Audio Signal Levels – Line, Microphone, Instrument, and Amplifier levels.

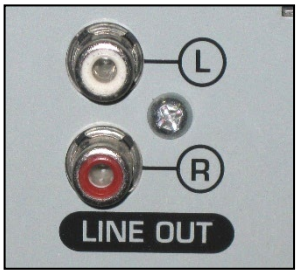
Audio Signal Levels: All audio signals transmit sound information with a certain amount of "strength" associated with the signal inputs and outputs. Guitar and Microphone signal levels are generally very weak, Line level signals are relatively strong, and Audio Amplifiers have higher power output levels. Below we will describe sound levels that you should be familiar with. Be aware that there is "theory" behind these sound "levels" that is much more detailed than what we will be covering in this book (the basics) – we encourage the reader to explore this subject matter further.

Line Level

Line level is a term used to designate the strength of an audio signal used to transmit analog sound information between audio components via Inputs and Outputs. Some examples include CD / MP3 players, iPads, signal processing equipment, mixing consoles (small or large), and amplifier "Inputs." There are two types of line levels – Consumer (which is -10dBV) and Professional (+4dBu).

Line Level Notes:

- **Sound System Equipment uses mainly Professional Line Level Signals (+4dBu)**
- **The voltage associated with a line level signal is around 1.23 volts.**
- **1.23 volts is equal to +4dBu (Line Out usually means +4dBu).** **Video Clip!**
- **Warning: Never plug a line-level source into a microphone input!**
- **This will cause distortion (overdrive the signal). There are ways to plug a Line level device into a Microphone input using an attenuator (see info on Page 17).**
- **As a technician, the main point to remember is to plug line-level signals into a line-level input, and Microphones into a microphone-level input.**



Example "Line Output"

Microphone / Instrument Levels

Microphone / Instrument levels are terms used to designate the strength of audio signals used with audio components such as Electric Guitars / Bass Guitars and Microphones. These signals are extremely weak. There are no amplifiers inside guitars or microphones to help make the signal stronger. These signals must be "amplified" (usually through a pre-amp) to ensure a strong signal. Active pickups in Acoustic Guitars will also require a power source (usually AA or 9-Volt batteries) to bring these lower Instrument levels up to a usable, stronger level (line level or close to line level).

Microphone Level Notes:

- **The voltage associated with Microphone level signals is around 1 milli-volt.**
- **Microphone levels are usually -60dBu (but can vary between -30dBu and -80dBu).**
- **Microphone preamplifiers come with a gain control to provide (add) between 30 and 80dBu of gain (the gain control should be enough to get the mic level up to line level). The image (shown right) shows a MIC / LINE switch example. When you flip the switch to Mic (-60dBu), the pre-amplifier kicks in. Switching to Line (+4dBu) will bypass the microphone pre-amplifier.** **Video Clip!**
- **Note: If you connect a Microphone to a Line Input, the signal level will be too weak to use, and there could likely be a lot of unwanted noise and hiss.**

Typical Mic / Line switch on a mixing board.

Instrument Level Notes:

- **Instrument levels usually fall somewhere around -20dBu to -30dBu (in between microphone levels -60dBu and line level signals +4dBu).**
- **This type of signal refers to levels from instruments – most common from electric guitars or bass guitars which have a very high output impedance (500-12,000 ohms).**
- **Instrument levels need to be amplified through a pre-amplifier that boosts the signal before being sent to the power amplifier section of the Instrument Amp.**

Audio Signals – Technical Note

Audio signals – are the electrical signals (AC) flowing through the mixer, wires, etc. These signals are fast and travel through the air at around 1080 feet per second. Audio signals are AC (alternating current), not DC (Direct Current). Acoustic Signals – Slowly move the "Cones" of speakers through the air.

Acoustic Amplifier Line Level Outputs – Notes:

The image shown to the right is from a Marshall Acoustic Guitar Amp. As you can see there are two different outputs - Line Out and D.I. Out.

- **Line Out is mainly used for connections to recording equipment, but can also be used for plugging into a stage snake to connect to the mixing board.**
- **D.I. Out (Direct Input) provides a "Direct" connection to the mixing board. This type of connection ensures that the amplifiers output signal matches the signal that the mixing console is requiring. You can also run longer cables using this D.I. Out connection without degrading the guitars sound quality.**
- **Don't assume that these line level outputs are Pro line levels (+4dBu). Read your equipment's manual. After reading the manual for this particular amp, I found that both the Line Out and D.I. Out are Consumer Line Level (-10dBV).**

Rear view of Acoustic Guitar Amplifier.

AVCSS Tech World
Basic Audio & Technical Information