Mercedes

Product: Kuka Industrial Robot Arm

Microprocessor: X86

OS: Windows CE OS & Others

Product: Bernina Artista 200 Sewing Machine

Microprocessor: Marvel StrongARM

OS: Windows CE

Can download new images from the internet and sew them

More Examples

Aircraft & Military Systems	Aircraft autopilots, avionics and navigation systems, automatic landing systems, guidance systems, engine controls.
Biomedical	XRAY, MRI, and Ultrasound imaging systems, patient monitors, heart pacers.
Cars	Engine control, anti-lock braking systems, traction control systems, air bag controls, heating and air conditioning controls, GPS mapping, Satellite Radio, On-board Diagnostics.
Communications	Communication Satellites, network routers, switches, hubs.

More Examples

Computer I/O devices	Keyboards, mice, printers, scanners, displays, modems, hard disk drives, DVD drives, graphics cards, USB devices.
Electronic Instrumentation	Data acquisition systems, oscilloscopes, voltmeters, signal generators, logic analyzers.
Home Electronics	Microwave ovens, dishwashers, DVD players, televisions, stereos, security systems, lawn sprinkler controls, thermostats, cameras, TVs, clock radios, answering machines, satellite or cable box, appliances.
Industrial Equipment	Elevator controls, surveillance systems, robots, CNC machines, Programmable Logic Controllers, industrial automation and control systems.

More Examples

Office Machines	FAX machines, copiers, telephones, calculators, cash registers.
Personal Devices	Cell phones, portable MP3 players, Video players, Personal Digital Assistants (PDAs), electronic wrist watches, handheld video games, digital cameras, GPS systems.
Robots	Industrial robots, autonomous vehicles, space exploration robots (i.e. Mars robots)
Toys	Video Game systems, “Aibo”, "Furby“, and “Elmo” type robot toys.