

# Audio Guide

Basic Outline – Full Page Coming Soon:

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- 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: Beyer 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:                      |
|---|---|----------------------|---------------------------------------|----------------------------|----------------------------------|
|    | <a href="#">L'Acoustics K1</a><br>3 way   | 35Hz to 20kHz        | 90                                    | 147dB                      |                                  |
|    | <a href="#">d&amp;b J Series</a><br>3 way |                      | 80 (J8) and 120 (J12)                 | 145dB (J8) and 143dB (J12) | <a href="#">Big House Sound</a>  |
|   | <a href="#">Clair I-5 Series</a><br>3 way |                      | 90 and 120                            |                            |                                  |
|  | <a href="#">JBL Vertec 4889</a><br>3 way  | 40Hz – 18kHz         |                                       | 116dB HF                   | <a href="#">Miller Pro Audio</a> |
|  | <a href="#">JBL VTX Series</a>            | 35Hz – 20kHz         | 90                                    |                            | <a href="#">Miller Pro Audio</a> |
|  | <a href="#">Nexo STM</a>                  | 85Hz – 20kHz (mains) | 90                                    | 145dB                      | <a href="#">Nomad Sound</a>      |

|   |                                  |              |    |       |                                 |
|---|----------------------------------|--------------|----|-------|---------------------------------|
|  | <a href="#">Meyer LE0</a>        | 55Hz – 16kHz |    |       |                                 |
|  | <a href="#">Adamson E Series</a> | 60Hz - 18kHz | 90 | 147dB | <a href="#">Big House Sound</a> |

## ▪ 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 |  |  |  |  |
|-------------|--|--|--|--|

## ▪ Consoles

- Below is a grid of some common audio consoles:

|   | Name                         | Channels | Digital / Analog | Notes  |
|---|------------------------------|----------|------------------|--|
|  | <a href="#">Avid Profile</a> | 24       | Digital          | 24 input faders / 8 output faders<br><a href="#">Spec sheet</a>    |
|  | <a href="#">Avid SC48</a>    | 48       | Digital / Analog | 48 analog inputs / 16 analog outputs<br><a href="#">Spec sheet</a> |
|  | <a href="#">Avid D-Show</a>  | up to 56 | Digital          | <a href="#">Spec sheet</a>   |

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

|   |                            |     |         |  |
|---|----------------------------|-----|---------|--|
|  | <a href="#">Digico SD7</a> | 253 | Digital |  |
|  | <a href="#">Digico SD8</a> | 60  | Digital |  |
|  | <a href="#">Digico SD9</a> | 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/F0H people if necessary



**Amp Racks from Monitor World, using an SC48 Console**