**Glossary – Audio Terms**

**A-D converter:** Short for Analogue / Analog to Digital Converter. Changes a continuously varying electrical signal into a stream of binary data. Found in computer soundcards, MiniDisc & CD Recorders etc.

**A2:** Assistant Sound Operator/Engineer (Audio 2)

**AAC:** Digital audio encoding format. The name stands for Advanced Audio Coding. The format provides slightly better audio quality than the MP3 format. File extensions in use for AAC files include .m4a, .m4b, .m4p, .m4v, .m4r, .3gp, .mp4, .aac. AAC is used on all Apple devices (including iTunes downloads) and was developed in 1997. Like MP3, it uses lossy compression, but provides an improvement in audio quality for the same file size.

**Absorption:** The ability of a surface to absorb sound. The absorption coefficient of a material is a figure between 0 and 1, representing its degree of absorption.

**AC (abbreviation for Alternating Current):** An AC cord or cable is used to connect between a mains power socket and a piece of equipment. A range of different connectors are used to connect to the equipment. The 3-contact cable plug is common throughout Australia. A lighter cable is used on smaller equipment which is double-insulated and has just two connections. [Powercon](https://en.wikipedia.org/wiki/PowerCon) is used on heavier duty equipment and locks into place to prevent accidental disconnection.

**Acoustics:** Science or study of sound.

**Acoustic Shell:** (also known as band shell or choral shell). A hard smooth curved surface which is designed to reflect the sound from the stage towards the audience. Some venues have shells which can be removed / repositioned or flown out of view to change the acoustics of the venue for different types of events.

**Acoustics:** The behaviour of sound and its study. The acoustic of a room depends on its size and shape and the amount and position of sound-absorbing and reflecting material. The quality of sound in a space, measured and analysed by its clarity, loudness, liveliness, reverberance, echoes, dynamic range, envelopment, spaciousness, warmth and silence or noise control rating.

**Active:** In electronics (particularly audio), an 'active' circuit operates with an external power supply and is usually low power, while a 'passive' circuit operates directly on the signal using the inherent power of the surrounding circuitry. This is why an active crossover is usually placed before the amplifiers, with integrated circuits and line level signal processing (100 Ohms impedance or greater), while a passive crossover acts after the amplifiers where the power level is much greater (16 Ohms impedance or less). Amp to speaker level is generally between 2 and 16 Ohms, while preamplifier electronics are generally 100 to 100K Ohms.

**Adaptor:** Connector which allows two or more electrical devices to be connected to a single power outlet. The connection is normally parallel, that is, each device is fed the same voltage, but the current is divided between them. Sometimes known as a 'double adapter'.

**ADR:** Stands for Automated Dialogue Replacement. Also known as "looping" this is the post-production process on a film / TV shoot where actors re-record their lines after original filming, either because the original production sound was not up to standard or due to external factors (aircraft noise in a period piece) which weren't noticed at the time of filming.

**Aerial:** Cable or rod used to send and receive radio signals (connected to transmitter and receiver or tuner).

**AGC:** Automatic Gain Control. Circuitry within recording equipment which compensates for differences in volume in the incoming sound signal by adjusting the gain automatically. Helps to reduce wild swings in volume.

**AIFF:** Audio Interchange File Format. Uncompressed Audio file format used on Mac computer systems.

**Ambient Noise (or ambient audio):** The sound heard in a room with no sound sources. Each space has a particular sound which aids our identification of the kind of space we're in.

**AMP:** Abbreviation for AMPERE or AMPLIFIER.

**Amplifier:** Equipment that amplifies/boosts the low voltage, low current audio signal from a computer, mixing desk etc. into a higher current signal suitable for driving speakers. Generally, each speaker in a sound system requires a separate amplifier. Each amplifier unit usually contains two amplifiers (for the two stereo components (left and right) of the sound signal), so with a single amplifier box, you can drive two speakers.

**Amplitude:** The strength of a vibrating wave; in sound, the loudness of the sound.

**Analogue Signal:** A continuously variable signal that can have any value over a given range.

An analogue recording will record the exact waveform of the original sound, simply converting it to an electrical signal at the microphone, and back into air movement at the speaker.

**Arrangement:** The arrangement of a piece of music defines how it will be performed, and how it will sound. It covers which musical instruments will play each part of the melody and harmonies. The score for a piece of musical theatre may have arrangements for a small (school) band, or a large Broadway orchestra.

**Array:** A set of loudspeakers flown in a performance space. See also CLUSTER.

**Atmosphere:** The normal background sound at any location.

**Atmospheric Sound:** Ambient or Atmospheric sound can be used to define a location or to help the audience to understand the world of the play better. In live performance, it consists of subtle and carefully balanced audio effects which should not overshadow the performance but set the scene. In film making, atmospheric sound in a location (with no dialogue or other actor sounds) is recorded so that a consistent audio background is available, to make sound editing an easier process, to smooth-over edits. The recording of atmospheric sound is known as the 'wild track'.

**Attenuate:** To reduce the intensity of a sound signal. This is what the 'PAD' switch does on a sound desk.

**Audio frequency:** The range of sound frequencies which can be heard by humans.

**Automation:** Facility available on larger sound mixing desks allowing channel muting or even fader moves to be taken under the control of a computer to ensure accurate and repeatable mixing.

**Auxiliary Input or Return:** A route back into the sound desk for a line level signal sent to a piece of outboard equipment (usually effects processor / EQ unit etc.) via an auxiliary send.

**Auxiliary Output or Send:** An additional line level output from a sound desk which can be used for foldback or monitoring without tying up the main outputs. Each input channel will have a path to the Aux buss. Also used for feeding a signal to an effects processor. See Auxiliary Return.

**Backing Vocals (B.V.s):** Additional vocals for a musical which are performed offstage, often in a specially constructed booth (or an adapted room just offstage).

**Backline:** Backline refers to the equipment which stands at the rear of a live band when they are performing. Guitar amps, bass amps etc. are standard backline equipment. Basically, everything a live band needs apart from the instruments the band hold (e.g. guitars), the PA (and front of house desks etc.) and the band themselves is backline.

**Baffle:** A panel in a loudspeaker cabinet designed to reduce back interference noise by isolating the front and rear of the loudspeaker diaphragm. It may also be used to name a panel in an auditorium positioned to reduce sound reflections and improve the acoustics of the space.

**Balanced Line:** A method of carrying sound or data signals which reduces interference by using a third conductor, the shield. In the balanced line the shield, which is grounded, is in addition to the two signal- (or data-) carrying conductors. Balanced lines are less prone than unbalanced to interference. In balanced lines, one of the signal wires carries the audio signal, while the other carries an out-of-phase (inverted) copy. When the signal reaches the destination, the inverted copy is flipped and added to the original. Any noise added by interference is also inverted. When combined with the non-inverted noise, the two noise signals cancel each other out.

**Balun:** A device which changes an audio or video signal from unbalanced wiring to balanced (or vice versa). The name is derived from BALanced / UNbalanced. The term is commonly seen now for devices that adapt an analogue audio or video signal so that it can travel long distances over standard wiring (such as CAT5).

**Bandwidth:** The range of a piece of sound equipment. If an equalizer has cutoff frequencies of 200 and 2000 Hz, then the bandwidth is the difference between them, in this case 1800 Hz.

**Bass:** Lower end of the musical scale. In acoustics, the range (below about 200Hz) in which there are difficulties, principally in the reproduction of sound, due to the large wavelengths involved.

**Beat:** In acoustics, a periodic variation in amplitude which results from the addition of two sound waves with nearly the same frequency.

**Beginners:** A call given by Stage Management to bring those actors who appear in the first part of a play to the stage. e.g. "Act One Beginners to the stage, please". The actors are then called by name. A similar call is given after the interval (e.g. "Act Two Beginners to the stage please"). The call is usually given 5 minutes before the advertised performance start time, but this may vary depending on how long the actors take to get into position.

**Belt pack:** Part of the communication ('cans') system in a theatre, the Bel tpack contains the controls and circuitry to drive the HEADSET worn by crew members. Each belt pack connects into the headset ring and back to a PSU (Power Supply Unit) which is powered from the mains.

**Bluetooth:** Technology enabling devices to wirelessly connect over a short range for the purposes of playing or recording sound, or transferring data, or controlling a fixed device with a mobile device (e.g. mouse / keyboard).

**Boom:** An arm mounted on a microphone stand.

**Breakout**: A connection at the end of a multicore cable which allows the connection of many items to it. (e.g. there is a breakout box at the end of a sound multicore cable which allows you to plug microphone cables into it).

**Bridge:** A walkway, giving access to technical and service areas above the stage or auditorium, or linking fly-floors. In this area,

**Bridging:** Technique for getting more power out of a stereo amplifier by feeding it a mono input signal and then connecting the outputs together. The amplifier is said to be 'BRIDGED'. Check the owner's manual of the amplifier before trying this. Some amplifiers have a switch which does the bridging internally.

**Buss:** A signal line within a sound mixing desk that can receive its signal from a few sources.

**Cable:** Wiring, temporarily rigged, to carry electrical current. Depending on the size of the cable (current carrying capacity), cables are used to supply individual lanterns, whole dimmer racks, or carry signals from a microphone etc.

**Cable Tie:** Lockable (and sometimes releasable) plastic strap used to tie a bundle of cables together, amongst many other things. Cable ties are ***not*** ***to be used*** to suspend anything (of any size, or at any height). Also known as Zip Ties.

**Calling The Show:** The process of giving verbal cues to the lighting, sound, fly operators and stage crew during the performance. Usually done from the prompt corner by the DSM on the book or Stage Manager over cans. Being 'on the book' involves verbally giving the 'GO' cues to all technical departments (lighting, sound, flies, automation, av etc). The cues are written in the prompt script. A 'STANDBY' (UK) or 'WARN' (US) cue is given first, so that the operators are ready for the actual cue.

**CANS:** Headset earpiece, microphone and belt pack used for communication and co-ordination of technical departments during a performance. (e.g. "Electrics on cans", "Going off cans", "Quiet on cans!"). As many of the technical operators are tied to expensive pieces of equipment, headsets are often wired. However, stage management (and any other crew who move around) often wear wireless versions, often known as radio cans. There are interfaces between wired and wireless versions enabling both to be part of the same system. Many headset systems have multiple channels, enabling different sub-groups to communicate separately. [Named after the well-known usage of two tin cans connected by a piece of string being able to transmit and receive a sound mechanically]. Also called 'Comms' short for Communications - the same phrases can be used (e.g. 'LX Off Comms' when leaving the operating position).

**Casuals:** Part-time temporary technicians (paid by the hour).

**CCTV (Closed Circuit Television):** A video relay system, used in the theatre to give a view of the stage to remote technical operators (especially stage managers). Also used to give musical performers a view of the conductor (and vice versa) to help in keeping time. It's called Closed Circuit because the signal is not being broadcast anywhere - there's a direct link between camera and monitor.

**Channel:** A complete control path for signals in lighting or sound equipment; a pathway through an audio device. For example, audio mixers have multiple input channels.

**Check:** Opposite of Build; a smooth diminishment of light or sound level (e.g. Lighting: 'I think we should check this state down a touch as the song begins')

**Clicks and Pops:** Any miscellaneous problem with a sound system (e.g. 'There are a few clicks and pops with the sound interface, but that should get sorted when we change the driver').

**Clipping:** Distortion in a sound signal caused by an amplifier or mixer being unable to handle the level of signal being fed to it.

**Comb Filtering:** An effect caused by the same sound arriving at a given point at slightly different times. This could be the listening position or a microphone. Comb filtering can be reduced in the case of sound from speakers by employing delays, and in the case of microphones by following the three to one rule. See THREE TO ONE RULE and DELAY.

**Condenser Mic:** (Capacitor Mic) A microphone that uses the varying capacitance between two plates with a voltage applied across them to convert sound to electrical pulses. Condenser microphones need a power supply to provide the voltage across the plates, which may be provided by a battery within the case of the microphone, or it may be provided from an external phantom power supply. A condenser mic is more sensitive and has a faster reaction to percussive sounds than a Dynamic mic and produces a more even response.

**Contact Mic:** A microphone that directly picks up the sound transmitted by a solid material. See Boundary Mic, PCC, PZM.

**Control Room/Desk:** Room or desk at the rear of the auditorium (in a proscenium theatre) where lighting and sound is operated from. Known in the US as the Booth. The stage manager calling the cues is very often at the side of the stage (traditionally stage left) but in some venues they may be in the control room also.

**Cross Fade / Crossfade:** Bringing a new audio state up whilst bringing the previous one down, so that the new one completely replaces the old one. Sometimes abbreviated to Xfade or XF. A Dipless Crossfade occurs when the lighting doesn't dip significantly between states, which results in a more subtle transition. Some sound mixers have a cross-fader - a single fader which can be used to fade one music source out while simultaneously fading the next one in.

**Crossover:** An electronic filter in a sound system that routes sound of the correct frequency to the correct part of the speaker system. Different speakers handle high frequencies (tweeters) and low frequencies (woofers). Sometimes known as a crossover network. An active crossover splits the signal from the mixing desk into high, mid and low frequencies which are then sent to three separate amplifiers.

**Crosstalk:** A leakage between two audio circuits (e.g. between two channels on a sound mixer).

**Cue:** The command given to technical departments to carry out a particular operation, e.g. Lighting Cue, Fly Cue or Sound Cue. Normally given by stage management but may be taken directly from the action (i.e. a Visual Cue). Departments are often abbreviated: Lighting is LX, Sound is SD (or sometimes SX, but this is too similar to LX, so SD should be used).

Any signal (spoken line, action or count) that indicates another action should follow (i.e. the actors' cue to enter is when the Maid says "I hear someone coming! Quick - Hide!" - this is known as a Cue Line).

Cues given verbally may be known as 'audible cues', although as this is the normal type of cues, they're usually just called 'Cues'. Cues that technical operators take themselves, without an audible cue, are known as Visual Cues.

**Cue List:** A list of sound, lighting, automation, scene change, video, followspot (etc) cues in order of their appearance in the show. Each cue is given a unique number, and the list includes a brief description of what it does (e.g. for Lighting: Blackout, Dim Downstage Wash, Red Spot Upstage; for Sound: Preshow Music, Fade Out, Snap Music to Quiet etc.) Cue is often abbreviated to 'Q". Also known as a Plot Sheet.

**Cueing:** There is a standard sequence for giving verbal cues: Example: Stand-by 'Sound Cue 19' (Stand-by first)

**Daisy-Chaining**: Connecting items of equipment together by linking from one to the next in a chain. Used for connecting demux boxes to dimmers etc.

**Decibel (dB):** Relative measurement for the volume (loudness) of sound. One dB is the smallest variation in loudness that the human ear can detect. Also used to measure the difference between two voltages, or two currents.

**Delay:** Outboard sound equipment that can momentarily stores a signal being sent to part of a P.A. system so that delayed reinforced sound reaches the audience at the same time (or just after) the live sound from the stage. Using the 'Haas Effect' the audience cannot detect the sound as amplified. Always used in large open-air concerts. The term Delay Line refers to the equipment that is used to produce the delayed sound signal.

**Diaphragm:** The part of a microphone which responds to sound waves or part of a dynamic loudspeaker attached to the voice coil that moves and produces the sound. It usually has the shape of a cone or dome

**Diegetic Sound:** Music or sound that is heard by the characters on stage (rather than just being for the audience to hear) is said to be **diegetic**. (e.g. a piece of music played on a radio on the set). The opposite (**non-diegetic**) sound or music is specifically **not** heard by the actors (e.g. scene change music, or an emotional underscore). A piece of music can be both diegetic and non-diegetic, if it starts out at low volume, coming from a radio on the set (diegetic), and then swells in volume and expands to fill the whole sound system (non-diegetic). It obviously cannot be both simultaneously, however!

**Digital:** Many electronic devices use digital logic. Information is handled in separate bits (either ON or OFF) rather than continuously variable analogue signals. Most computer lighting boards give a digital multiplexed output, and more and more sound equipment is going digital.

**Digital Effects:** Reverb, Delay, Phasing, Flanging, Harmonising, Chorusing. Pitch Change. These audio effects can be added to a sound source in several ways, either in software, if the track is pre-recorded, or 'live' via outboard processing equipment, or via the effects functions built into a digital mixing desk.

**Distortion:** Usually undesirable result of overloading sound equipment. Reducing the levels can remedy the situation.

**Diversity:** A way of maximising the quality of received radio signal by using two receivers and aerials tuned to the same frequency - the circuitry automatically silently switches to the strongest signal.

**Dome tweeter**: A high frequency speaker driver with a dome-shaped diaphragm usually made of metal or silk.

**Dress Rehearsal:** A full rehearsal, with all technical and creative elements brought together. The performance as it will be 'on the night'.

**Driver:** A loudspeaker unit, consisting of the electromagnetic components of a speaker, typically a magnet and voice coil.

**Dry:** To record a sound without using any effect or other processing is to record it 'dry'. Recording with an effect is recording 'wet'.

**Dubbing:** The analogue process of copying a sound or video from one source to another for backup purposes, or for mass distribution.

**Dynamic Mic:** Robust type of microphone which picks up the sound on a diaphragm connected to a coil of wire which moves within a magnet. An alternating current is induced into the wire which provides the electrical output. Most dynamic mics have low output impedances of 200 Ohms.

**Dynamic range:** The range of sound intensity a system can reproduce without compressing or distorting the signal.

**Earth Loop:** Normally refers to audio interference resulting from a situation where two pieces of sound equipment are connected over a long distance. The earths of the equipment are at different potential, and this results in an audible hum or buzz. Can be cured by removing the screen connection on one end of the signal cable. Electrical earth connections must never be removed.

**Earthing:** Electrical safety requirement that metal parts of electrical equipment are connected to a common earth or ground point so that in the event of a fault, excess current can be carried away, causing the fuse to blow. Some sound problems (such as hums) can be cured by altering the earthing / grounding arrangements of the system, but this should never involve removing the earth connections to equipment, only by adding an earth connection where none exists, or by adjusting the way audio cables are wired. Seek professional advice to avoid safety problems.

**Echo:** A repeated sound received late enough to be heard as distinct from the source.

**Effects, Sound:** Often abbreviated to FX. There are many sources for recorded sound effects, from computer files, to downloading from the Internet. May form an obvious part of the action (train arriving at station) or may be in the background throughout a scene (e.g. birds chirping).

**Electret Mic:** A condenser microphone where the capacitor plates are given a charge during manufacture which they retain, therefore requiring no external power supply.

**Enhancer:** Sound processing equipment which increases the presence of the vocal track in a mix by adding to the treble information in the signal. Also known as an Exciter.

**Environmental Sound:** A sound that is not specifically mentioned in the text of the play but helps to create a feeling of reality / appearance of truth. Examples include dripping water in a cave, distant organ music heard in a church graveyard, traffic heard passing outside an office.

**Equalisation:** The process of adjusting various audio frequencies to correct or enhance the sound. A graphic equaliser provides adjustment for a wide range of frequency bands and is normally inserted in the signal path after the mixing desk, before the amplifier.

**Fade:** A fade is an increase, diminishment or change in lighting or sound level. A **snap fade** is an instant change. A **slow fade** could be anything from 5 seconds to a few minutes (or even more, for a naturalistic sunset lighting effect). A **quick fade** is a couple of seconds long. A **fade out** takes the lighting state to blackout (or a particular sound to silence). A **fade in** does the opposite. A **crossfade** smoothly transitions from one state to another, without going through darkness (or silence for sound).

**Fade Up:** An increase in lighting or sound level, over a given time. An increase in level from an existing state is known as a Build.

**Fader:** A vertical slider which is used to remotely set the level of a lighting or sound channel.

**Fat Finger:** A common problem among lighting & sound operators, when two buttons are accidentally pressed at the same time by a finger that's too large for the buttons.

**Feed:** A power supply to a piece of equipment or installation is termed a 'feed'. Sound equipment and sensitive computer equipment should have a clean feed - that is, a supply that is free from interference from other equipment. A signal from one system to another is also known as a feed (for example, an audio signal from the FOH desk to a TV company videoing a concert is known as a feed.)

**Feedback:** A loud whistle or rumble heard emanating from a sound system. It is caused by a sound being amplified many times. (e.g. a sound is picked up by a microphone and amplified through the speaker. The microphone picks up this amplified sound and it is sent through the system again). Feedback can be avoided by careful microphone positioning and can be reduced by use of Equalisation to reduce the level of the frequency band causing the feedback.

**Female / Male Connectors:** This terminology is beginning to change, as it's not very subtle, and sometimes isn't as clear as it could be. Connector manufacturers and crew members refer to plug connectors (with pins) as MALE, and sockets (which receive the pins) as FEMALE. Many modern companies refer to plug and socket instead of the genderised terms, but that in itself can cause confusion. The situation remains confusing.

**Sound:** Microphones have pins on them, so a XLR cable socket is used to connect to them. The other end of that cable is a plug, which connects to the mixing desk.

**Power:** Sockets are used to supply power so that it's not possible to touch live connectors. Plugs are used to connect equipment to the supply.

**Fills:** Term for speakers additional to the main PA to improve the sound in particular locations (e.g. 'Front fills' add sound at the front of the auditorium which might be just out of range of the main PA stacks at the sides of the stage).

**Filter:** Electronic device to isolate and redirect specific frequencies in a speaker system.

**Flightcase**: Metal framed wooden box on wheels with a removable lid used for transporting equipment between venues. Flightcases are very strong and have reinforced corners and edges. Care should be taken when lifting flightcases as they can be very heavy. The term comes from their original use in protecting delicate equipment when being loaded into air transport and being both very strong and relatively lightweight.

**Floats:** Early form of footlights using burning wicks floating in oil across the front of the stage. Now applies to anything rigged on the front edge of the stage (e.g. Float microphones, Uplights / footlights etc.)

**Front Of House** **(FOH):** The part of a performance venue that is open to the public.

**Foldback:** Means by which musicians can part of the rest of the sound mix (including voices) and how their instruments sound after being amplified. Also enables actors on stage to hear musicians or effects when they cannot hear the output of the auditorium sound system.

**Frequency:** (measured in Hertz - Hz - cycles per second) The number of times a sound source vibrates each second. A high frequency (HF) sound has a higher pitch and is unidirectional. A low frequency (LF) sound has a lower pitch and is omnidirectional.

**FX:** Abbreviation for Effect, usually referring to Sound Effects, but can also mean special stage effects.

**Gaffer Tape:** Ubiquitous sticky cloth tape. Most common widths are 6 mm for marking out areas and 50 mm (usually black) for everything else. Used for temporarily securing almost anything. Should not be used on coiled cables or equipment. Originally known as Gaffer's Tape, from the Gaffer (Master Electrician) on a film set.

**Gain:** The level of amplification given to a signal or of a system. A control of the amount of pre-amplification given to a sound signal on its way into a mixer. Particularly important for microphone inputs - a quiet vocal will require a lot of gain, a loud singer less so.

**Group:** A subdivision, permanent or optional, of a sound desk.

**Haas Effect:** A psychoacoustic phenomenon whereby an audience will focus on an actual sound source if the reinforced sound from speakers arrives 10 - 15 milliseconds later. The setting up of delays can be time-consuming but the Haas Effect can make a vast difference to the perceived quality of the sound in a show. The delays are set up by experimentation rather than by using distance/speed/time formulae.

**HDMI (High Definition Multimedia Interface):** A digital video interface allows high definition video (up to and in excess of 1080p/60) and audio (up to 8 lossless channels) to be transmitted over a single cable.

**Headset:** General term for theatre communication equipment; a headphone and microphone combination used in such communications systems with a belt pack.

**Hertz (Hz):** A measurement of the frequency of sound vibration.

**Hot:** One of three connections on an audio or power connector. Hot - the 'live' or positive or signal cable, often coloured red; Cold/Common - the 'neutral' or return cable to complete the circuit; Ground - the 'earth' or ground connection which ensures electrical safety. In an audio connector is this often connected to the metal sheath of the cable.

**Impedance:** The amount of opposition a device has to an audio signal. In technical terms, the combined effect of capacitance, inductance and resistance on a signal.

**In Ear Monitors:** Small headphones worn inside the ear by members of a pop band so they can hear the monitor mix (or the backing track they're miming to) without having lots of monitor speakers onstage. The advent of in-ear monitoring has improved the sound quality of the monitoring for these band members as they no longer must try to hear the monitors over screaming from the audience. Each member of the group can have their own monitor mix which is guaranteed to be the same in every venue on the tour. Known as I.E.M.s or IEMs for short.

**Incidental Music:** Music heard by the audience in a non-musical performance, either as background atmosphere as underscore, or between scenes or to set the mood. Incidental music is not heard by the characters in the play, so is non-diegetic.

**Induction Loop:** System which amplifies audio frequency currents (from a microphone over the stage) around a large loop of cable (around the auditorium) to generate a magnetic field which can be picked up by a hearing aid switched to the 'T' position.

**Interval Music:** Music played in the foyer and/or auditorium during intervals.

JACK: Segmented audio connectors that come is several sizes and configurations. (Images shows 1 stereo Minijack (3.5mm) and 2 x mono Jacks (6.35mm).

Mono Jacks have two connections - tip and sleeve and are unbalanced. Stereo jacks have three connections - tip, ring and sleeve. The configuration is often abbreviated (T = Tip, R = Ring, S = Sleeve), so a stereo jack is TRS, a mono one is TS.

**Jackfield:** An array of jack sockets ('jills'), providing connections to equipment/outlets etc. A patch panel.

**Jumper:** An adaptor from one type of electrical connector to another. For example, a 13 - 15A jumper has a 13A plug and a 15A socket at either end of a short cable. Also applicable to sound cables.

**Key:** A section on a layout plan, which denotes what the symbols on the plan refer to. Although many symbols are standardised, there are variations, and to avoid confusion (or errors) when rigging and laying out equipment, a key is essential to ensure the requirements of the design are correctly interpreted.

**Kill:** To switch off (a light/sound effect); to strike/remove (a prop). (e.g. Kill channel 6 please)

**Lady and the Tramp:** A Lady and the Tramp moment occurs when two people clearing and coiling LX or sound cables end up both coiling the same one. Named after the Disney classic animation where two dogs end up eating the same piece of spaghetti.

**Latency:** In digital live sound systems there are tiny time delays due to the processing time required to convert sound from analogue to digital and back again. This time is known as the latency of the system.

**Lavalier Microphone:** Applies to a small 'tie clip' microphone. These microphones are used for TV and in musical productions requiring the amplification to be 'invisible'. The mic is worn in clothing, in hair / wigs, over the ear or on the face (heavily made-up).

**Lemo:** A small metal multipin connector used for connecting radio microphone heads into the transmitter pack.

**Level:** The setting of a light or sound control channel. On a lighting desk, levels range from 0% to 100% (also known as FULL). On a sound desk, the bottom of the fader is ∞ (infinity) and the top may be +20. The fader is designed to be operated at its optimal position which is labelled 0dB. The decibel (dB) scale is a measure of sound intensity.

**Line Array:** A vertical cluster of flown speaker cabinets positioned either side of a stage to give a more controlled coverage of sound than is achievable with speakers on stage. Line Array speakers provide a more focussed beam of sound with a high loudness level without wasting energy amplifying sound which is projected towards floors / ceilings.

**Line Check:** An important part of the sound check process, the line check is a methodical test of every instrument or microphone that is connected to the sound desk. It enables the sound technician to ensure that everything is working correctly and is connected as she/he expects it to be and is in the correct place on stage.

**Line Level Signal:** Standard' level at which the inputs and outputs of domestic and professional sound equipment operate. Slight variations are that some equipment works at +4dB, some at -10dB.

**Line-Up Tone:** Signal of known frequency and level used for setting up sound recording equipment levels accurately.

**Loom:** A neatly organised bunch of cables. A wiring loom is used to avoid messy runs of cables by keeping the cables going in the same direction (to the same piece of equipment) tied together. This saves time when installing and packing-down equipment and ensures that a piece of cable can't be mislaid or left behind. The cables can be taped together (using PVC tape, never Gaffer Tape) or, for more long-lasting arrangements, with cable ties. More environmentally friendly companies use short lengths of rope for the same purpose, which are re-used repeatedly. Strips of rubber can be used for the same purpose. The looms are named according to their purpose (e.g. the Control Loom goes from the control desk to associated equipment, and may contain a power cable, a communication cable and a DMX512 cable for the control signals).

**Loudspeaker:** Device for converting the electrical signal from an amplifier back into sound waves, most commonly by vibrating a paper cone. Most speaker systems are composed of a few sources each designed to handle a specific range of frequencies.

**MADI:** Acronym for Multichannel Digital Audio Interface, this is a standard way of sending digital audio signals over distances over 100m. Developed by AMS Neve, Mitsubishi, Solid State Logic and Sony, it is defined and monitored by the Audio Engineering Society. The standard is also known as AES10. MADI supports serial digital transmission over coaxial cable or fibre-optic lines of 28, 56, or 64 channels and sampling rates of up to 96 kHz with resolution of up to 24 bits per channel.

**Master:** An overall control fader or lever on a lighting or sound control board. The Grand Master takes precedence over all other controls and allows the operator to fade out the entire output of the lighting desk. On a lighting desk the PRESET MASTER allows the control of a section of the desk independently from the rest.

**Matrix Output:** Set of outputs on a mixing desk which allows the user to pre-set a few output configurations, e.g. on a 8 x 8 matrix, each of the 8 group outputs from the channels can be routed to any or all of the matrix outputs.

**Mic:** (pronounced 'Mike') Abbreviation for microphone.

**Mic Check:** Process of testing the functionality and audio quality of the microphones used in each performance. It's particularly important when using radio mics, to check for any crackles or loss of signal. One by one, the mics are tested, ideally with no other noise or activity taking place on stage. The sound team can listen for unusual noises and can confirm that each mic is connected correctly (ie that it appears in the correct channel on the sound desk) and that it works. It's a different process from the sound check, which takes place with the performers, to check for the correct placement of the mics, and to enable the sound team to balance / adjust the mics for best quality.

**Mic Level Signal:** Low level audio signal produced by circuitry in microphone. Needs boosting either by a pre-amp or a mixing desk before it can be amplified. Susceptible to interference over long cable runs.

**Mic Plot:** A chart showing which character / actor uses which radio microphone throughout the show. Vertically down the page are the scenes, musical numbers etc. Across the page are the numbered microphones. This enables the sound operator to instantly see who is using each microphone at every point during the show.

**Mic Pouch:** A small fabric pocket that can contain a radio microphone transmitter pack. The pocket is often made of a slightly elasticated material (e.g. lycra) in black, and is attached to an elastic belt, or has a belt loop built in, if it's to be worn on the outside of a pair of trousers or under a jacket.

**Mic Up:** The process of attaching a radio microphone to a performer. The transmitter pack contains the battery and on/off switch, along with a short aerial cable and the microphone connection. This pack should be placed securely in a pocket, or in a mic pouch worn under the outer costume layer. The microphone head is connected to the transmitter via a cable, which should be run under the costume (with the cable held in place using micropore (surgical) tape if necessary) to the back of the performers' head, and the microphone should then be positioned either above an ear, in the middle of the forehead at the hairline. Having the microphone attached to a costume should be the last option, because the distance of the mouth to the microphone will change when the performer turns her head, making it very difficult for the sound operator to balance the wildly varying levels.

**Microphone:** A transducer which converts analogue sound vibrations into an electrical signal which can then be amplified or recorded onto tape. Signals from a microphone are very low level and are amplified in the mixing desk to line level. There are many different types of microphones, each designed for a specific purpose. They can broadly be divided into three groups:

1. General Use - designed to be placed in front of and relatively close to a sound source, used for vocals and instrument mic-ing.
2. Directional - also known as shotgun microphone - picks up from a longer distance away from the source.
3. Body-worn - small size, consisting of a microphone head and a separate electronics pack. General use and body-worn mics are available in wired or wireless (radio) versions.

**MIDI (Musical Instrument Digital Interface):** A standard of communication between musical instruments, controllers and computers.

**Midrange (mids):** The frequency range above bass but below treble that carries most of the identifying tones of music or speech.

**Minijack:** Also known as a 3.5mm jack, this is found as a headphone outlet on many pieces of personal audio equipment or laptops. A minijack to twin-phono cable is used to connect from a laptop, phone or MP3 player into a sound system or mixing desk that has phono ('pin plug') input connections.

**Mixer:** A desk comprising several input channels where each sound source is provided with its own control channel through which sound signals are routed into two or more outputs. Many mixing desks can also change the quality of the sound.

A Powered Mixer has an amplifier built into it. Sound sources of varying levels are accepted which can be amplified if necessary.

**Monitor:**

1) An onstage speaker which allows a performer to hear the output of the PA system, or other members of a band.

2) A video display screen (not normally able to receive broadcast TV pictures) used with a CCTV system or a computer.

**Monophonic (Mono):** Single channel sound recording, as opposed to Stereophonic, which uses two channels (left and right).

**MP3:** Compressed audio file format, short for MPEG-1 Audio Layer 3. Enables 'good enough' audio quality when moving music around on portable devices. However, MP3 compression can sound awful through a theatre PA system, so ensure you are always using the best uncompressed version of music and sound effects tracks for a show.

**MP4:** MP4 is a multimedia container format, which can store video, audio or still images.

**Multicore:** A flexible electrical cable composed of many well-insulated sets of cables covered in a strong PVC or rubber covering. Enables several different circuits to be carried down one piece of cable. Both lighting (power) and sound (signal) multicores are available.

**Noise Boy:** (Colloquial term) Theatre or concert sound engineer. Sometimes male, but not exclusively so! Also known as a Hum Head. See also Techie and Lampy.

**OHM:** The unit of electrical resistance.

**Outro:** A piece of music or media, or a part of the performance, which takes place at the end of the performance. The opposite of an Intro.

**Overheads:** Microphones positioned above a drum kit to pick up the cymbals etc. without getting hit ***or*** Microphones positioned over the stage to pick up the overall sound of the concert / production.

**PA System:** Short for Public Address System.

**Pad:** A switch on a mixing desk input channel which attenuates (reduces the level of) a signal. Used if a loud / high level signal is causing the desk to be overloaded.

**Paging:** Action preventing microphone etc cables from getting entangled by pulling / releasing them from offstage as performer walks around.

**Pan:** A control on a mixing desk which allows the operator to position the channel's output in the final stereo image (L - R).

**Patch:** (verb) The act of plugging an audio cable into the son desk.

**Patch Bay:** Used to connect outboard equipment into the sound desk and to connect sound desk outputs to amplifiers, and amplifiers to speakers.

**Patch Panel:** A board consisting of rows of sockets into which plugs can be connected to route sound signals or power for lighting circuits.

**Peak:** The highest level of strength of an audio signal. Often refers to an unacceptably high level, where the signal begins distorting.

**Phantom Power:** Some condenser microphones require a power supply to operate. If this supply is not from a battery within the microphone body, it is known as a phantom power supply. It is usually 48 Volts DC (can be 9 - 52 volts from most mics), and is supplied either by a separate battery pack, or by the sound desk. The supply is termed 'phantom' because it is 'invisibly' carried down the same microphone cable as the sound signals.

**Phase:** Two identical sound waves which are slightly apart in time are said to be out of phase; two identical waves are in phase.

**Pick-Up:** A way of describing the directional sensitivity of a microphone. An Omnidirectional microphone has equal pick-up from all around, a Cardoid microphone is more sensitive from the front, a Hypercardoid has very strong directionality from the front. A figure-of eight microphone picks up front and rear but rejects sound from the sides.

**Pitch:** The frequency of a sound defines the pitch. A higher frequency gives a higher pitch note.

**Plot:** List of preparations and actions required of technical crews during the performance (e.g. Sound Plot = list of sound cues and levels in running order.) In the US, the term plot refers to a plan. (e.g. Light Plot = scale plan showing lighting instruments).

**Plotting Session:** Time during which the plot for each department is prepared (e.g. Audio Plotting session)

**Plug:** A power or signal connector with a pin or pins which is used to make a connection from a power or signal source (the socket) to a device or another connector. Plugs are not used as a source of power, because of the risk of electrocution by touching the fully exposed pin connections. Sockets, where the connection is shielded, are used as the source of power.

**Pop Screen:** A thin gauze screen placed between a singer and a microphone to reduce vocal 'popping' and other breath noise. This noise is particularly produced by pronunciation of plosive sounds (the sounds from the letters P, B, T).

**Pop Shield / Pop Filter:** A foam shield placed over the end of a microphone to reduce the pickup of vocal 'popping' and external wind noise.

**Power Amplifier:** Converts sound signals of line level (approximately 1 volt) into tens of volts, with currents of around 1 Amp to drive speakers.

**Preamp:** An amplifier that boosts the incoming signal from a microphone before reaching the mixer.

**Pre-Fade Listen:** Often shortened to PFL. Control on a sound mixing desk which allows the user to check the presence of a signal, and its quality before bringing up the fader. Also vital for fault-finding, where the route of a signal can be PFL'ed around the desk until the point where the fault occurs. Also known as Check and Cue.

**Prefade / Postfade:** An output from a sound desk is said to be pre fade if it is independent of the channel fader. If it is post fade, the level of the output is relative to the channel fader.

**PSU:** Power Supply Unit.

**Psychoacoustics:** Psychoacoustics is the branch of psychology concerned with the perception of sound and its physiological effects. The Haas Effect is used to trick audience members into believing the source of a sound is the stage, rather than a nearby speaker with a slight delay on the sound. MP3 audio compression uses psychoacoustics to remove sounds that are masked by others to reduce the file size.

**Public Address System:** The venue auditorium sound system. Usually shortened to "PA". Most theatres will have a separate sound system for emergency announcements in all public areas of the theatre. This system may also be used for Front of House calls.

**Rack:** A cabinet of standard width into which various components can be bolted. Racks are ideal for touring equipment, are neat, and they allow easy access to the rear and front panels.

**Radio Mic:** Device consisting of a microphone head, transmitter pack with batteries, aerial and mains receiver unit which allows actors and singers to be amplified with no visible means of connection. Almost universally used in musicals where the singers must be amplified to be heard over the orchestra / band. Used in non-musical shows for sound reinforcement.

Can be Handheld (where the microphone head, transmitter pack and batteries are all in one unit) or Lavalier (where a miniature microphone is either clipped onto clothing or body worn).

Radio mics use either VHF or UHF frequency bands to send the radio signals from the transmitter to the receiver. UHF systems tend to have better range than VHF, have more frequencies to select from, and are less susceptible to interference from TV systems. Radio systems are being replaced in some situations, by digital wireless systems which use a digital wifi signal to transmit the audio. These can run into problems in areas with existing wifi networks and a lot of users with connected devices.

**Rat Stand:** Illuminated music stand (named after manufacturer).

**RCA:** A common type of audio (and video) connector.

**Resolution:** The quality of a sound sample is measured by the sample rate (e.g. 44.1kHz is CD quality sample rate) and the resolution (either 8 bit or 16 bit normally).

**Return:** Route for an auxiliary signal back into a sound mixer (see also SEND).

**Reverb (Reverberation):** Effect which may be added to sound effects during recording or to a voice during performance. Sustains the sound longer than normal, as if the sound was reverberating around a large building (e.g. cathedral). Persistence of sound after the source has ceased.

**RF:** Radio Frequency.

**Ring Out:** Process of maximising the volume of sound possible through a sound system before feedback ("ringing") occurs. The equalisation controls on the mixing desk channels are used, along with gain controls to reduce the chance of feedback.

SCORE: The score is the written notation of a musical work. An arrangement of a piece of music for piano is called the Piano Score. An arrangement for a singer is the Vocal Score.

**Scribble Strip:** The display window on a lighting, sound or automation control desk which enables the user to add a description of the function of that channel. Can be entered as text, or a hand-drawn image or text. This enables graphical characters (e.g. Chinese) to be used, or other symbols.

**Shield:** In an audio cable, a conductive cylinder around one or more centre conductors that protects against unwanted electrostatic fields that could induce a signal, heard as a hum or buzz, across the conductors of the cable.

**Shotgun Microphone:** A type of highly directional, high quality condenser microphone which can be placed a relatively long way from a sound source. A shotgun microphone uses a hypercardoid pick-up pattern.

**Show Relay:** A network of speakers carrying the sound of the show, and sometimes stage managers calls, to the furthest reaches of the theatre. (e.g. 'Can we turn the show relay down please?')

**Snap:** A lighting or sound cue with no fade time - the cue happens instantly. This can be achieved on a computerised lighting desk by using a fade time of zero seconds.

**Socket:** A power or signal connection point where a plug can be inserted to make a connection from the source of power. Sockets can be used as signal outputs or inputs, and are usually used as power outputs, due to the shielded connections, making it impossible to touch the live connections with fingers.

Sockets are often wall or panel mounted, while plugs are used to connect portable equipment.

There are exceptions of course - Powercon connections which are panel mounted can be either power inputs OR outputs and are differently colour coded to make it clear which is which, and the connectors are designed so they cannot be used incorrectly.

**Soft Key:** Short for Software Key. A button on a lighting or sound desk whose function changes according to your last action. The function of the soft key is often shown on an adjacent display panel.

**Solo:** On a sound desk, the solo button on each input channel silences all other inputs so that channel alone can be heard. Dangerous to use during a show but can be useful for fault-finding or testing equipment.

**Sound Check:** A thorough test of the sound system before a performance. This will include checking each speaker cabinet individually, and each playback device. In the case of a live concert, this is the session when each instrument is played in turn for the sound engineer to check and fine-tune the sound. A line check should be carried out methodically to ensure that every input to the sound desk is working correctly.

**Sound cue sheet:** Document containing a detailed listing of all the music and audio requirements used within a production.

**Sound Designer:** Member of the production team who has the responsibility for planning and executing the layout of all sound playback and reinforcement equipment for the show. This role also includes the sourcing of music and sound effects for the production.

**Sound Technician/Engineer:** Member of the Audio Department, also known as Audio 1, who is responsible for operating the sound mixer to ensure that microphones and other audio sources are mixed to carry out the sound designers' vision for the show. Although many operations can be automated, to ensure that groups of microphones are unmuted at the right time, to ensure maximum quality and volume in the sound mix, faders must be continuously monitored and adjusted - only microphones that are needed at each precise moment should be 'live' so that no unwanted sounds are audible through the PA system.

The sound technician on a musical will usually have an assistant working backstage, who ensures that radio microphones are working, and are fully charged, and allocated to the correct performers. Any faults during the show should be remedied (by changing batteries, adjusting aerials or replacing microphone heads) and communicated to the sound engineer immediately to adjust the mix accordingly.

**Sound Ground Plan:** Sound technicians can use ground plans to indicate where any important pieces of sound equipment will be placed during a performance.

**Sound Reinforcement:** Amplifying a voice just enough so that it can be heard, without the audience being aware that it is being amplified (ideally!).

**Soundscape:** A background sound that runs under a scene, to help establish a reality for the world of the play, and to immerse the audience in that world. It can also be used to heighten emotional moods and to emphasise important occurrences.

**SQ:** Abbreviation for Sound Cue, used by stage management in the prompt book. The equivalent for lighting cues is LX. Avoid using abbreviations such as SX or FX for sound effect cues, as they sound like LX. When cueing the show, the member of stage management on the prompt book should say 'Sound Cue 12' rather than 'S. Cue 12', for clarity.

**Squelch:** Control on a radio microphone receiver for fine-tuning the reception according to the surroundings.

**Stage Box:** A connection box at the end of a sound multicore cable.

**Stage Left / Right:** Left/ Right as seen from the Actor's point of view on stage when they are facing the auditorium. (i.e. Stage Left is the right side of the stage when looking from the auditorium.)

**Stand-By / Standby:** A warning given to technical staff by stage management that a cue is imminent. The member of the stage management team calling the cues will say "Standby Sound Cue 12". Technicians acknowledge by saying "Sound Standing By".

**Stereo:** Audio which is made up of two channels - left and right.

**Stage monitor speaker:** A speaker that is typically placed within and pointed at the performance area to aid in a performer being able to hear critical elements for performance.

**Sub-Bass:** That part of a speaker system designed to extend the low frequency range of the system. See also Subwoofer.

**Subwoofer:** (often just SUB) - Speaker dedicated to reproducing very low frequencies. The large cabinet is often placed on the floor as the low frequencies radiate out, and the ear cannot detect their source, so the position of the Sub is not as critical as the rest of the sound system.

**Take-Down:** The same as a get-out, often used for live music events, this consists of removing all equipment and structures used for an event.

**Technical Rehearsal (also known as the Tech Run, or just Tech):** Usually the first time the show is rehearsed in the venue, with lighting, scenery and sound. Costumes are sometimes used where they may cause technical problems (e.g. Quick changes). Often a very lengthy process. Often abbreviated to the Tech.

A **Dry Tech** is without actors to rehearse the integration of lighting, scenic changes etc. It follows that a **Wet Tech** is a full technical rehearsal with actors and all technical elements, although this term isn't used as often as **Dry Tech**.

A **Paper Tech** is a session without the set or actors when the technical and design team talk through the show ensuring everything's going to work as planned. Stage Managers can use this session to ensure all is written correctly in the Prompt Book.

**Three To One Rule:** To get maximum gain (level) out of a PA system, microphones which are picking up the same sound source (e.g. a chorus on a large stage) should be three times further from each other than from the sound source. This minimises Comb Filtering.

**Track:** Separate audio recording channel.

**Transducer**: A device that converts energy from one form to another. A microphone is a transducer that converts sound wave energy into electrical pulses.

**Treble (highs):** Upper end of the audio spectrum reproduced by tweeters.

**Troubleshoot:** Searching for errors or faults in an audio network setup.

**Tweeter:** Part of a speaker system designed to handle the high frequency part of the signal.

**Ultrasonic:** Audio frequencies which are too high to be heard by humans (above approximately 20,000 kHz).

**Unbalanced Line:** A method of carrying sound or data signals cheaply. An unbalanced cable consists of two conductors - audio and screen/ground. Two pin connectors such as RCA/phono connectors are used, which are not suitable for heavy duty professional use. Commonly used for short distance hook-ups between audio or video equipment, unbalanced cables are subject to interference over long distances.

**Upstage:** The part of the stage furthest from the audience. It's called Upstage because on a raked stage the stage slopes down towards the audience to improve sightlines. The furthest from the audience is literally higher due to the slope of the stage, so moving from close to the audience involves walking up the raked stage, towards 'Upstage'.

**Visual Cue:** A cue taken by a technician from the action on stage rather than being cued by the stage manager. Often abbreviated to "Viz" or "Vis".

**Vocal:** Pertaining to the human voice.

**Voice Over:** Refers to a technique for recording an actor's voice and replaying it during the performance to indicate a thought process, or for more practical uses such as covering a scene change or costume change. Abbreviated to V.O.

**Voltage:** The pressure at which electric current is available. The Australian standard voltage is 240 Volts alternating current (AC).

**Volume:** A measure of the loudness of a sound cue.

**VU Meter (VU - Volume Unit):** Pointer and scale meter which indicates the average level of a signal. Misses any transients and spikes that lead to a clipped signal.

**Wavelength:** The distance from one point on a vibrating wave to the same point on the next wave. The lengths of the sound waves (wavelengths) we can hear range from one inch to 40 feet. High frequency sounds have short wavelengths (and are more directional), low frequency sounds have long wavelengths (and are less directional).

**Wedge:** A wedge-shaped foldback speaker. Angled so that it can sit on the stage floor and point up at musicians/cast.

**White Glove:** A role is said to be 'white glove' if the person is not required or expected to help with setting up equipment, only in the operation of it.

**White Noise:** A signal consisting of random frequencies at a uniform intensity. Used for audio system testing and to signify overload or the static present on an untuned TV.

**Woofer:** Part of a speaker system designed to handle the low frequency parts of the signal.

**XLR:** A lockable connector, available with various numbers of pins. The most common XLR in audio work is the 3-pin XLR.

**Zero DB:** The common reference point when discussing sound levels. Levels above 0dB are expressed as positive (+5dB) and those below as negative (-20dB).