AUDIO ENGINEERING I

COLLIN COLLEGE – SPRING 2014

Topics of this course:

- Overview of the Recording Studio
- Acoustic principles
- Basic studio equipment/electronics
- Microphone types, uses, and techniques
- Studio setup, signal flow
- Introduction to Pro Tools Software
- Overview of mixing and editing principles

Chapter 1: The Recording Studio

Different types of studios:

- Professional Recording Studio
- Project Studio
- Portable Studio

AN EXAMPLE STUDIO SETUP:

Rooms of a studio:

- Control Room
- Recording Room/s
    - Iso room/booth
    - Larger room with reverb
- Technical room

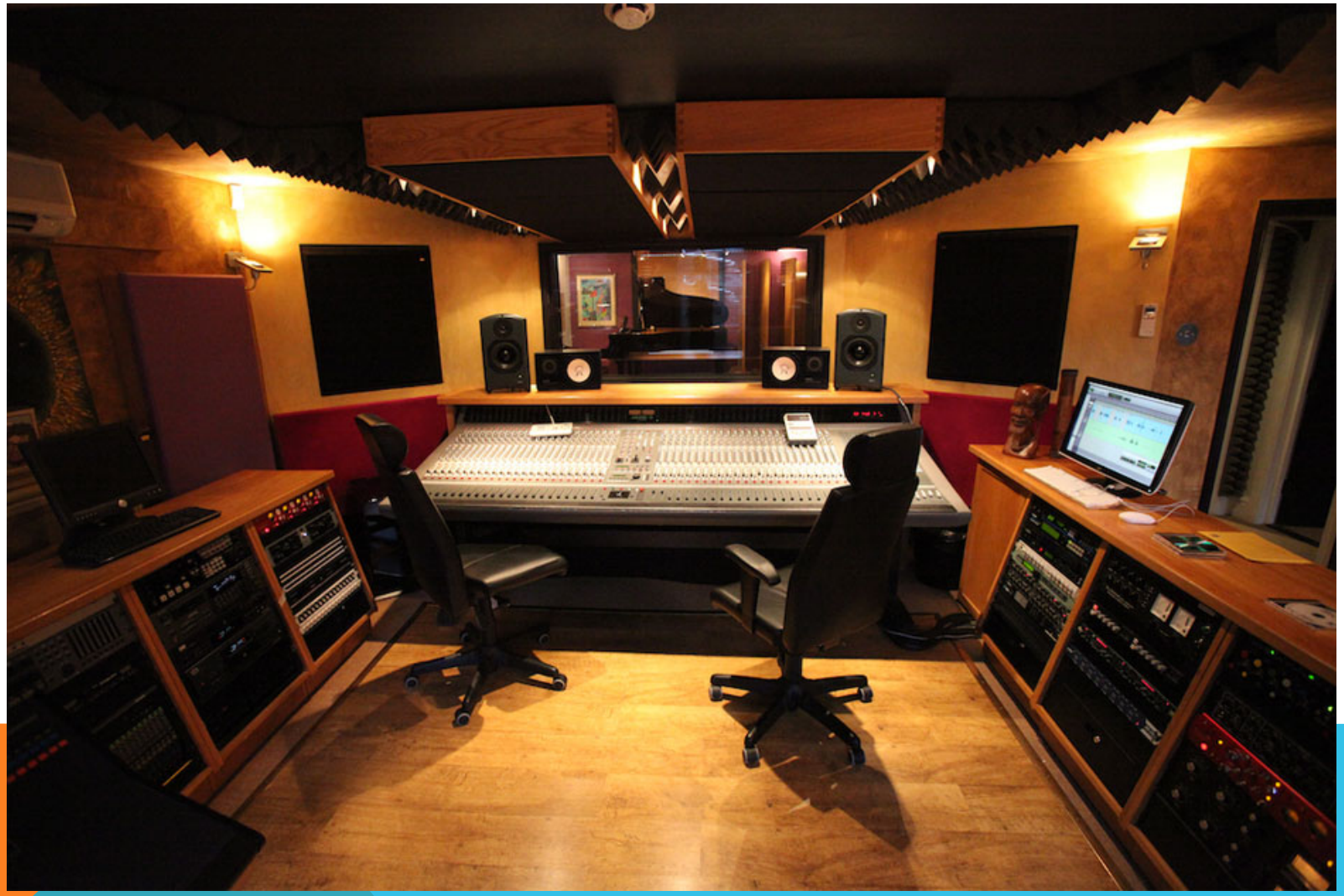
Iso room looking into the control room

Redlands Recording Studio, Miami

A large recording room with drum and guitar/amp setup

Sound Emporium, Studio A, Nashville

Control Room



Yellow Shark Studio, UK

Control room with mixing console, monitors, Pro Tools computer setup, and several racks of outboard devices

THE RECORDING PROCESS

1. Preparation
2. Recording
3. Overdubbing
4. Mixdown
5. Mastering
6. Song Sequence Editing
7. Product Manufacturing
8. Marketing & Sales

1. PREPARATION

Questions to be answered:

- What is the goal?
- What are the budget and studio costs?
- How will it be funded?
- What is the time frame?
- Are musicians and instruments ready for the project?
- Who will be the producer, recording engineer, etc.?

2. RECORDING

Sound sources (instruments, voices) are recorded using microphones or directly to the tracks of a recording system.

- The instruments/musicians are the MOST important component in getting a good quality sound
  - Drummers must play cleanly and with constant tempo and dynamic level
  - Guitarists must play cleanly and with a good sound
- A bad-sounding instrument can be cleaned up in the mix, but will never sound as good as an instrument that sounds good on its own.

Any number of instruments can be recorded and mixed together with recording equipment and DAWs (Digital Audio Workstation)

Isolation – allows maximum flexibility in mixing and adjusting individual instruments or tracks

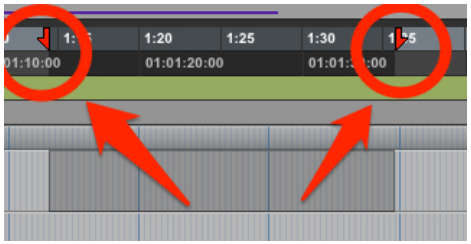
- Through separate recording
- Baffle
- Isolation booth

RECORDING PROCESS

- Select and place microphones, place instruments and musicians, set up headphones for musicians, and ***document*** mics and settings
- Label mixing console and DAW
- Set levels for each instrument (asking each musician to play solo, or hearing a song and listening to each track with the solo function)
- Make rough headphone mix(es) to send to musicians
- Rundown (record if desired)
  - Adjust headphone levels
  - Adjust individual levels, balance
  - Note song's section changes – breaks, chorus, etc.
- RECORD.

3. OVERDUBBING

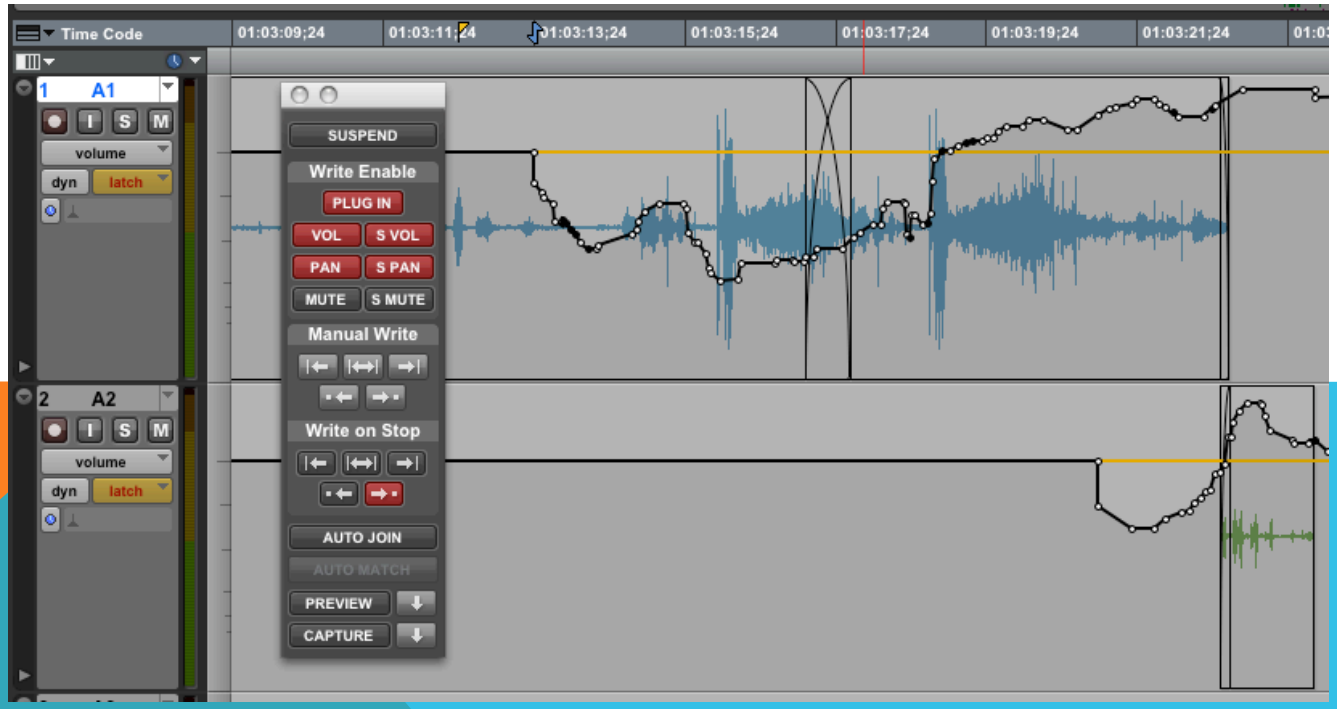
- Placing additional instrument or vocal parts into an existing recording.
  - Any number of takes can be played in at any time; either the full song, an entire segment such as verse or chorus, or punching in – dropping in the middle of a track to record a short segment.



  - All settings (mics and position, EQ, room, and level all have to be the same as they were in the original take. This is why documentation is important!

4. MIXDOWN

- After recording and editing, the individual songs are mixed to their final media forms and final combined sound
  - Can take place through a hardware mixing console or through a DAW's virtual mixer
  - Level adjustment, fine-tuning (EQ and positioning) and effects processing (reverb, delay, etc.) can be added
  - Automation may be used



5. MASTERING

The final mixdown may be sent to a mastering engineer to make fine tuning adjustments to the overall recording:

- Level balancing between songs
- Dynamic level of entire recording – reaching the ideal dynamic level for its intended sound medium (i.e. CD)
- Equalization

- Mastering doesn't have to be sent somewhere else; it can be done in-house. This should be decided beforehand!

6. SONG SEQUENCE EDITING

The final masters are put in their intended order, fades and silence gaps can be set.

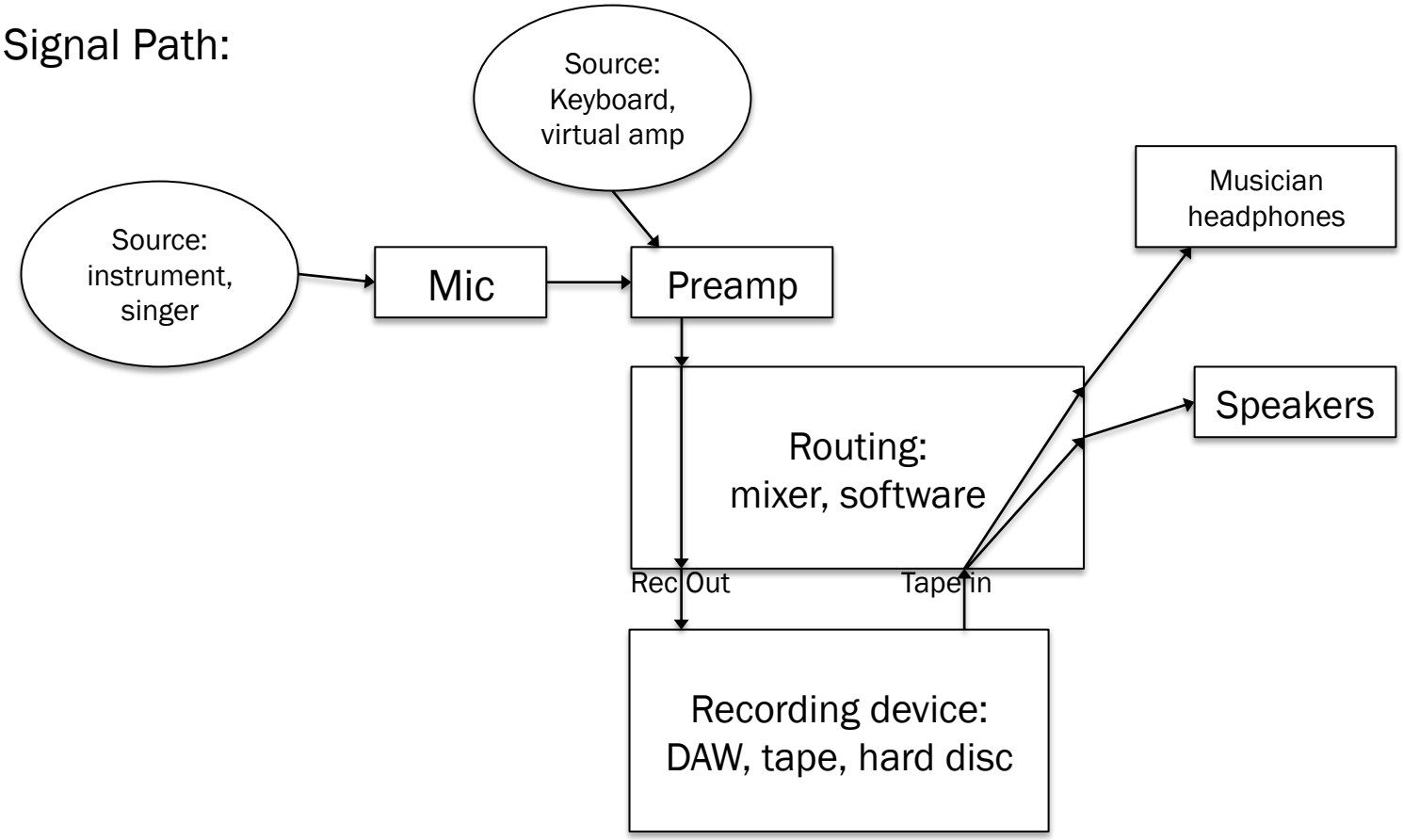
7. PRODUCT MANUFACTURING

Artwork, packaging, and wholesale production are completed

8. MARKETING AND SALES

Another topic entirely, but extremely important!

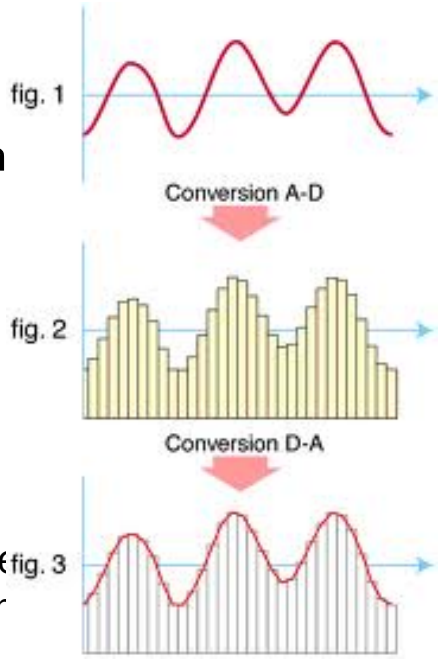
Signal Path:


Source:
Keyboard,
virtual amp
Source:
instrument,
singer
Mic
Preamp
Musician
headphones
Speakers
Routing:
mixer, software
Rec Out
Tape in
Recording device:
DAW, tape, hard disc

A Secret to Recording a GOOD sound:

- The **Player** and instrument contribute at least 50% to the overall sound.
- The **Room** contributes about 20% to the overall sound. (Even on close-miked instruments. The room is more responsible for the ultimate sound than many engineers realize)
- The **Mic Position** contributes about 20% to the overall sound.
- The **Mic Choice** contributes about 10% to the overall sound.

THE TRANSDUCER



- Any device that changes one form of energy into another form of en

- Examples:
- Microphone
- Guitar
- Loudspeaker
- Ear
- A/D converter: (i.e. within an audio interface or mixing console) take electrical voltage levels from microphone and converts them into num values.
- D/A converter: takes numerical digital values and converts them into electrical voltage levels, which create air-pressure vibrations – physical, audible sound!