



# **Basic Knowledge of Audio Physics, Wireless Mics and Sound Systems**

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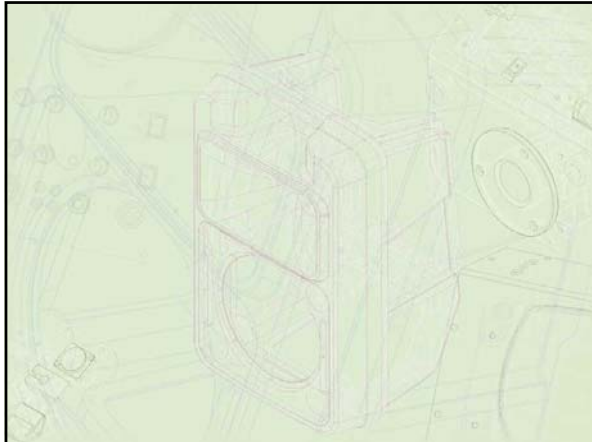
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## **Texas Bandmasters Association 2014 Convention/Clinic**



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**Basic Knowledge of Audio  
Physics, Wireless Mics and  
Sound Systems**

**What every band director should know**

Brian Stith  
National Sales Manager  
Sound Projections

Sponsored by Dan Ryder Field Drills

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**3 Main topics to discuss**

- Range of wireless
- Clarity of Sound
- Watts vs. Decibels (db)

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### Range of Wireless Transmission

Internal Antenna  
150' Transmission

VS.

External Antenna  
350' Transmission



Freedom FR-3neo      Sound Machine SM-5

Distances of transmission based on unobstructed, open field with no TV interference.

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### Range of Wireless Transmission

Affects on wireless transmission distance

- Other wireless microphones in the area
- 700 mhz (now illegal to use)
- HDTV stations
- **WATER!!**

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### Clarity of Sound

- Americans listen to consonants

**PROOF**



Consonants are in upper frequency of what we hear. Horns reproduce those frequencies.

SM-5 Sound Machine

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### Available Sound Projections units

Sound Machine (SM-5)

Voice Machine (VM-2)

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### Decibels (db) not Watts = Volume

- Human ear perceives 10db = Double Volume
- 90db twice as loud as 80db
- Systems should be 10db louder than competing sound

**Decibel Table**

**137.6** World Record stadium sound Seattle Seahawk (12/2/13)

**127** Max volume **Voice Machine**

**125** Max volume of **Sound Machine** loud mode

**110** 150 piece **MARCHING BAND**

**90** Osterizer Blender

**80** Stereo/TV Listening Environment

**70** Typical Conversation

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### Differences in Portable Systems

**Reentrant horn system (VM-2)**

- 4 Month system (July – Oct) then on shelf
- Lightweight (15 pounds)
- Less Expensive
- Great for Metronomes and Voice

**Full Range System (SM-5)**

- Year Round – Field, Rehearsal Room, Outreach
- Heavier (33 pounds)
- More Expensive
- Full Range system both Voice and Music
- Can use to solo instruments at Friday night games

Both systems use Lithium Iron Phosphate (LFP) batteries

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### Sound Machine Rear Panel

**"Talkover"** automatically lowers program material when speaking on microphone (may be turned on or off)

Individual volume control for wireless microphones and CD/MP3 player

2 - balanced XLR microphone inputs

Balanced XLR 1/4" TS and RCA Line inputs

3 band EQ

VoicePower switch to optimize sound for music of large crowds (120-127db)

Battery gas gauge

Balanced XLR 1/4" TS and RCA Line outputs

Also Included: Speakon 4 - conductor speaker output

Multiple inputs and outputs for total flexibility to meet any need

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### Voice Machine Rear Panel

Up to two SHURE 123-channel wireless systems

"Siren" feature gets everyone's attention

Balanced XLR and 1/4" TS line inputs

External Antennas up to 300' transmission

Battery gas gauge

1/4" TS line and 2 - 1/4" speaker outputs

Multiple inputs and outputs for total flexibility to meet any need

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### Using 2 systems on the field

SMS-HBM-HBMDLX

Companion speaker does not change db level

50' speaker cable

Metronome transmit wirelessly to Rear speakers

IC-S for 1/4" inputs OR 1/8" TRS for iPod & iPads

SMS-HBM-HBMDLX

Asst. Director's headset transmits to Front speakers

Director's headset Transmits to both powered speakers (same channel)

50' speaker cable

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Things to consider when purchasing a portable system

- Wireless system
  - Scanable channels (UHF frequency agile)
  - Digital Display
  - Easy Repair/Replacement of transmitter
- Minimum db output of system
  - Is it at least 120 db minimum
- Clarity of system
  - Does it have a horn to “throw the sound”

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Things to consider when purchasing a portable system

- Flexible system – multiple uses
  - Full range system – solos, recording, small venues
  - Horn loaded system – lighter, less expensive
- Type of battery
  - Lead Acid – cheap, shorter life, heavy  
(200 cycle will die if stored for long period)
  - Lithium Iron – more expensive, long life, light  
(2000 cycle, won't die if not charged)

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Things to consider when purchasing a portable system

- Number of inputs for the system
  - Extra microphone or line level inputs
- Is the system American made
  - Repairs or Technical Support
- Warranty of Product
  - Minimum of 2 upwards of 6 years

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**Proper care of your system**

- Leave system plugged when stored
- Unplug mic from belt-pack to store
- Place speaker on stand when using
  - System on ground won't be heard in back
  - Helps with line of site for wireless
- If it rains, use a plastic bag to cover speaker
- Use padded case or hard case for transporting

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**Questions ??**

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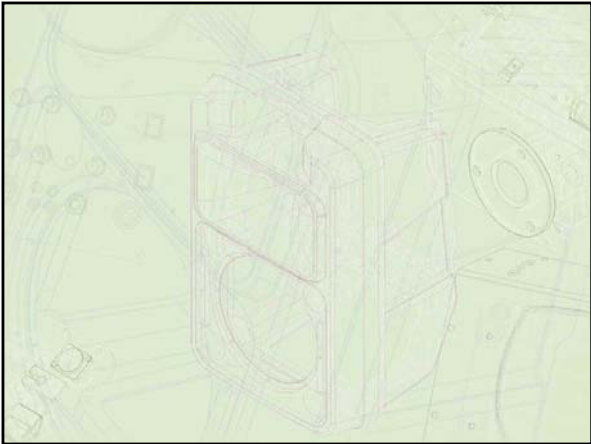
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