

DSP Applications

Common Uses for DSP

As DSP has become more well known and as chips have become more powerful and less expensive, DSP has been added to more and more products. Today, most electronic products and equipment contains some form of DSP. To the average user, it is invisible. To the service technician, it is transparent. Like so many things in electronics today, most operations are carried out inside some embedded controller or other processor. Software does all the work.

DSP has only continued the trend to doing virtually all electronic applications digitally and reducing the size of the equipment by integrating all operations into just a few processor and peripheral chips.

So, DSP is very wide spread. Here is a brief summary of the most common applications.

DSP Applications Summary

Personal computer

- Sound functions

- Modems: a modem today is just a DSP chip that performs all modulation/demodulation, filtering, etc.

Broadband modems

- Cable TV and DSL high speed Internet applications for modulation/demodulation, filtering, mixing, and other functions

- Wireless local area networks (WLANs) such as 802.11 Wi-Fi 802.11a and g formats use orthogonal frequency division multiplexing (OFDM).

Cell phones and cell phone base stations

- Voice compression/decompression, modulation/demodulation, filtering, mixing, and other functions

Other Applications

Military radar and sonar

Used to improve signal-to-noise ratio by filtering and to help recognize specific targets and threats by signature analysis

Voice over Internet Protocol (VoIP)

Used in voice encoding and decoding, filtering, and other uses in packetized telephone calls that are rapidly being adopted

MP3 and AAC players like the Apple iPod

MP3 and AAC are compression algorithms that allow music to be stored in less space and transmitted faster.

CD/DVD

Used for filtering, compression/decompression, and other features

More Applications

Music synthesizers

Used to emulate almost any other music instrument

Digital radio

Used by both satellite (Sirius and XM) and terrestrial digital radio (HD Radio) for demodulation, filtering, and other functions

Industrial control

Used in factory automation and automobiles for motor control

Software-defined radios (SDR)

Used to replace over half of all receiver and transmitter functions in newer radios including cell phones, cell phone base stations, cordless telephones, and wireless data systems like WiMAX

Multimedia

Used in video games and video special effects, and in compression/decompression (MPEG) for digital TV

What Doesn't Use DSP?

About the only segment of electronics that does not use DSP is microwaves and RF. These frequencies, from 200 MHz to 10 GHz, are too high for practical analog-to-digital converters or for DSP chips that are fast enough for real time calculations. Yet, as technology improvements are made, this limitation will slowly go away.

Assignment: Can you name one modern electronic product that does NOT use DSP?

Test your knowledge

**Digital Signal Processing
Knowledge Probe 5
DSP Application**

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