DSP Concepts
Digital Signal Processing
Applications for Digital Signal Processors

• Automation & Process Control
• Automotive & Transportation
• Communications & Telecom
• Consumer & Portable Electronics
• Health Tech
• Security & Safety
• Avionics & Defense
DSP processors
DSP processors

• A DSP is a specialized processor that does signal processing very efficiently. (consume less time, energy and power than a general-purpose microprocessor when carrying out signal processing tasks)
DSP processors can do...

- Digital audio or video
- Digital recording
- CD, DVD, and MP3 players
- Digital cameras
- Digital and cellular telephones
- Digital satellite and TV
- Wire and wireless networks.
DSP processor features

• Real-time digital signal processing capabilities.
• High throughput.
• Deterministic operation.
• Re-programmability by software.
• Fast math computations
DSP system
DSP real world examples
Digital Crossover Audio System

Digital audio $x(n)$

- Digital highpass filter
- Digital lowpass filter
- Gain
- Tweeter: The crossover passes high frequencies
- Woofer: The crossover passes low frequencies
Interference Cancellation in Electrocardiography
Speech Coding and Compression
Digital Photo Image Enhancement

Original image

Enhanced image

A

B
DSP implementation
ASIC (application-specific integrated circuit)
Analog vs digital
• Changeability
• Repeatability
• Size, weight, and power
Tarea

- DSP history
- DSP Manufacturers