

Example of Video Transcriptions for Course 120: DSP

Digital Signal Processing Overview

1. A Little Background

As long as there have been audio signals, there has been a need to modify them. In the early days of audio, signal processing was accomplished using passive electronic components, such as resistors, capacitors, and inductors. Combinations of these devices form circuits which modify the characteristics of the audio signal passing through them. Eventually active circuits replaced passive circuits for some applications, using transistors and integrated circuit “chips” to emulate the characteristics of passive circuits. The up side is that circuits became much more powerful and versatile. The down side was that the signal processor now needed a battery, brick, or power cord. Rack mount signal processors became, and still are a mainstay of professional audio.

2. Why Process?

There are three main reasons to apply signal processing to audio program material:

- To change the way it sounds

- To make it more suitable for a loudspeaker that it will eventually be applied to

- To control its level, dynamics, and/or timing

In that regard, not much has changed. These are still the main reasons for signal processing. The broad pallet of signal processes can be divided into four main groups:

- Routing and Mixing

- Filtering

- Delay

- Dynamics Control

3. Digital Signal Processing - DSP

Today, it is much more likely that signal processing will be accomplished using digital technology. Digital Signal Processing, or DSP is slowly but surely replacing analog technology for many audio applications. Most of the processes themselves are identical to those accomplished by analog circuits. The DSP is just emulating an analog process that has been around for over a century. Other signal processes can only be accomplished by DSP. As we work through the course, I will point out which ones are which. I will also present some analog signal theory. The response of an analog filter still serves as the reference for understanding the behavior and characteristics of a DSP.

4. The Signal Chain

This course, like all other SynAudCon courses, is built around the signal chain. Some systems have a dedicated mixer for operation of the system. The DSP is for technical signal processing and is placed post-mixer and made inaccessible to tampering fingers. In some systems, the DSP also serves as the mixer. Microphones may directly feed the inputs, with outputs connected directly to power amplifiers. This makes it necessary for some of the processes to be made accessible to the system operator, while others must be locked to prevent changes. Manufacturers have figured out many creative ways to allow a DSP to play this dual role in an audio system.