

Audio Guide

Basic Outline – Full Page Coming Soon:

Other Production Guides: [Lighting](#) – [LED / Video](#) – [Staging](#) – [Backline](#)

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: Beyers 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:

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▪ **Monitors**

- Below is a grid of some common monitors:

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▪ **Amplifiers**

- Below is a grid of some common amplifiers:

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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