

Audio Guide

Basic Outline – Full Page Coming Soon:

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Quick Jump: [Mics](#) – [PA Speakers and Amplifiers](#) – [Consoles](#) – [Examples of PA Sizes](#)

- Audio Basics
 - How audio is reproduced – normal spectrum of the human ear (20 to 20).
 - Recommended decibel levels
 - Typical audio elements at a given event or festival
 - Microphones
 - Loudspeakers (or Mains)
 - Subwoofers
 - Amplifiers
 - Mixing Consoles
 - Front of House
 - Monitor World
 - Onboard Processing
 - FOH Rack
 - Stage Rack
 - Show files
 - Monitors
 - Side and front fills
 - Delay towers
 - Power needs
 - **Microphones** – there are three main types:



- **Ribbon** – operating on magnetic principle, a thin metal ribbon is suspended

in between two poles of a magnet, which then vibrates in response to sound waves. The most fragile type of microphone, these are also used more in the studio, and they often have a fuller and warmer sound than moving coil mics when used close up.

- Examples: Beyerdynamic M160 / RCA 77-DX / Royer 121



- **Condenser** – operating on a variable capacitance principle, a metal coated piece of plastic vibrates in response to sound waves. The most accurate type of microphone, these are the preferred mics for studio recordings; however, they are not usually ideal for live music as their flat frequency response tend to cause feedback.
 - Examples: Shure KSM 44, SM 82 / Neumann U87, U89 / AGK 414 / Schoeps CMC 5U





- **Moving Coil** – operating on magnetic principle, a copper coil moves up and down a cylinder suspended around a magnet in response to sound waves. These are the standard for most live music situations, but they are not the best at capturing subtle changes.
 - Examples: Shure SM57, SM58, Beta 57, Beta 58 / Sennheiser 421 / AKG D12

▪ **Loudspeakers or Mains**

- Below is a grid of some of the most popular

speaker systems – while most of these are used in medium to large setups, they are all scalable to fit almost any size or budget:

| | Name | Usable Spectrum | Horizontal Pattern Coverage (degrees) | Peak SPL | Offered by: |
|---|---|----------------------|---------------------------------------|----------------------------|----------------------------------|
|  | L'Acoustics K1 3 way | 35Hz to 20kHz | 90 | 147dB | |
|  | d&b J Series 3 way | | 80 (J8) and 120 (J12) | 145dB (J8) and 143dB (J12) | Big House Sound |
|  | Clair I-5 Series 3 way | | 90 and 120 | | |
|  | JBL Vertec 4889 3 way | 40Hz – 18kHz | | 116dB HF | Miller Pro Audio |
|  | JBL VTX Series | 35Hz – 20kHz | 90 | | Miller Pro Audio |
|  | Nexo STM | 85Hz – 20kHz (mains) | 90 | 145dB | Nomad Sound |

| | | | | | |
|---|----------------------------------|--------------|----|-------|---------------------------------|
|  | Meyer LE0 | 55Hz – 16kHz | | | |
|  | Adamson E Series | 60Hz -18kHz | 90 | 147dB | Big House Sound |

▪ **Subwoofers**

- Below is a grid of some common subs:

| | | | | |
|-------------|--|--|--|--|
| Coming soon | | | | |
|-------------|--|--|--|--|

▪ **Monitors**

- Below is a grid of some common monitors:

| | | | | |
|-------------|--|--|--|--|
| Coming soon | | | | |
|-------------|--|--|--|--|




▪ **Amplifiers**

- Below is a grid of some common amplifiers:

| | | | | |
|-------------|--|--|--|--|
| Coming soon | | | | |
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▪ **Consoles**

- Below is a grid of some common audio consoles:

| | Name | Channels | Digital / Analog | Notes |
|---|------------------------------|----------|------------------|--|
|  | Avid Profile | 24 | Digital | 24 input faders / 8 output faders Spec sheet |
|  | Avid SC48 | 48 | Digital / Analog | 48 analog inputs / 16 analog outputs Spec sheet |
|  | Avid D-Show | up to 56 | Digital | Spec sheet |

| | | | | |
|---|-------------------------------|--------------------|------------------|---|
|  | Behringer X32 | 32 | Digital | |
|  | Midas XL4 | 48 | Analog | |
|  | Midas XL8 | 96 | Digital | |
|  | Midas H3000 | 52 | Analog | |
|  | Midas Pro2 | 64 | Digital | |
|  | Midas Pro6 | 80 | Digital / Analog | |
|  | Yamaha PM5D | 48 mono + 8 stereo | Digital | PM5D-RH is also available – see spec sheet for both |
|  | Yamaha M7CL | Up to 48 | Digital | Spec sheet |

| | | | | |
|---|----------------------------|-----|---------|--|
|  | Digico SD7 | 253 | Digital | |
|  | Digico SD8 | 60 | Digital | |
|  | Digico SD9 | 48 | Digital | |

- What level of PA should an event or festival have?
 - When determining the amount of PA you should have, you need to take into consideration the following factors:
 - How long of a throw do you need? In other words, how far back from the stage do you need to comfortably hear the music?
 - How many people do you expect to attend and how large of an overall crowd space will there be for the sound to be heard?
 - Are you indoors, where the sound will be reflected off the walls, or outdoors where it will freely go out until the sound wave dissipates?
 - Small event or festival
 - Very small events (crowds under 100 people) that aren't on a large stage can usually get by with something simple like the below – 2 speakers on a stick, simple mixer, and a couple of monitor wedges. Most audio rental companies will offer a package like this along with a tech, or you can purchase

your own for a few hundred dollars.



[View more about this setup from Amazon](#) 

- Small events (crowds under 500 people) normally will need at least 2 to 4 mains per side and 2 subs to achieve the proper sound coverage
- Medium event or festival (crowds between 500 and 5,000 people) will need anywhere from 4-8 mains per side and 4-8 subs.
- Large event or festival (crowds between 5,000 and 20,000 people) will need anywhere from 8-16 mains per side and 8 to 16 subs.
- Very large festivals (crowds in excess of 20,000 people) will likely need additional delay towers to increase the overall throw of the audio to the farthest reaches of the crowd.
- How to best work with artists to ensure a smooth show from an audio perspective
 - Advancing with their FOH / PM
 - Making sure everyone knows what they're getting
 - Seeing if they can work with the PA they are given
- How to ensure the audio company has everything they need to put on a great show
 - Proper labor
 - Parking

- Storage
- Power
- Meals
- Shade
- Credentials
- Schedule
- Stage Plots / Input Lists
- Contacts of the bands PMs/FOH people if necessary



Amp Racks from Monitor World, using an SC48 Console