Recording Band, Choir, and Orchestra

Dr. Andrew Stonerock
Tarleton University
Stonerock@Tarleton.edu

Dr. C. Floyd Richmond
Tarleton University
CRichmond@Tarleton.edu

Dr. Vicky Johnson
Tarleton University
VJohnson@Tarleton.edu

TMEA

1:00P, February 14, 2020

http://floydrichmond.com/tmea2020

https://www.tarleton.edu/finearts/music/

VJ

What We Will Cover In Today's Session

- **Tips for recording your ensembles.**
- **Bands**
- **Choirs**
- **Orchestras**
- **Chamber Ensembles**

VJ

Hardware
We will look at . . .

Strategies for recording using devices you may already have and some you may not.

Devices:

Cameras/Phones

Handhelds

Computer

iPads

Chromebooks

Gear:

Microphones

Audio Interfaces

Mixers

Amplifiers

Speakers

Cables

VJ

Software
We will look at . . .

Software - Quick overview

Entry-Level Programs:
Audacity
GarageBand
MixCraft
Pro Tools First

Pro Level Software:
Pro Tools
Logic
Ableton Live
Reason
Cubase
Studio One

Cloud Based Software
Sound Trap
Soundation
Band Lab

iOS Software
GarageBand
Cubasis
Fruity Loops

VJ

Tips for Recording Bands, orchestras, and Choirs

1. Select the right microphones.
2. Place microphones appropriately.
3. Choose a good space for recording.
4. Arrange performers for best possible blend.
5. Check setup.
6. Check levels.
7. Delegate sound recording responsibilities.
8. Run a backup recording of the program.
9. Arrange dress rehearsal.
10. During recording, keep in mind limits of performers.

SELECT THE RIGHT MIC

- **Concert Hall –** in a loud environment for orchestra or band – pair of small diaphragm condensers. (AT 5045)
- **Studio –** in a quiet environment for capturing detail, beauty of tone, instruments like acoustic guitar, vocals, pair of large diaphragm condensers.
- **Rock and Roll Mics** – in a loud environment needing sound isolation – Dynamic - Shure SM 57/58, Sennheiser 835/935, AKG D5
- **Specialty Mics** – Use ribbon mics for soft vocals and acoustic guitars (Royer 10, or 121/122), use kick drum mics for bass on drum set. Shure SM57s work well for snares and toms. Use small diaphragm condensers for overheads and cymbals (Rode M5 or NT 5).

AS

PLACE MICS APPROPRIATELY

- Bands, orchestras, and chamber ensembles - far enough for a good blend - well above the band (18'-20' above floor level) and as far in front of the group.
- Choirs - far enough for a good blend - well above the choir - (3 feet above and 3 feet in front of tallest singers)
- Studio/Solo - far enough away from instruments to avoid instrument noise such as clicking keys, far enough away from vocals to avoid sibilances (Ss, Ps). Mic screen may help.
  - Vocals: Dynamic mics - 1", Condenser 6"
  - Instruments: Dynamic mics - 6", off center of bell. Condenser mics - 1'-3', off center of bell.
- Specialty Mics –
  - Acoustic Guitars - pickups in the instruments usually do a good job, but if not, a condenser or ribbon far enough away to avoid excessive strum, pick and finger noise.
  - Percussion - kick drum mics - 3"-6" from head. Snares and toms 1"-3" from heads. Overheads for cymbals 2'-3' above instruments.
  - Piano - Grand - Open lid, xy mic pattern over center of strings. Upright - open lid, xy mic pattern over center of strings.

CHOOSE A GOOD SPACE

- Bands, orchestras, jazz bands, and most chamber ensembles should perform in medium to large auditorium with uneven ceiling, raised floor, treated walls (curtains or acoustic treatment) especially on parallel walls. There should be hard surfaces behind the horns to bounce back through the ensemble to the audience. Some dampening may be necessary. The stage curtain valence should not trap the sound on stage.
- Choirs - Choirs are quieter than bands. They work better with rooms that have more natural reverb/ echo - but not too much. A high school gym seldom is a good space for any musical ensemble. A shell is often a great help in projecting choral performances in a large auditorium.
- Guitars, Harps, and similar quiet instruments produce the softest musical performances. They should perform in spaces with more reverb than others. Wooden floors and hard, untreated walls generally help these ensembles.
- Pianos should perform in rooms where the piano will fill the space and where the space will enhance the sound (enough reverb/echo to make it full, but not enough to make it muddy). If the auditorium is too large, the quality of the sound will decline, and if the piano has to run through a sound reinforcement system, it will suffer even more. Microphones should be placed on pianos for recording, and not for sound reinforcement, except when there is no choice.

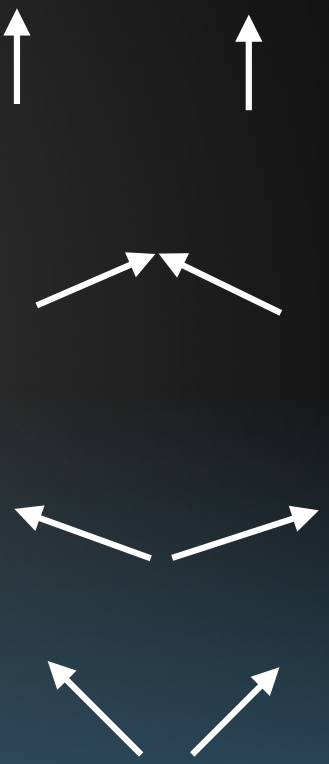
AS

ARRANGE FOR GOOD BLEND

- Listen to the entire ensemble from the auditorium near mics. Consider whether some instruments need to be moved further from the mics. This is especially true of percussion and loud instruments. Consider whether some need to be moved closer. It's unusual, but there is wisdom in moving strings forward when recording. Solos should generally be forward, or mixed separately with spot mics.
- For choirs, you have loud and soft singers and those with good tone and those with great. Place your loudest singers a good distance from the mics. Place your best tones for blending closer to the mics. Place the softest singers closer, but still sorted for tone. Place soloist forward, at least during their solos. They must move quietly through the ensemble. Spot Mics may help soloists.

CHECK SETUP - MIC PATTERNS

- Avoid parallel mic-ing (AB pattern, two mics, side by side, pointing directly at source). Why? It's likely to produce phasing.
- Use XY pattern, to pick-up different parts of the room, and to more nearly imitate the stereo sound of human hearing.
- Use ORTF pattern (like XY but with spacing about the width of the the human ears.
- Use NOS pattern (like ORTF, but with a more forward facing angle.



CHECK SETUP - BATTERIES

- If you are using wireless microphones check their batteries before recording.
- I recommend backup mics (wired) nearby, in case needed.

CHECK LEVELS

- Avoid Clipping. With modern recording, it is important that analog inputs (microphones) do not exceed the limits of what the digital system can record. Check the levels on your recording device and turn down inputs as needed. Signals which have been clipped due to exceeding limits cannot be repaired with accuracy or certainty and any attempts will take unduly large amounts of time. A "clipped" performance is worse than no recording.

DELEGATE RECORDING

- If you are the director, have someone else take care of recording.

BACKUP RECORDING

- A backup recording of any performance is recommended.
- Your backup may not be as good as your primary, but given the number of things that can go wrong, it's a good idea.

DRESS REHEARSAL

- Those recording and those doing sound reinforcement should be at a dress rehearsal to uncover any surprises that could impact the recording process.

KEEP IN MIND LIMITATIONS OF PERFORMERS

- Musicians should be well rehearsed.
- Brass can only play so long and high.
- Vocals can only sing so long and loud.
- People need breaks to stay focused.
- If you are not doing a live recording, it's better to get all takes before stopping. Live recording is usually once through.
- If you are not doing a live recording, schedule soloists so they do not have to sit through the entire recording session.

AS

Recording with Devices You May Already Have

- If you just need a recording of a rehearsal to check for musical development, you may be able to make a serviceable recording with your camera, phone, or handheld recorder.

Recording with a Camera

- Most cameras can record video and audio
- Check input quality settings (sample rate, bit depth, compression).
- Switch to video mode
- Press the record button.
- Transfer the recording to your computer using SD Card or USB Cable.
- Use your computer's software (iMovie) to extract audio from video.

Quality Settings

Sample Rate

- 44.1K
- 48K
- 96K
- 192K

Bit Depth

- 16 bit
- 24 bit
- 32 Float

AS

Quality Settings

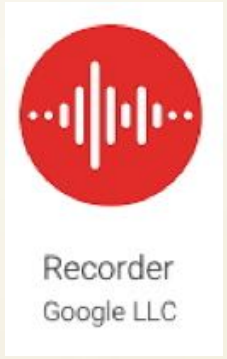
Compression

- **Lossless (uncompressed)** - Typically WAV or AIF
- **Compressed** - Typically MP3 or AAC
- It is recommended that MP3s and AACs be set to a stream rate of 320 for great quality. 120 is the minimum for useful music and is a detectable compromise. Less than 120 is for speech only (not music)

AS

Recording with an Android

- **Simplest approach**
- **Run Google's Recorder**



- **Press the record button.**

- **Recorder may not come on the phone, but can be added to modern phones. It also transcribes text and will save it to your Google drive. There are numerous recording apps on the Play Store but Google's Recorder is recommended.**

- **See more here: Google**

Recording with an iPhone

- **Simplest approach**
- **Run Voice Memos**
- **Press the record button.**

- You can pause and resume during recording. You can play back from the same device. You can edit, trim, crop, record-over, and share Voice Memos afterward. AirDrop, email, and text are supported. The recordings are automatically copied to every device on the same iCloud account. Just run Voice Memos on any other device, and there they are. The Voice Memos app comes with every recent iPhone and Mac OS Mohave and higher. Adjust quality in Settings>Voice Memo. By default it uses the build-in microphone, but you can plug in external mics through the Camera Connection Kit, or on older phones, through the TRRS/headphone jack.

- **See more here: Apple**

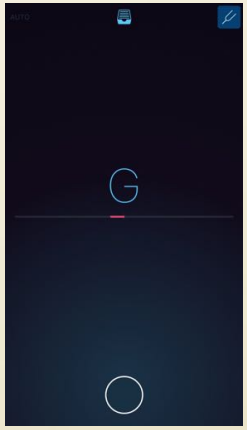
Recording with an iPhone

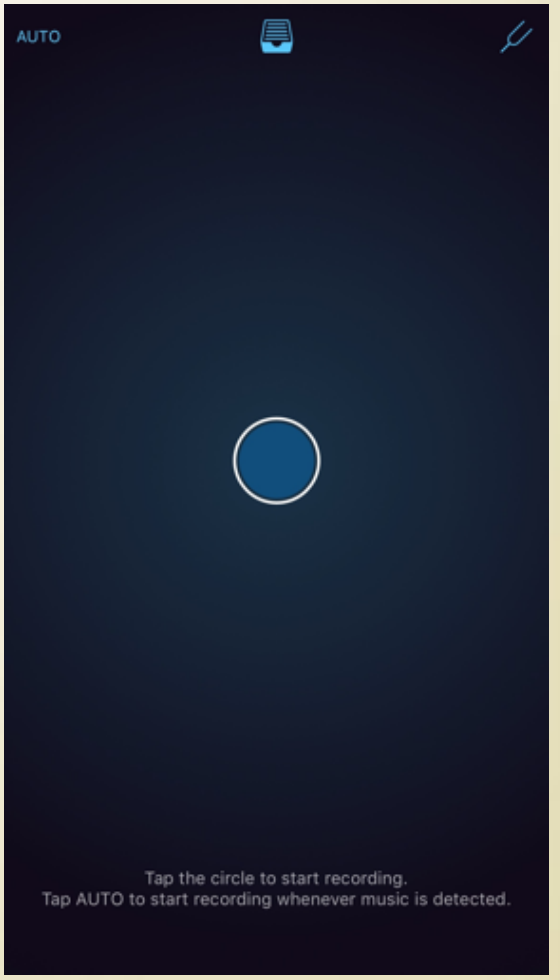
- **Run Music Memos**

- **Press the record button**

- Similar to Voice Memos, Music Memos will record your work and organize it by beats and measures. It will suggest chords and can create a drum and bass accompaniment. You can upload directly to SoundCloud or YouTube from the app. You can send the project with drums and bass to GarageBand or Logic. If Apple's MusicMemos is not on your phone, it is a free download.

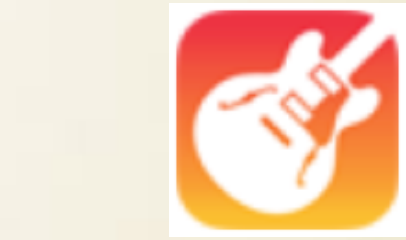
- **See more here: Apple**





Recording with an iPhone

- **Run GarageBand for iOS**
- **Create a new song**
- **Create an audio track.**
- **Set the length to record to automatic (Important!)**
- **Press Record.**



- **GarageBand is more suited for studio-like recordings than live, one-pass recordings. GarageBand's studio includes virtual instruments which are playable with the touch screen and which are programable with automatic patterns, loops, live loops, effects, adjustments for tempo and key, instrument, quantization, automation editing, and many more advanced pre and post-production features.**

- **See more here: Apple**

RECORDING WITH AN IPHONE

GarageBand

iPhone inputs
and settings

You must use auto song-length from GarageBand Preferences!

GarageBand is one of the few recording programs that lets you adjust input levels.

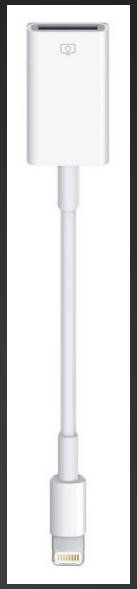
ADDING A MICROPHONE TO AN IPHONE

There are several useful inputs.

- Lightning - Best choice
- TRRS (only on older iPhones and on Androids with a headphone jack)
- Bluetooth - Slightly more complex setup, Potential interference and latency issues.

ADDING A USB MICROPHONE TO AN IPHONE

- USB Microphone and Apple Camera Connection Kit
  - Connect a USB Microphone to Apple's Camera Connection Kit, then plug into the phone. The app should automatically switch to the USB microphone. Mics must use universal drivers.



Microphones such as the AT2020 may be purchased with a USB or XLR interface. USB allows them to connect to an iOS device, or to a Laptop, desktop, or Chromebook.

ADDING ANY XLR MICROPHONE TO AN IPHONE

- XLR Microphone
- Audio Interface
- Apple Camera Connection Kit

- Connect an XLR Microphone to an Audio Interface using an XLR Cable.
- Connect the Audio Interface to the Apple's Camera Connection Kit, using a USB Cable
- Plug the Camera Connection Kit into the phone.

The app should automatically switch to the USB microphone. The interface must use universal drivers. The interface provides phantom power, pre-amps, gain control, and monitoring if needed.

AUDIO INTERFACE

- To Connect Professional Mics to . . .
  - iOS Devices
  - Computers

AS

Audio Interface

AS

The Audio Interface - Mixer

- Converts the audio signal from the microphone into a digital signal for the computer.
- Provides phantom power for condenser microphones.
- Focusrite Scarlett 2i4 USB Audio Interface ca. $180.00

- Input 1
- Input 2
- Monitoring

- Plug in 1/4 or XLR src
- Select line or inst level
- Adjust input level
- Select pre-amp to use.

- Set headphone level (plug into front)
- Set overall monitor level (plug spkrs into back)
- Balance incoming and previously recorded
- Set monitoring to DAW or Interface
- Turn on/off 48v Phantom power

AS

Hardware

- Microphones
  - Internal - convenient
  - External - quality

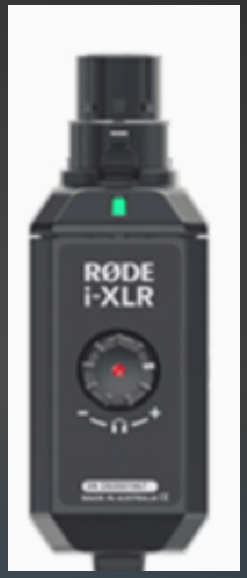
- Interface
  - Audio Interface - convenient, limited number of tracks
  - Mixers - more setup, more tracks, more complexity, support live sound.

OTHER MICROPHONES FOR IOS

- - -

OTHER MICROPHONES FOR IOS

- Plug an XLR Microphone into a Lightening Adapter

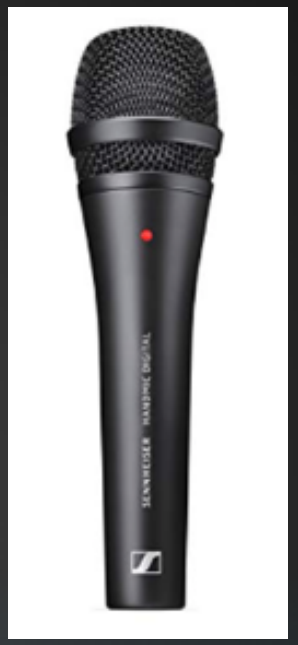


- Saramonic LC-XLR XLR to iOS Lightning Interface Cable
- RODE iXLR - XLR to Lightening Cable

The Rode iXLR does not provide phantom power!
The Saramonic does not mention phantom power in specs.
Both have built-in analog to digital conversion and will work with dynamic and self-powered condenser mics.

OTHER MICROPHONES FOR IOS

- Microphones
- Sennheiser



- Speech: Handheld: Sennheiser HandMic Digital ($260) iOS/Lightning port, Mac/PC.
- Speech/Music: Sennheiser MK 4 for iOS/USB ($400)
- Speech/Singing: Lavalier, Clip Mic ($200)
- Speech/Singing: Lavalier, MKE 2 ($500)

OTHER MICROPHONES FOR IOS

- Microphones
- Shure

- Speech - Shure MV88 ($146), wind screen, Lightning port
- Music – Shure MV 51 Digital ($200), iOS/ Mac/PC/Android
- Speech - Shure MVL Mobile Lavalier ($70), TRRS

OTHER MICROPHONES FOR IOS

- Microphones
- Other

- Speech: Lavalier: Saramonic LavMicro-UC ($90) Android/USB-C.
- iRig Mic Cast ($40). Requires a TRRS 3.5mm audio jack (iPhone 6 or earlier, iPad with headphone jack)

TIPS FOR RECORDING WITH PHONE

- Recording with Your phone
  - **Microphones** – locate built-in mic, clear around it, point toward source. Greatest improvements come with alternative inputs.
  - **Placement** – place to eliminate wind, nearby conversations, place close to subject/ensemble.
  - **Network** – to use as a recorder, don't use as a phone (put it in airplane mode, turn-off networking and bluetooth.
  - **Capture Software** – set to lossless, adjust input levels.

Recording with a Handheld

- For ease of use and convenience, it's hard to beat a dedicated handheld audio recording device.

AS

HANDHELD – FREE STANDING

- Zoom H1n
  - $120
  - Handheld/Portable/Convenient
  - Built-In Condenser Mics
  - Good quality – 24/96

AS

HANDHELD – FREE STANDING

AS

HANDHELD – FREE STANDING

- Zoom H2n $169
- Zoom H4n $219
- Zoom H5 $279
- Zoom H6 $399

- Each step up adds inputs, outputs and interface features.

AS

HANDHELD – FREE STANDING

Tascam has
Handhelds ranging
From $150 to $400.
Each serves as a
Handheld and as
A USB Interface
for a computer.

Each step up adds inputs, outputs and interface features.

AS

HANDHELD – FREE STANDING

Other companies offering handhelds include Sony, Roland, Izotope,

AS

TIPS FOR USING HANDHELDS

- Mount handheld and/or mics on a stand
- Place well
- Fresh batteries, fully charged, or **plug in**.
- Use proper inputs (Mic/Line/Built-in)
- Check settings (levels, compression)
- To improve quality, use better mics.

AS

EQUIPMENT NEEDED

- Hardware . . .
- Software . . .

Hardware

Computers
•Best choice for heavy duty production

Laptop vs Desktop
•Laptops - portable, but buy higher end machines. Built in mic and camera. Use external gear for higher quality.
•Desktops - more power, more expandable, lower cost, not portable. Require external mics/cameras.

iOS Devices
•iPads and iPhones are an increasingly viable option for music production. Have built in mics and cameras. Use external gear for higher quality. GarageBand, FruityLoops, Cubasis

Chromebooks -
•Chromebooks can do music production but are currently the most limited option.
•Must use cloud-based solutions such as SoundTrap, Soundation, or BandLab.
•Can use internal or external mics and cameras (but only with universal USB drivers).

Handheld/Stand-Alone Recording Devices
•Pros
Excellent Quality
Convenient and Fast
Especially convenient for one-pass recording
Some units have multi-track capabilities.
•Cons
Quality could be improved
Still require careful setup
Limited editing interface (small screen, smaller than a phone or computer)

Microphones

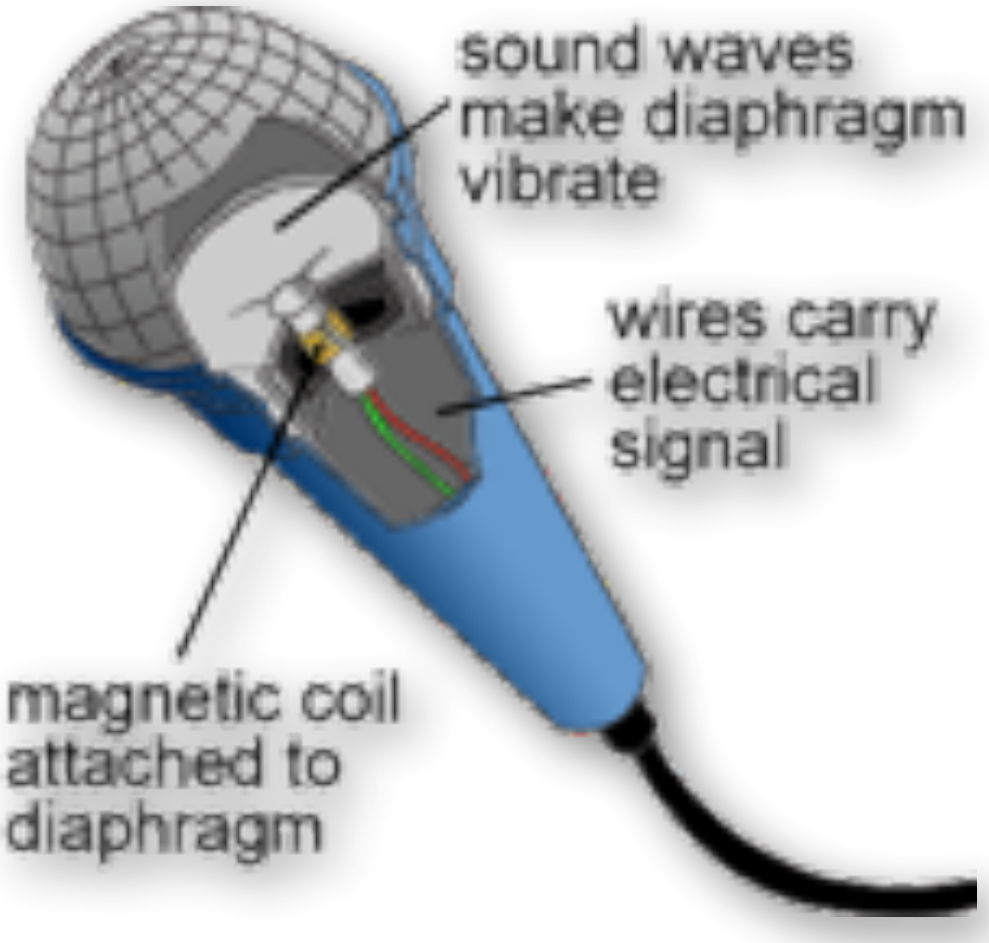
Gear

Microphones

Dynamic ***Condenser***

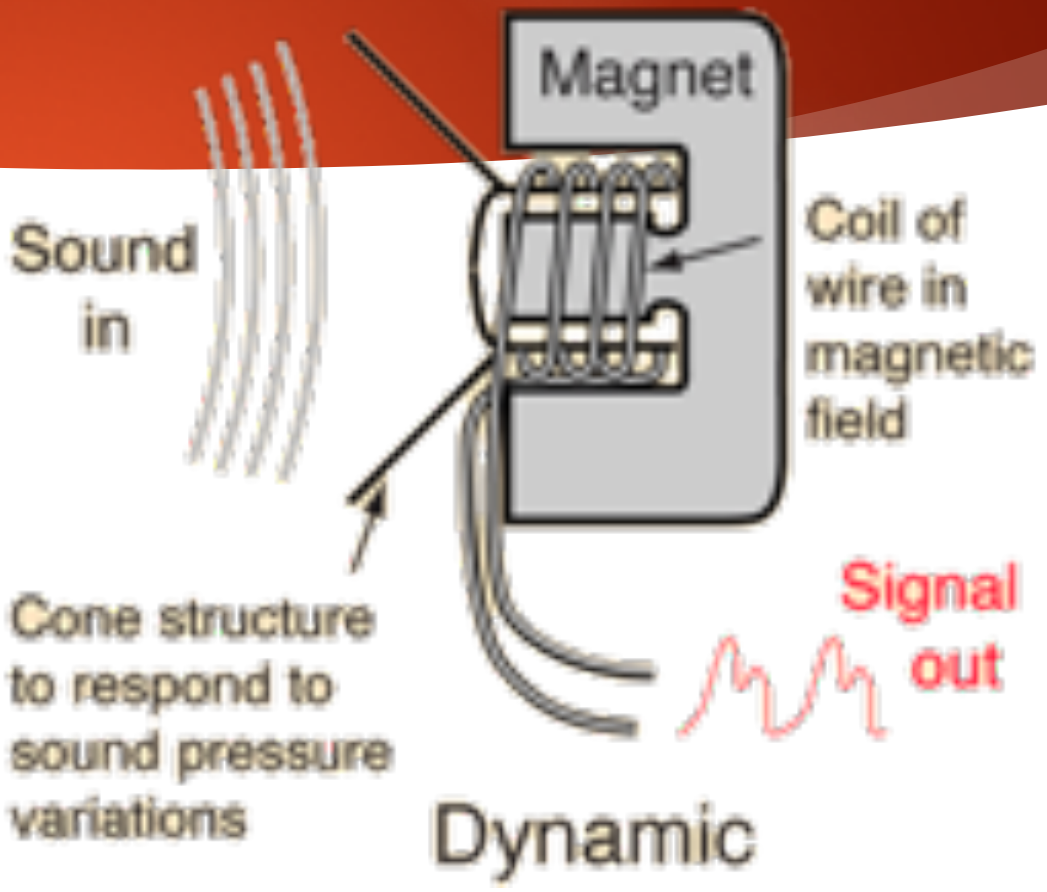
Microphone Components

- The sound receiver (the transducer) is called the element or capsule.
- The element is contained in the housing
- The output



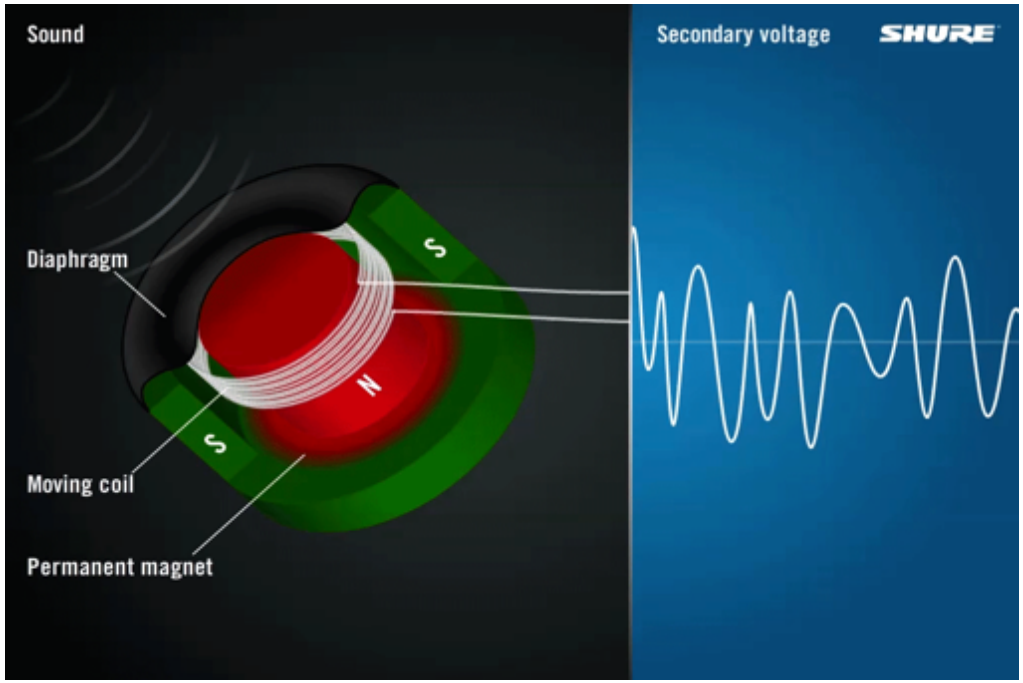
The Transducer

- A device which changes energy from one form into another
  - In this case from acoustic into electrical.
- Three main types of transducers
  - Dynamic
  - Condenser
  - Ribbon



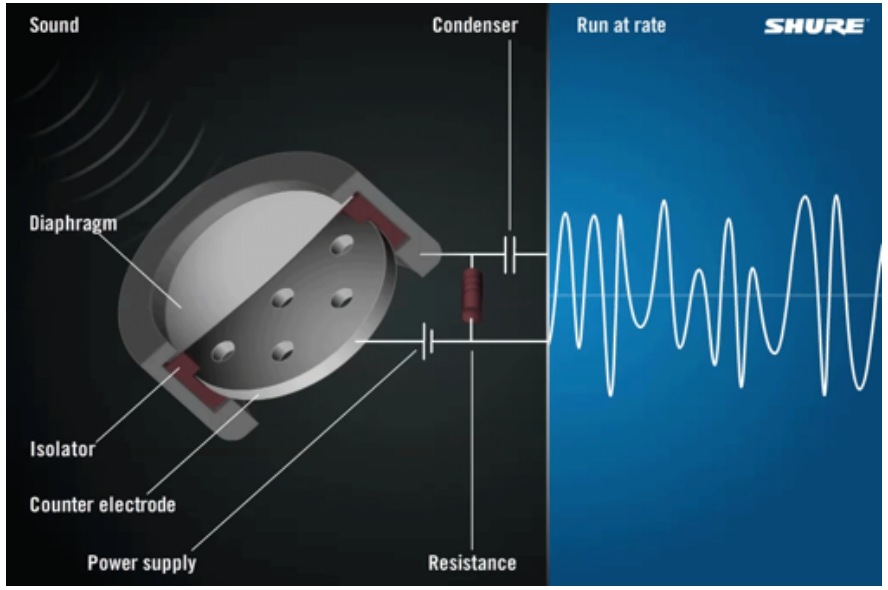
Dynamic Microphones

- The elements are made up of a diaphragm, voice coil, and magnet which form a sound-driven electrical generator.
- Sound waves move the diaphragm/voice coil in a magnetic field to generate the electrical equivalent of the acoustic sound wave.
- The signal does not need any additional circuitry.
- Extremely rugged
- Good sensitivity
- Can handle the loudest possible sound pressure levels without distortion.



Condenser Microphones

- The elements use a conductive diaphragm and an electrically charged back-plate to form a sound-sensitive "condenser" (capacitor).
- Sound waves move the diaphragm in an electric field to create the electrical signal.
- All condensers have active electronic circuitry called the preamp, either built into the microphone or in a separate pack.
- Condenser microphones require phantom power or a battery to operate.

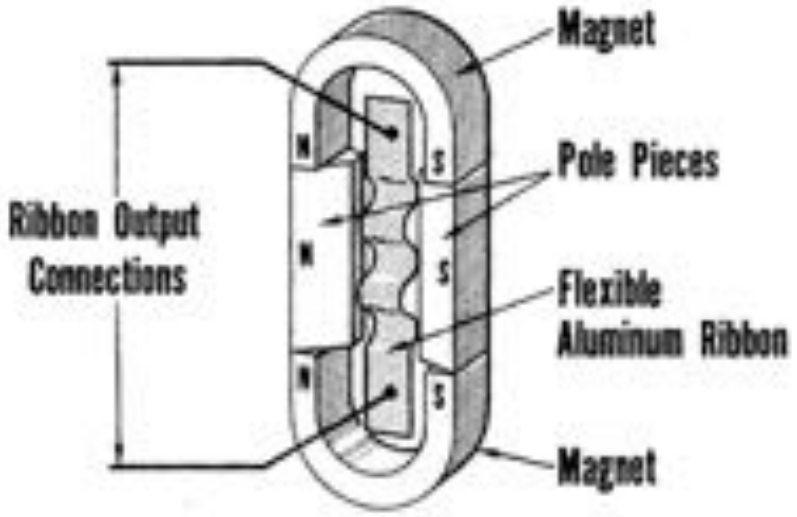


Condenser Microphones

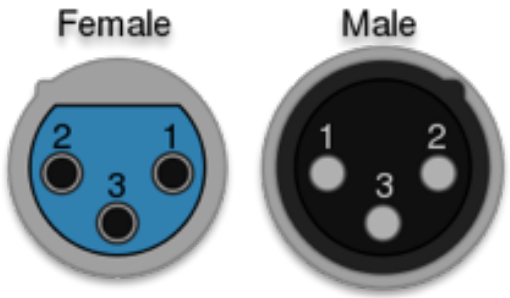
- Advantages:
  - Best overall frequency response makes this the microphone of choice for many recording applications.
- Disadvantages:
  - More Expensive
  - May pop and crack when close miked
  - Requires a battery or external power supply.

Ribbon Microphones

- A thin aluminum ribbon is suspended within a magnetic field and moves when hit by sound waves.
- Like a dynamic microphone, the movement creates an electrical signal.
- Advantages:
  - Adds "warmth" to the tone by accenting lows when close-miked.
- Disadvantages:
  - Accenting lows sometimes produces "boomy" bass.
  - Very susceptible to wind noise.
  - Not suitable for outside use unless very well shielded
  - Expensive



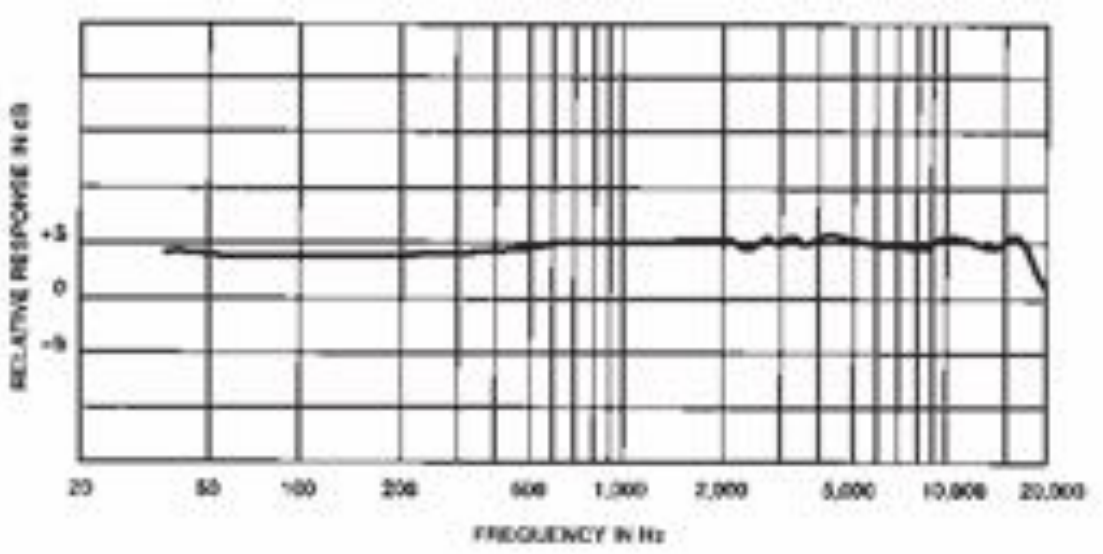
Phantom Power



- A DC voltage (usually 12-48 volts) used to power the electronics of a condenser microphone.
- This voltage is supplied through the microphone cable by a mixer equipped with phantom power or battery.
- The voltage is equal on Pin 2 and Pin 3.
- For a 48 volt phantom source, Pin 2 is 48 VDC and Pin 3 is 48 VDC.
- Pin 1 is the ground (shield).

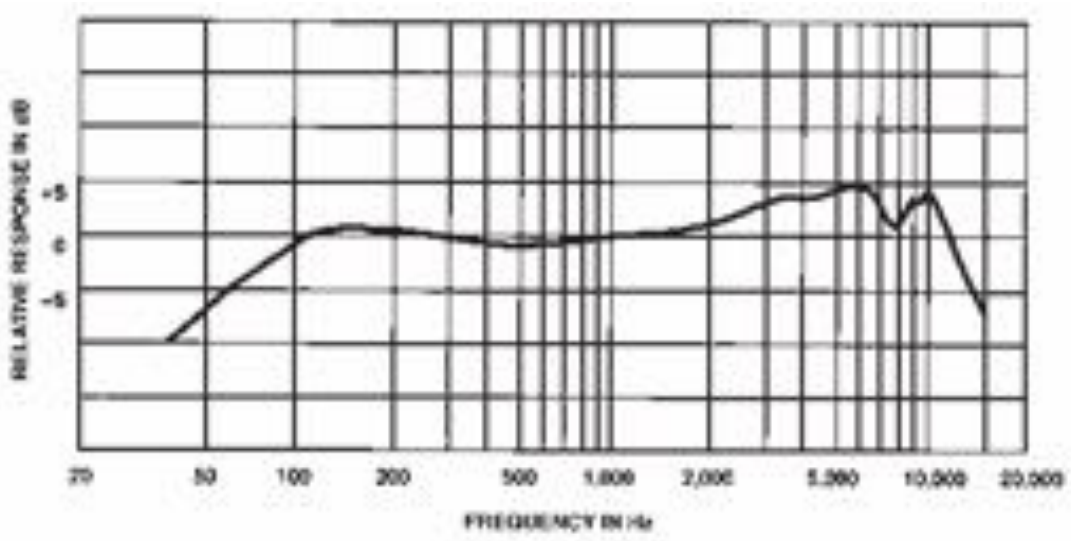
Frequency Response

- Virtually all microphone manufacturers will list the frequency response of their microphones at a range from 20 - 20,000Hz.
- A microphone whose response is equal at all frequencies is said to have a “flat” frequency response.



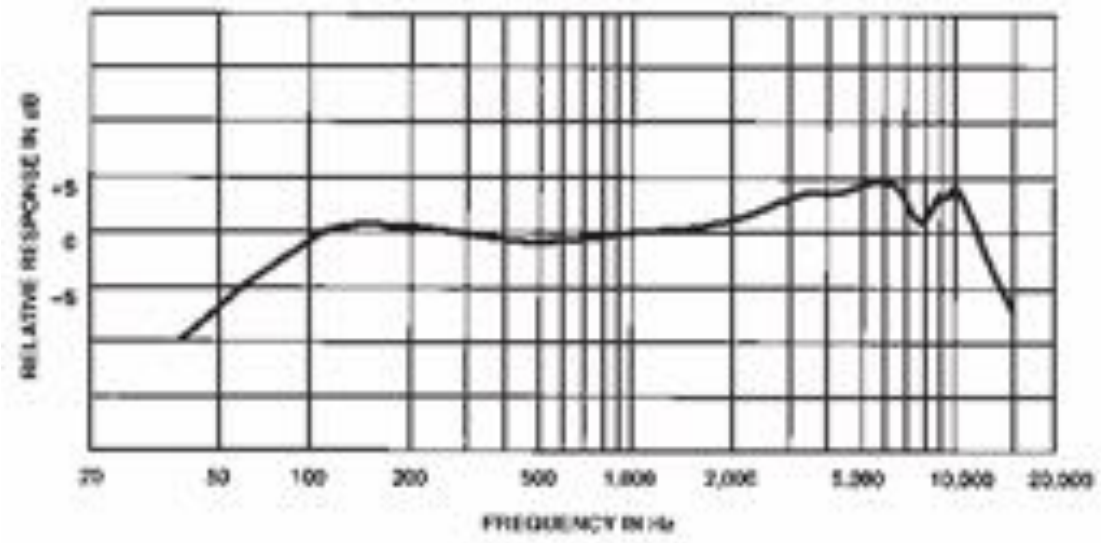
Frequency Response

- A microphone whose response has peaks or dips in certain frequency areas is said to have a “shaped” response.
- This response is designed to enhance a frequency range that is specific to a given sound source.
  - For example, a microphone may have a peak in the 2-10Khz range to enhance the presence of vocals.



Frequency Response

- A microphone's response may also be reduced at other frequencies.
- One example of this is a low frequency roll-off to reduce unwanted "boominess."

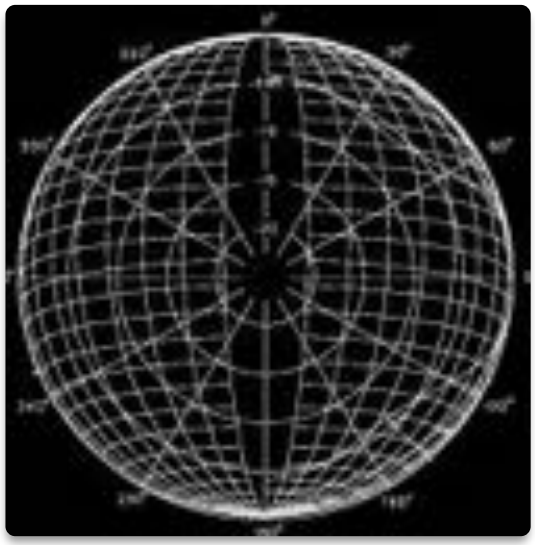


Directional or Not

Every microphone has a property known as *directionality*.

This describes the microphone's sensitivity to sound from various directions.

Omni-directional Response



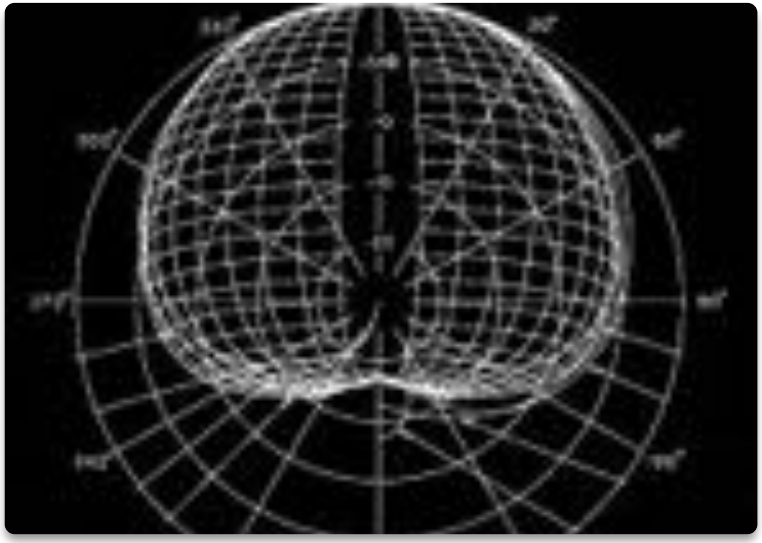
- Its “coverage” or pickup angle is a full 360 degrees.
- This type of microphone can be used if more room ambience is desired.

Unidirectional Response

- A microphone that is most sensitive to sound arriving from one particular direction and is less sensitive at other directions.
- They are used to isolate the desired on-axis sound from unwanted off-axis sound.

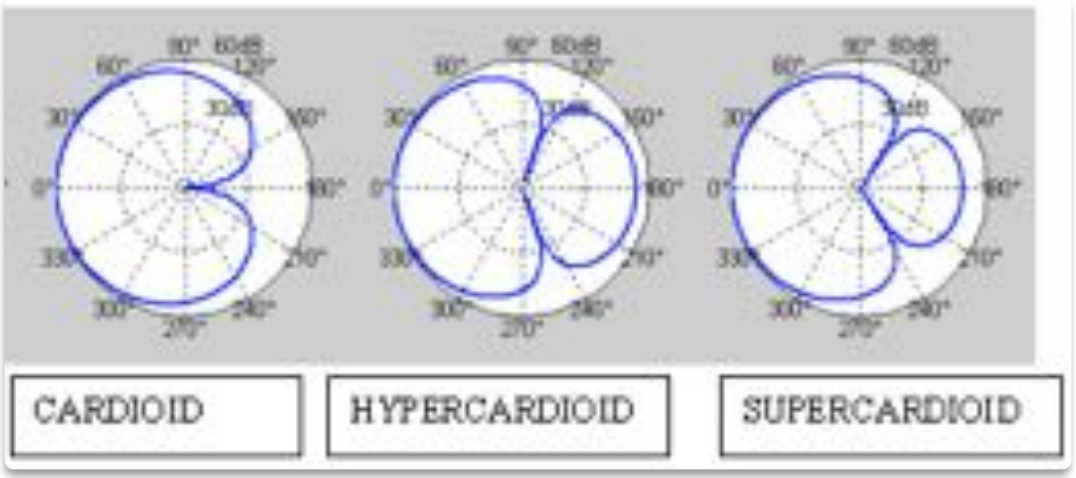
Directional Response

- Cardioid "Heart-shaped" Sound is picked up mostly from the front, but to a lesser extent the sides as well.
- The cardioid mic picks up only about one-third as much ambient sound as an omni.



Variations of Unidirectional Mics

- Supercardioid and hypercardioid.
- Both patterns offer narrower front pickup angles than the cardioid.
- 115 degrees for the Supercardioid and
- 105 degrees for the hypercardioid.

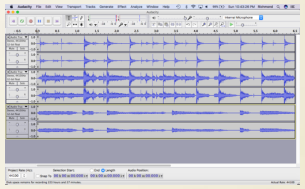


EQUIPMENT NEEDED

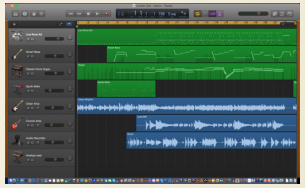
- Hardware . . .
- Software . . .

Free or Entry-Level Software

Audacity - Free, good for straight capture and multi-track recording, destructive editing, no MIDI, instruments or loops.



GarageBand - Free, for Mac only. Best interface in the business, but hides complexity/power. Extensive loops.



MixCraft - Modeled after GarageBand interface, Windows only, Great collection of loops. Not free - educational discounts!

Cakewalk - Free, formerly a commercial product. Windows only.

ProTools First - Free, Like ProTools, but a limited number of songs in the cloud and limited to 16 tracks and 23 plug-ins.

Professional Software

ProTools - Industry standard, strong community, quality, good for straight capture and multi-track recording, includes non-destructive editing, supports MIDI, expandable (extensive editing requires additional plug-ins and instruments). Limited loops and loop interface. $$$

Logic - A powerful and affordable package with quality consistent with ProTools, extensive non-destructive editing, supports MIDI, can use plug-ins and third-party instruments, but comes with a lot more than ProTools, saving money due to less required expansion. Strong loops! $$

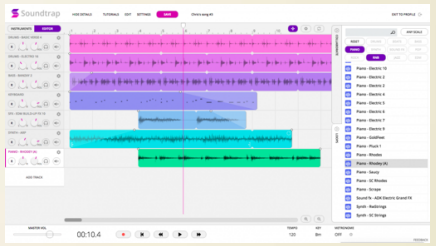
Ableton Live - Excellent quality, consistent with Logic and ProTools. Has a unique session view (Advanced DJ compositional mode). Interfaces with some unique hardware. Makes many changes in live or real-time. Excellent Loops. $$


Reason - Excellent quality, consistent with Logic and ProTools. Has a unique studio view (lets you put together and program a virtual studio). Excellent loops. $$

Steinberg's Cubase and Presonus' StudioOne - Strong contenders, on approximately the ProTools level with a greater selection of instruments, and some unique editing capabilities. $

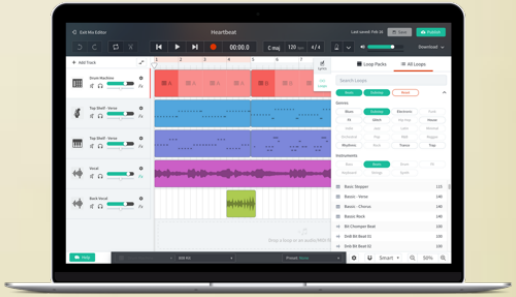

Cloud-Based Software

SoundTrap - Increasingly powerful, cloud-based DAW. Owned by Spotify. Good collection of loops. Free version has a limited number of loops. Premium version requires a subscription. Ideal for Chromebooks.



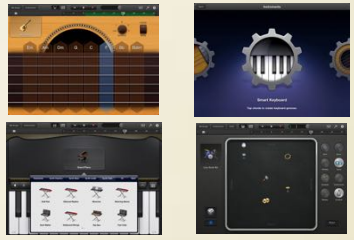
Soundation - A cloud-based DAW and one of the earliest. Free version has a limited number of loops. Premium version requires a subscription. Ideal for Chromebooks.

BandLab - a recently released cloud-based DAW with strong features. Ideal for Chromebooks.



iOS Software

GarageBand - Free! Amazingly powerful DAW for tablet or phone. Adds a collection of exceptional DAW-based instruments which may be played using the touch screen (not available on the computer). Projects on GarageBand for iOS may be taken to GarageBand, or to Logic for further development (but not back to the iPad).



Cubasis - $40! An iOS version of Cubase, and in a few ways, more capable than GarageBand (supports MIDI in and out). GarageBand is MIDI in only.

Fruity Loops - $15! An iOS (also Windows) app that uses a strong loop based approach to production.

Tarleton State University

Menagerie Quartet

AS

Recording Comparisons

AS

Tarleton State University

VJ

Tarleton State University
Texas A&M University System
Founding Member

VJ

Tarleton State University

VJ

Tarleton State University

VJ

Tarleton State University

VJ

Tarleton State University

B.A.

General Studies - Vicky Johnson

Music Business - Floyd Richmond

Jazz Studies - Andrew Stonerock

Musical Theater - Heather Hawk

B.M.

Performance - David Robinson

Music Education - Gary Westbrook

M.M.

Music Education - Vicky Johnson

VJ

Recording Band, Choir, and Orchestra

Dr. Andrew Stonerock
Tarleton University
Stonerock@Tarleton.edu

Dr. C. Floyd Richmond
Tarleton University
CRichmond@Tarleton.edu

Dr. Vicky Johnson
Tarleton University
VJohnson@Tarleton.edu

TMEA

1:00P, February 14, 2020

http://floydrichmond.com/tmea2020

https://www.tarleton.edu/finearts/music/

VJ

Footnotes

Recommended Web Sites

Recording Choirs
Mic'ing Patterns

SOUND REINFORCEMENT MANUFACTURERS - MICROPHONES

- Shure
- Sennheiser
- Electrovoice
- Audix
- Neumman
- Beyer Dynamic
- AKG
- Cascades
- Earthworks
- Rhode
- Blue
- Audio Technica
- Royer

SOUND REINFORCEMENT MANUFACTURERS - AUDIO INTERFACES

Apogee
ART
Arturia
Audient
Behringer
Black Lion Audio
Blue Microphones
Boss
Cranborne Audio
Cymatic Audio
Denon DJ
DPA
Focusrite
Grace Design
iConnectivity
IK Multimedia
JoeCo
Keith McMillen Instruments
Line 6
Lynx
M-Audio
Mackie
MOTU
Native Instruments
Orange
PreSonus
Radial
RME
Rode
Roland
Shure
Solid State Logic
Sonoma Wire Works
Sound Devices
SPL
Steinberg
TASCAM
TC-Helicon
Universal Audio
Zoom

SOUND REINFORCEMENT MANUFACTURERS - MIXERS

- Presonus
- Mackie
- Allen and Heath
- Peavey
- Yamaha
- Taft
- Carvin
- Avid
- Behringer (Midas)
- Digico
- SSL

SOUND REINFORCEMENT MANUFACTURERS - SPEAKERS

- Mackie
- M-Audio
- JBL
- Peavey
- Fender
- Fishman
- Bose
- Yamaha
- Meyer Sound
- L Acoustics
- D&B

DEALERS

- Romeo
- Soundtree
- Sweetwater
- Musician's Friend
- Sam Ash
- Guitar Center
- Woodwind/Brasswind
- ProAudio
- B&H Photo
- Full Compass

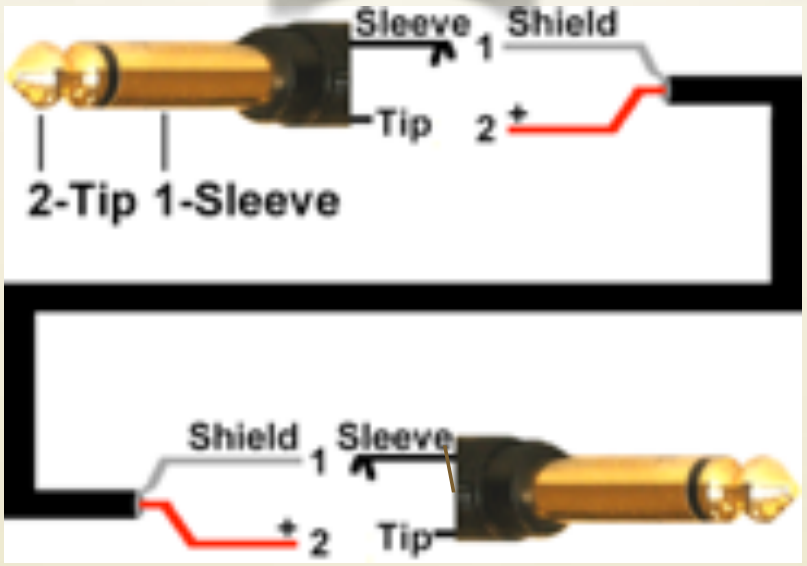
Cables

Gear

Cables

Gear

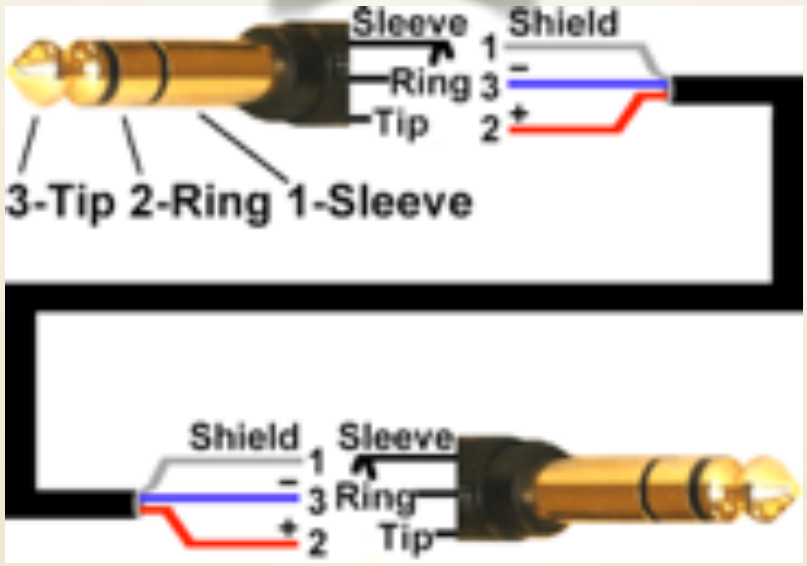
Cables



1/4" TS for Instruments such as Guitar, Bass, Keys

Gear

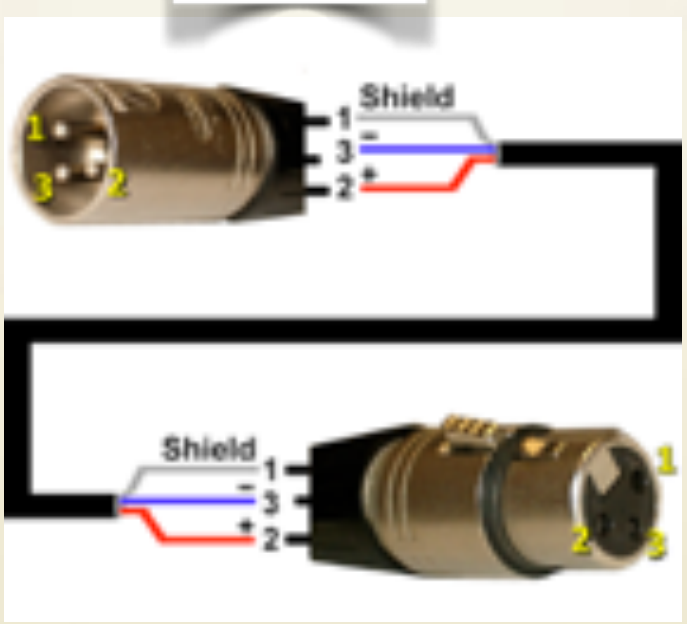
Cables



1/4" TRS for Balanced Lines and Stereo Equipment

Gear

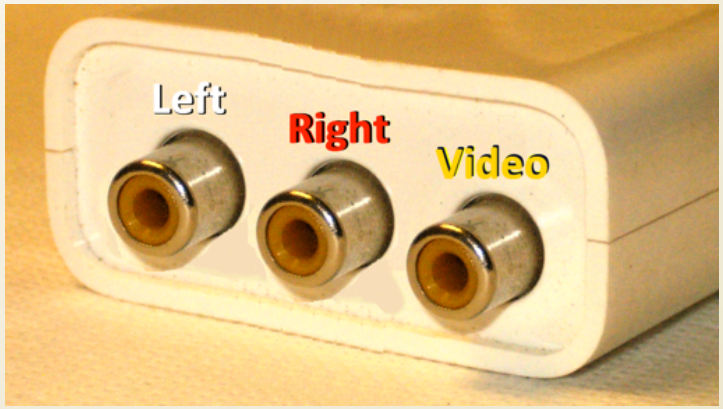
Cables



XLR for Microphones

Gear

Cables



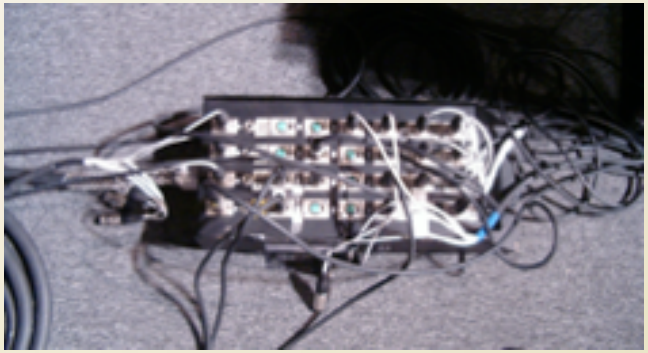
RCA Cables primarily for CD and DVD players, tape recorders

Gear

Instruments/Direct Boxes

Gear

Snake



Mixers

Gear

Mixer - Allen and Heath iLive 112

Gear

Mixer - Mackie SR 24-4-VLZ Pro

Gear

Mixer - Allen and Heath GL 3300

Gear

Digital Mixer - Digidesign 8

Gear

Digital Mixer - Digidesign Control 24

Gear

Digital Mixer - Presonus StudioLive 24.4.2.24

Digital Mixers

Digital Mixers provide fundamentally the same operations as analog mixers, however, common differences are as follows.

(1) Additional effects on each track.
    (1) Filters - EQ
    (2) Dynamics - Compression and Limiting
    (3) Noise - Gating
    (4) Time - Reverb, Echo, Delay

(2) The ability to save and recall board settings from different rehearsals.
(3) Recording Interface - can record each single track for separate mix-down later.
(4) Greater complexity (extra features) - less approachable interface.

Gear

Powered Speakers
(Amplifier and Speakers)

Gear

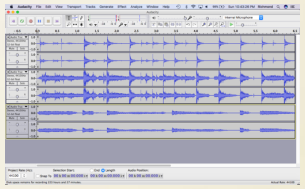
Powered Speakers

EQUIPMENT NEEDED

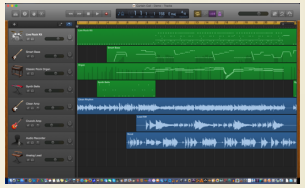
- Hardware . . .
- Software . . .

Free or Entry-Level Software

Audacity - Free, good for straight capture and multi-track recording, destructive editing, no MIDI, instruments or loops.



GarageBand - Free, for Mac only. Best interface in the business, but hides complexity/power. Extensive loops.



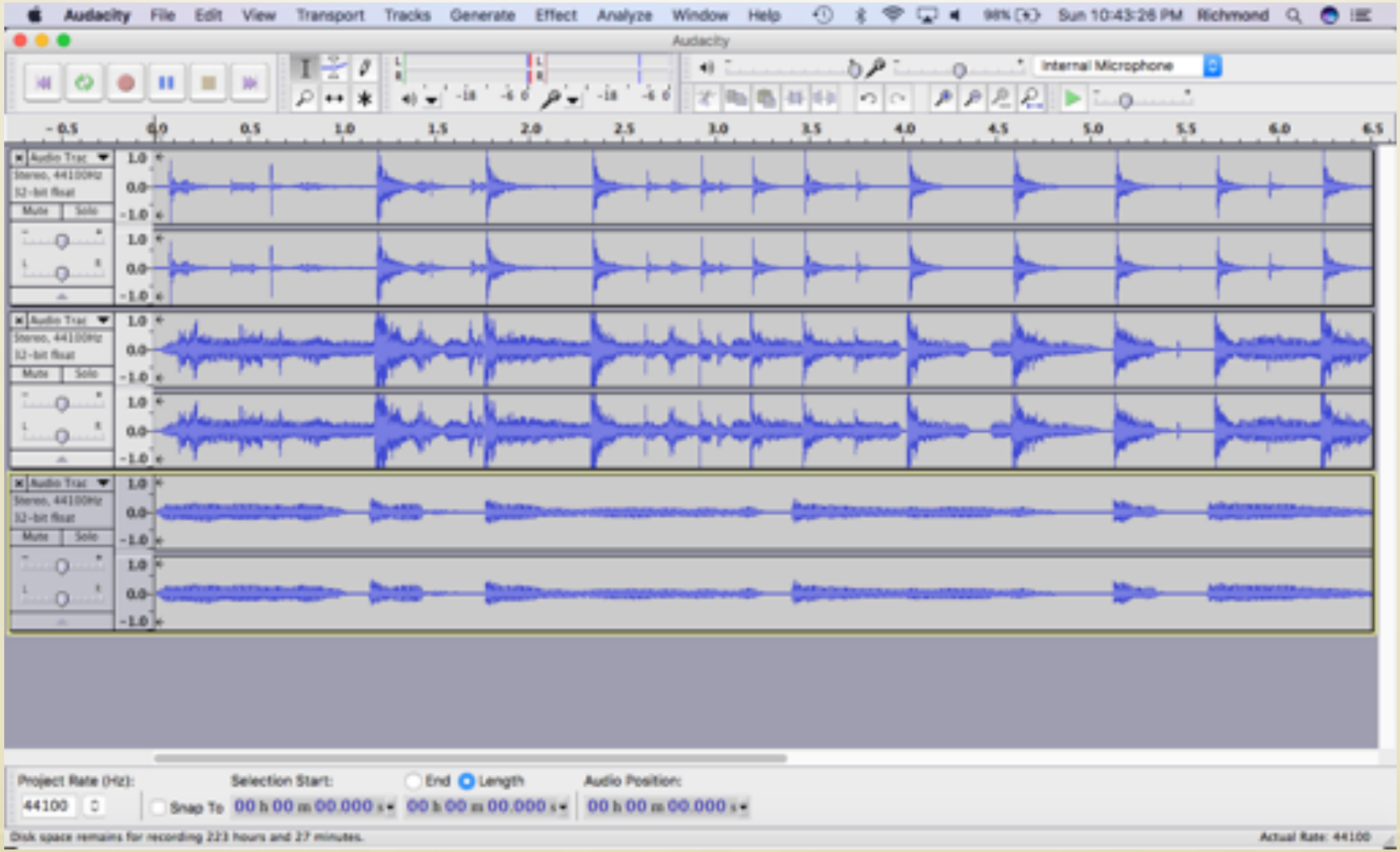
MixCraft - Modeled after GarageBand interface, Windows only, Great collection of loops. Not free - educational discounts!

Cakewalk - Free, formerly a commercial product. Windows only.

ProTools First - Free, Like ProTools, but a limited number of songs in the cloud and limited to 16 tracks and 23 plug-ins.

Free or Entry-Level Software

Audacity - Free, good for straight capture and multi-track recording, destructive editing, no MIDI, instruments or loops.



Free or Entry-Level Software

GarageBand - Free, for Mac only. Best interface in the business, but hides complexity/power. Extensive loops.

Free or Entry-Level Software

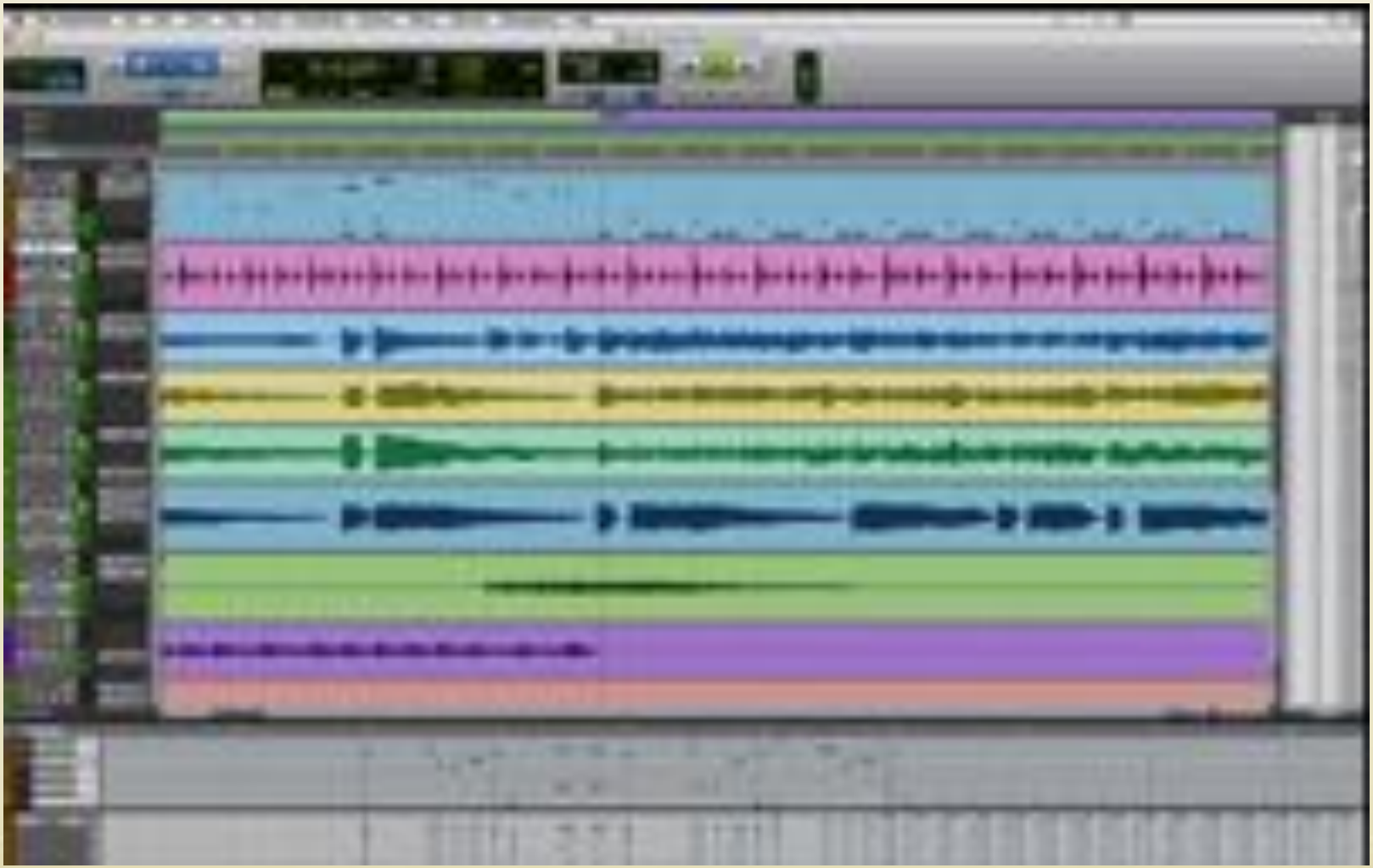
MixCraft - Modeled after GarageBand interface, Windows only, Great collection of loops. Educational discounts!

Free or Entry-Level Software

Cakewalk - Free, formerly a commercial product. Windows only.

Free or Entry-Level Software

ProTools First - Free, Like ProTools, but limited songs in the cloud and limited tracks.



Professional Software

ProTools - Industry standard, strong community, quality, good for straight capture and multi-track recording, includes non-destructive editing, supports MIDI, expandable (extensive editing requires additional plug-ins and instruments). Limited loops and loop interface. $$$

Professional Software

Logic - A powerful and affordable package with quality consistent with ProTools, extensive non-destructive editing, supports MIDI, can use plug-ins and third-party instruments, but comes with a lot more than ProTools, saving money due to less required expansion. Strong loops! $$

Professional Software

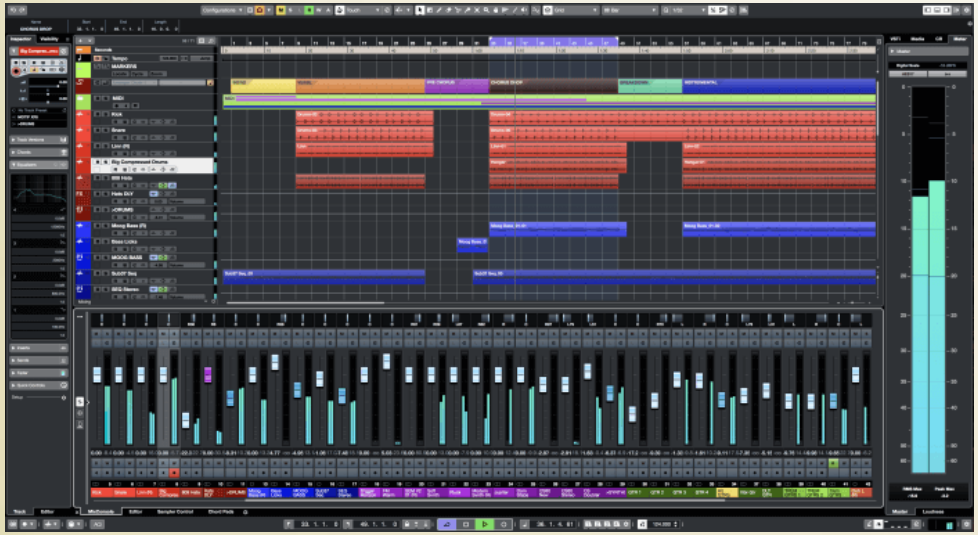
Ableton Live - Excellent quality, consistent with Logic and ProTools. Has a unique session view (Advanced DJ compositional mode). Interfaces with some unique hardware. Makes many changes in live or real-time. Excellent Loops. $$

Professional Software

Reason - Excellent quality, consistent with Logic and ProTools. Has a unique studio view (lets you put together and program a virtual studio). Excellent loops. $$

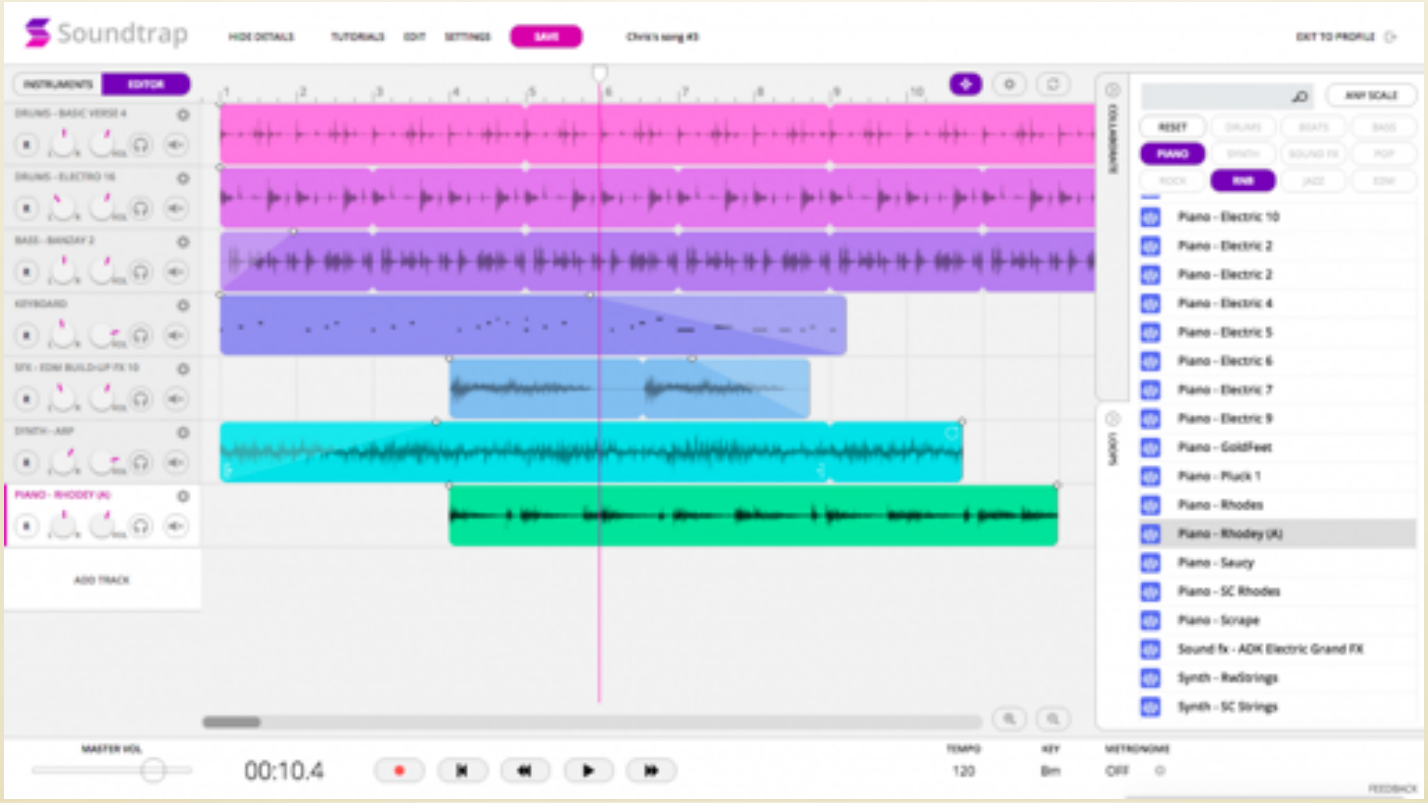
Professional Software

Steinberg's Cubase and Presonus' StudioOne - Strong contenders, on approximately the ProTools level with a greater selection of instruments, and some unique editing capabilities. $



Cloud-Based Software

SoundTrap - Increasingly powerful, cloud-based DAW. Owned by Spotify. Good collection of loops. Free version has a limited number of loops. Premium version requires a subscription. Ideal for Chromebooks.



Cloud-Based Software

Soundation - A cloud-based DAW and one of the earliest. Free version has a limited number of loops. Premium version requires a subscription. Ideal for Chromebooks.

Software for iOS

GarageBand - Free! Amazingly powerful DAW for tablet or phone. Adds a collection of exceptional DAW-based instruments which may be played using the touch screen (not available on the computer). Projects on GarageBand for iOS may be taken to GarageBand, or to Logic for further development (but not back to the iPad).

Desktop

iOS

Software for iOS

Cubasis - $40! An iOS version of Cubase, and in a few ways, more capable than GarageBand (supports MIDI in and out). GarageBand is MIDI in only.

Software for iOS

Fruity Loops - $15! An iOS (also Windows) app that uses a strong loop based approach to production.

C. Floyd Richmond

Music teacher K-12 - 1980-1986
(band director, general music , choir, orchestra)

Higher Education - since 1987

Ball State University - Doctoral Fellow

Taylor University - Externship

West Chester University

- started music technology concentration in MM in Music Education

University of Valley Forge

- started undergraduate music education program
- started MM in Music Technology
- directed numerous small and large ensembles

Houghton College

- Coordinator of Music Education

Texas A&M University - Corpus Christi

- Music Education, Concert Band Director, Tuba Ensemble Director

C. Floyd Richmond

Graduate Music Technology Courses

- Ball State University (2 years)
- West Chester University (13 years)
- Villanova University (10 years)
- Kent State University (10 years)
- University of Valley Forge (15 years)
- Boston University (2 years)
- Five Towns College (5 years)
- Pinellas County School District (11 years)

C. Floyd Richmond

TI:ME

- Education and Certification Chairman (since 1996)
  - Edited and wrote TI:ME Certification Courses
- President (2014-2016)
  - Expanded membership
  - Expanded connections to state MEAs
  - Created Composition Contests
  - Expanded publications
  - Strengthened relations with educational and commercial members.
- Conference Committee Member, and active presenter
- Executive Committee Member
- Board Member

ATMI

- Conference Committee Chairman (2004, 2019 Conferences)
- Active presenter

C. Floyd Richmond

Author

- https://www.amazon.com/Floyd-Richmond/e/B0042A8M5O

Composer and Arranger

- http://floydrichmond.com/compositions/
- http://floydrichmond.com/brass

EASY REMOTE BROADCAST

- Facebook Live
- YouTube

Both have come a long way since introduced.
Initially both were one camera solutions.
Both now permit WireCast or OBS and multiple cameras.
Both have a no copyrighted music policy and a strike system, which creates some issues . . .

VIDEO

- Smaller Broadcasts to Limited Audiences:
  - Google HotSpot
  - Skype

FACEBOOK LIVE

Use your
phone
or other gear.

MOBILE AUDIO RECORDING

FLOYD RICHMOND

FRICHMOND@ICLOUD.COM

KEYBOARDS

KEYBOARDS

- **Controller** - sends signals to virtual instruments (usually software instruments such as MainStage on a computer, iPad, or hardware). Audio is from computer or other hardware. May include knobs for mapping to and controlling virtual instruments and for creative sound design on them.

- **Workstation -** has built-in sounds and audio and may control other devices. It does not require virtual instruments for performance (plug it in and turn it on, then play). May include knobs for mapping to and controlling virtual instruments and for creative sound design on them, as well as for its own built-in sounds.




KEYBOARDS

- **Size** -
  24 to 88 keys, with
  48, and 60 being common sizes.

- **MIDI** - MIDI In, Out, and Thru ports allow the instrument to connect to other MIDI instruments, and to computers. Most modern instruments have a keyboard to computer interface built in and connect through USB to a computer. Modern instruments, and devices, may connect to MIDI through bluetooth.

- **Weighted Keys** - Instruments may come with no weighting (like an organ), semi-weighted (some weighting), and fully weighted.

OTHER INSTRUMENTS

Electric Guitar

Electric Bass

Acoustic Guitar

Electronic or MIDI Drums

MIDI Instruments

•EWI

•Violin

VIRTUAL INSTRUMENTS

Mainstage

VIRTUAL INSTRUMENTS

Apple

Avid

Arturia

Best Service

EastWest

Garritan

Heavyocity

IK Multimedia

Line 6

Native Instruments

Output

Positive Grid

Propellerhead

Sensory Percussion

Spectrasonics

Steinberg

Steven Slate Drums

Toontrack

UVI

Vengeance-Sound

XLN Audio

Kontact

Note: Bold designates bigger companies. There is quality in all of these.

KEYBOARDS

Major Brands

- Korg
- Yamaha
- Roland
- Akai
- Alesis
- M-Audio
- Nord
- PreSonus
- 1K Multimedia

Many Brands:

- AirTurn
- Akai
- Alesis
- Arturia
- Behringer
- CME
- Crumar
- Doepfer
- GSi
- Hammond
- Hornberg Research
- IK Multimedia
- Kawai
- Keith McMillen Instruments
- Korg
- Livid
- M-Audio
- Native Instruments
- Nektar
- Nord
- Novation
- One Control
- PreSonus
- Reloop
- Rocktron
- Roger Linn Design
- Roland
- ROLI
- Samson
- Source Audio
- Studiologic
- Tech 21
- Voodoo Lab
- Yamaha