



DF102 Production Sound

Detailed Schedule

Overview

In This seven session hands-on seminar Students will learn the basic techniques of sound recording for motion pictures and television specifically as they relate to digital filmmaking. The physics of hearing, Signal flow, microphone selection and placement, acoustics, signal metering, wireless technology, mixing and evaluating the finished master recording will all be covered.

DAY 1

Introduction

Instructor background, basic overview of the course.

Sound and Hearing

- pressure waves

- speed of sound

- hearing sensitivity/threshold of pain=dynamic range of human hearing

Exercise:

Sit wherever you are and listen to your environment. What is there? What would be recorded that you hadn't noticed at first?

Frequency response

- Fletcher-Munson curve

- Dual tuned ports!

- Professional audio record/reproduction targets

- Bandwidth limiting in various systems

The ear

- Outer ear

- Inner ear

Brain

- Auditory cortex

Amygdala

Exercise:

Give an example of how sound, from experience or a movie, has affected you.

Stereo Hearing

- TDOA and pressure differential
- Spacing of transducers
- Head related transfer function

Exercise:

Cover/plug one ear and close your eyes. Have another person clap or call out. How can you tell where they are?

BREAK

Acoustics -how it works/how to control

Reflections

- Early/late

- Multipath

- Architectural concerns or Problems In The Man-Made World

- How multiple reflections decrease intelligibility

- Treating surfaces for better recordings

What does your space sound like?

- Authentic is not necessarily accurate

- Shot-to-shot set treatments

- Actors, cameras, lights, crew as noisemakers

Exercises:

Make a corner tent out of furniture pads facing a hard wall. Talk facing the soft corner, then the hard corner. What differences, if any, can you detect?

Make something ring.

Discuss ways to improve the classroom to make it a better recording environment.

Review and discussion

DAY 2

Microphones types

- Dynamic

 - Durable, high spl, low output

- Electret

 - Better freq response, S/N

- Condenser

 - Best freq response, S/N, high output, better sensitivity

- Lavalier

- PZM

- Hand held

- Boom or stand mounted

Exercise:

 - Break out microphones from kit, connect to mixer, listen, discuss

Pickup patterns

- Omni

- Hemispheric [PZM]

- Figure 8

- Cardioid

- Hypercardioid

- Shotgun

Exercise:

 - Compare kit microphone pickup patterns

Mics for production

 - Perspective, intelligibility, environmental problems and S/N

Directional mics

 - Short shotgun, pole mounted or planted

 - Mic placement for pole mounting

 - Powering schemes

 - Shockmounting

 - Wind control

Mic placement

Exercise:

Connect a directional mic, shockmount/pole assembly to the mixer. Place the mic in various places near a speaking person. Cue between two speaking persons. Note differences. Be prepared to discuss the results.

Lavalier mics

- Pickup patterns

- Axial-pickup

- Radial pickup

- Tailored frequency response

- Placement on subjects

- Hiding techniques

- Wardrobe, noise and other nightmares

- Planting lavs

- Other non-PM small microphone techniques

Exercise:

Mount a lavalier mic on a subject, dress cables, connect to mixer and listen. Option: Record to digital recorder or camera. No lighting allowed.

BREAK

Stereo in production

- MS

- XY

- Binaural

- Other techniques

Cabling

- Balanced and unbalanced signals

- electromagnetic and electrostatic shielding

- grounding in audio chain

- ground loops

- Star Quad

Exercise:

Examine various audio connectors, cable samples

Make a stereo microphone using the CDIA sound kit

Day 3

Mixers

- Basic mixer functions
 - Amplification
 - Mic pres
 - Signal leveling
 - Channel assignments
 - High pass filtering
 - Infrasonics

Exercise:

Hands-on familiarization with the Sound Devices 302 mixer

- Limiting
- Metering
 - VU
 - Peak
 - PPM
- Signal distribution
 - Feeding multiple inputs

Exercise:

Connect a microphone to a mixer, set input and output levels with appropriate high pass filtering and environmental controls.

Exercise:

Construct and execute a shot where a boom mic will not work, a PM will not have the correct perspective and a plant mic is the only choice.

DAY 4

Radios

- basic RF theory
- DTV and wireless
- frequency coordination
- wireless range
- Antennas
- Line-of-sight
- diversity reception
- DSP and digital radios
- perspective
- applications

Exercise:

Connect a lavalier mic to a transmitter. Mount the mic on a subject. Adjust the modulation input for optimal operation, output of the receiver for correct levels, connect to mixer. Listen and discuss.

Mount a lavalier mic on a subject at different places and note the difference in sound. Why is one place better than another?

Construct a wireless plant mic. Hide it in a "set."

Determine the line-of-sight working limit of distance in downtown Waltham for the wireless system. Why would it be different in Waltham than, say, Albuquerque?

Connect the output of the radio receiver to the mixer. Set levels and listen.

Connect a microphone, mixer and camera, setting gain structure correctly and learning the menu system. Set mixer to listen to the camera return.

DAY 5

Recorders

DAT, the first digital format for production

HD recorders

Deva

PD6

Cantar

722/744

Nagra

HHB

MD recorders

Applications

Computer-based recording

Protools

Audition

Qbase

Nuendo

Other recorders

Nomad

Recording to cameras

Analog Betacam

Digital Beta

DVX100 class cameras

Setup and operation of the DVX100a

Unscaled metering

Location of mic/line switches

Location of input level switches

Location of bit depth switches

Location of headphone volume level control

PD150: a special case

PD100 and other mini mini DV cams

What is digital audio anyway?

Bitrate

Bit depth

Resolution

A/D-D/A

Nyquist limit

Digital zero

Exercises:

Send a line-level signal to a recorder set up for mic level inputs. Listen.

Adjust the input of a mixer to produce an above-digital-zero result in a digital recorder. Record. Playback.

Choose a location and microphone for a sit-down interview. Connect the gear. Roll to record a five minute interview. Playback, compare.

Make a stereo recording.

Demonstrate the major functions of the Lectrosonics wireless system

Follow a speaker with the overhead boom

DAY 6

Prep for Post

Communication

- Talk to sound editor beforehand

 - Editing system

 - Track handling

 - Timecode

 - Music beds

 - Ambiences and room tone

- Deliver materials that fit the workflow

 - Additional tracks on DVD/CD/??

- Stereo

 - MS or XY

- Producing a basic sound report

 - Writing down what's useful

 - Keeping a copy

SMPTE Timecode

- Basic overview

- Jam sync

- Usefulness in digital filmmaking

- Record-run or free run?

- TC slates

- Frame rates and why there are multiple frame rates

- synchronizing multiple devices

Exercise:

- Synchronize two or more DVX100 cameras

Set Savvy

- Being ready

- Thinking ahead

- Get in on the scout

 - understanding lighting

 - Working with other departments for shadow control

 - Don't leave the fridge off

Production Nightmares

Being lit out
Uncontrollable environments

Day 7

Exercise:

Students will re-shoot a scene from their camera workshops using a sound unit with overhead boom mic and/or lavalier mics as appropriate, using techniques and principles acquired during the sound seminar and evaluate the results