Glossary:
Audio Terms

Some of the terms used when discussing production intercom for television or theatre may be new to you as they are unique to intercom applications. Although many of the terms are common to other audio applications, to be certain, you understand their meanings we offer the following definitions.

A

A1: Person responsible and in charge of the audio effort. Usually, the A1 is the person who mixes the show.

A2: This person works for the A1 and is generally responsible for all audio setup outside of the truck.

All Call: Activating an All-Call button from a Main Station or Remote Main Station will initiate a talk to all channels at once.

American Wire Gauge (AWG): A standardized wire gauge system used for measuring the diameters of round, solid, nonferrous, electrically conducting wire. The AWG of a stranded wire is determined by the total cross-sectional area of the conductor, which determines its current-carrying capacity and electrical resistance. Increasing gauge numbers give decreasing wire diameters.

Audio Frequency: Range of frequencies lying within the range of human hearing, often 20 hertz to 20,000 hertz, where hertz is cycles per second.

B

Balanced Audio: Audio that is differently driven down a path, where neither lead of the audio pair is at ground potential. Each signal on the two leads is 180 degrees out of phase with each other. Because of this fact balanced audio is generally immune to outside interference. Audio XLR connectors have three conductors, two for each of the two audio signals and one for ground. Compared to single ended audio where the audio signal is on a single conductor and referenced to ground, which is the other conductor. RCA audio connectors carry single ended audio.

Balance Line: Defined in terms of the impedances of the two signal conductors with respect to a reference, which is usually "ground". Neither conductor is tied to circuit common. Circuit common is either tied to a transformer center tap, or is an electrical center point, or not tied at all.

Beltpack: A portable headset user station. This station is designed to be worn on a user's belt with the idea of semi-portability. It can be single or two intercom channels capable. Requires a headset or handset. Interconnects to system with microphone cable and is powered by a central Power Supply or Main Station.

Binaural: Refers to two ears. In intercom use it refers to two signals, typically may be two different signals fed to two ears independently. Called Split-Ear.

Biscuit: A portable user speaker station.

Breakout Box: A box with multiple connectors on it that is connected to a cable that encompasses multiple feeds within it. The breakout box provides a separate connector for each of the individual feeds for the signals in the cable. See mults and pigtails.

Bridging, High Impedance (hi-Z): A method of connecting to a nominal impedance audio line (such as Clear-Com) and creating a non-significant effect on the circuit. (loading or taking appreciable power from that line.) Simply stated, as you add more and more stations to the line, the volume remains constant.

Bus: Circuitry that transports multiple digital signals grouped together as parallel lines. Also refers to large conductors used to carry electric power. Such a wire, or in general, a collection of wires that carry some multi-bit information, is called a bus.

C

Call Signaling: This feature is included with the majority of Clear-Com products. It can be an audible and/or visual alert on a user station (a lamp or LED) used to attract the attention of an operator signifying that someone at another station wants to initiate a conversation. The Call light feature is used for two different purposes: 1) primarily to get a user's attention of incoming communication. 2) To indicate a cue, routinely: light on means standby, light off after light on means apply.

Cans: Slang for headphones.

Capacitance: Exists between the transmission line wires. The capacitance between wires is usually expressed in Pico farads per unit length. This electric field between the wires is similar to the field that exists between the two plates of a capacitor. Your cable consists of two wires normally twisted together in a bundle. Between any two wires there will be capacitance. High capacitance will affect the frequency performance of a line in two ways - increased attenuation and changing phase of a signal.

Channel: A "channel" is one individual circuit of communication used within a partyline - it is typically a two-way talk/listen path. An example would be a partyline channel for spot light operators. There can be more than one line circuit channel to allow for multiple conversations or information flows to occur simultaneously. It is possible for a user station (beltpack) to select between several channels available in a system with a channel selector on the user station. This allows for multiple conversations or information flows to occur independently as needed. An example would be a Remote Stage Manager with Carpenters on Channel A and the rest of the production on Channel B.

Channel is also used to describe a range of frequencies (or, equivalently, wavelengths) assigned by a government for the operation of a particular television station or radio station. In common usage, the term also may be used to refer to the station operating on a particular frequency. This is common with two-way radios.

Circuit: A complete path for electrical power or an electrical signal (usually two conductors). In an intercom system, a channel for one or two-way conversation may be called a circuit.

CODEC: An acronym of Compression, Decompression = a device or piece of software which takes one file or signal format and translates it to another with an ideally undetectable loss of quality. Equipment that takes baseband video and audio and compresses it into one of many file or transport stream formats or decompresses it back to baseband.

Conference Line Intercom: See Partyline.

Crossover Cables:

> **Computers:** A crossover cable is sometimes known as a null modem. A crossover cable is a type of twisted pair copper wire cable for LANs (local area network) in which the wires on the cable are crossed over so that the receive signal pins on the RJ-45 connector on one end are connected to the transmit signal pins on the RJ-45 connector on the other end. This is the opposite of the usual straight-through LAN cable, in which the receive and transmit signal pins on one connector are connected to the corresponding pints on the other connector.

Its purpose is to allow the direct connection of two LAN devices, such as two hubs, two switches or a hub and a switch. It can also be used to create a direct connection between two computers.

Audio:

Very similar to a crossover cable used in Ethernet networks an audio crossover cable is a type of twisted pair copper wire cable in which the wires on the cable are crossed over so that the receive audio signal pins on one end are connected to the transmit audio signal pins on the other end connector.

Cross Talk: Leakage of audio transmissions from one channel to another.

D

Daisy Chain: Some Clear-Com Partyline user stations allow the looping together (or daisy chaining) of user stations. These stations have a "loop through" connector as well as a 'line' or "line input" connector. A partyline system can be constructed by connecting one user station to another via the line and loop through connectors. Other wiring options are "home running," which is running a line cable from each user station to a central point connecting to the power supply ("home").

Decibel (dB): In electronics and communications, the decibel is a logarithmic expression of the ratio between two signal power, voltage, or current levels. In acoustics, the decibel is used as an absolute indicator of sound power per unit area.

Destination: A destination is anything that a talk key talks to or a listen key listens to. Therefore, a destination can be an intercom station, beltpack or interface, (or group of such devices connected together), which is assigned to a source channel of a power supply or central intercom Main Station.

Dim: This the intentional attenuation of an audio signal. "Dim" occurs in two contexts in intercom systems. First, Dim is used to correct a feedback problem that can occur between two user speaker panels operating in close proximity that talk/listen to a common destination. This can help to prevent occasional feedback between the speaker and microphone due to volume settings, microphone placement, etc. Second, dim is referred to the lowering of a program feed to a destination so that a talk path could be heard – such as in a dressing room page or talent IFB cueing.

Dry Pair: A telephone term is used to describe a pair of wires (2 conductors) that carry audio but no voltage. Contrast this with a "Wet Pair" that carries both audio and voltage.

Dual Listen: This is an option or feature of intercom user stations. Dual listen permits an operator to listen to two channels at once. This may be a mix of two channels to one ear, or in a binaural or stereo user station, one channel can be assigned to one ear and the other channel to the other ear.

Dual Listen could also be an intercom channel and a program audio source. The dual listen pots are functionally configured in two ways: 1. One pot controls the audio of the channel actively used, and the second pot controls the audio of a monitored channel. 2. One pot is always one channel and the other pot is always the other channel.

Duplex: Duplex refers to bi-directional communications. **"Full" Duplex** describes bi-directional communications all the time. Regular communications between individuals conversing face to face is "full duplex" -- in other words you can talk and listen simultaneously. Full Duplex communication allows simultaneous two-way conversations, plainly - one person can interrupt the other.

The alternative is **"Half" Duplex**. Half Duplex communication allows two-way conversations, one-way at a time, such that one person cannot interrupt the other. A walkie-talkie is a good example of half-duplex communication.

E

Electromagnetic Interference (EMI): Interference caused by the radiation of electrical or magnetic fields from sources such as radio transmitters, light dimmers, computers, and transformers.

Electronic Field Production (EFP): An EFP truck contains the necessary audio, video, intercom, and other equipment to create these productions.

Electronic News Gathering (ENG): An ENG truck contains the necessary audio, video, intercom, communications, and other equipment to effectively support gathering news and transmitting news reports back to a studio.

F

Four-Wire (4-wire): A communications system where the paths are different for talk and listen. In intercom channels there are four wires (two paths). Four-wire systems can be four-wire balanced and four-wire unbalanced. Four-wire audio is more or less defined as a pair of conductors carrying an input/receive signal and a second pair carry the output/send signal. The four-wire circuit gets its name from the fact that a balanced pair of conductors was used in each of two directions for full-duplex operation.

Four-Wire Balanced: Four-wire (4-wire) balanced is similar to four-wire unbalanced except that conductors are not tied to circuit common. Circuit common is either tied to a transformer center tap, or is an electrical center point, or not tied at all.

Four-Wire Unbalanced: A four-wire (4-wire) system that uses a circuit common and two additional conductors. The talk pathway consists of one conductor plus circuit common. The listen pathway consists of another conductor and circuit common.

G

Gigahertz (GHz): Thousand million cycles per second.

GPIO: General Purpose Input / Output. (You may also see this referred to simply as "GPI".) GPIO is a means of controlling devices using switch contact closures, DC voltages, or similar methods. Additional general purpose control outputs are provided by optional relay frames.

H

Headset: Portable intercom connection from a user station to one or both ears via headphones with integrated microphone on a boom arm. Connects to a beltpack, remote stations or Main Stations. Used by the user to talk and or listen.

Headset / Double-Ear: Headset with two earphones plus a microphone. It can be connected monaurally (same information, both ears) or binaurally (separate feed each ear). In binaural operation, the feed can be intercom in one ear and program in the other, or intercom channel A in one ear and intercom channel B in the other ear. Channels A

and B are either conference line channels or other intercom feeds. A binaural feed requires a binaural/stereo capable user station.

Headset Microphone Type:

Dynamic Microphone: Converts sound pressure waves to electrical signals by means of a coil attached to a diaphragm moving in a magnetic field.

Electret Microphone: A microphone using a capacitor as the sound pressure sensing element. Electret microphones are a special case of condenser microphones in that they are permanently polarized and require no special polarizing voltage. Electret microphone outputs are high impedance.

Hertz (Hz): A unit of frequency. It is defined as the number of cycles per second. It is the basic unit of frequency in the International System of Units (SI), and is used worldwide in both general-purpose and scientific contexts. Hertz can be used to measure any periodic event; the most common uses for hertz are to describe radio and audio frequencies, more or less sinusoidal contexts in which case a frequency of 1 Hz is equal to one cycle per second.

I

Impedance: Impedance is the total effect of resistance, capacitance and inductance and each of these oppose electrical flow on a cable in different ways. Impedance is a combined effect or total opposition to current flow.

Interrupted Fold Back (IFB): A communication circuit feature or a separate system that interfaces with the intercom system. In use, a user, (typically talent) listens to the program all the time and is 'interrupted' by the director (typically) with cues or instruction.

I/O: Input and output connections.

ISO: A private conversation path. An ISO channel allows one to simply push a button and transfer themselves and the person they wish to speak with to an isolated channel.

J

K

Kilohertz (kHz): Thousand cycles per second.

L

Latency: Usually used in context of audio, video, and RF signals. Latency is the time it takes a signal to travel over a path or through a piece of equipment.

Limiter: Used to limit dynamic range to ensure adequate intelligibility to the listener. The limiter/compressor in user stations has three functions: I) It helps loud talkers and soft talkers to be heard equally well, 2) It prevents a loud voice from being severely distorted, 3) It keeps the voltage levels from exceeding system limits.

Line: A single communication path.

Linking: Linking ties separate channels into one single partyline.

Local Power Option: Local Power Source is a small AC converter that converts AC line power to low voltage in order to power a user station --a separate connector is provided. User stations usually get DC from the converter, although occasionally low voltage AC power is used.

Loop-Through: See "Daisy Chain".

M

Main Station: A multi-channel intercom station with an internal power supply which can provide power both to itself and to all of the remote stations connected to it.

Mix-Minus Bus / Feed: A mix-minus feed is typically used for the IFB. The mix-minus allows the talent to hear the program audio that includes the voices of other talents at

other venues as example, but not the talent's own voice. The effect is to allow more normal conversations, on air, among the performers. The bus feed refers to the mixer mix-minus feed available to one or more IFB program inputs.

Mono: Single channel audio.

Mults: A large cable that is made up of many smaller internal cables. Often used to carry multiple audio feeds. In many instances fiber optic cables are replacing these cables. A mult box is sometimes called a 'press box' usually reserved for the sports media's section of an arena or frequently at press conferences.

Multi-Channel: More than one channel.

N

Null: A hybrid's ability to isolate the transmit signal from the receive signal in the 2-wire-to-4-wire interface is critical. The quality of this isolation is technically known as return-loss. A side tone nulling control fine tunes the circuitry to best match the devices to the acoustic conditions near the intercom, as well as to the electronic conditions on the intercom line. They should be set at the time of system installation and adjusted as is comfortable for the user.

Four-wire audio is more or less defined as a pair of conductors carrying an input/receive signal and a second pair carry the output/send signal. This hybrid circuit connects the four-wire audio to the single wire in such a way as to variably restrict the user's reception of his own voice on the intercom line, which is often referred to as "side tone". High gain between the send and receive poses a risk of oscillation or 'howling' resulting from acoustic and/or electronic coupling within a headset or between a speaker and a microphone.

With manual nulling devices there are the following accessible controls: Separate "R" (Resistance), "L" (Inductance), and "C" (Capacitance) controls compensate for each component of the line's impedance, providing the best null possible. Ideally, there should be no portion of the talk signal in the listen signal. The variation of the 2-wire line phase coherency is affected by the cable capacitance (length of wire and gauge) and inductive elements of the line. The "C" control compensates for cable capacitance; the setting depends on the length of the line. The "L" control compensates for the low-frequency inductive and capacitive elements the wiring of the external party line presents to the line. The importance of 2-wire termination, lack of, or double termination also influences the null result. If the "R" control is turned fully counter-clockwise, the line has either

more than one termination, or an excessive resistive load. If the "R" control is fully clockwise, then the line has no termination.

O

P

Partyline (PL): Intercom system where all people talking on the system can talk or listen to each other simultaneously. The name PL (partyline) came from the original telephone systems where everyone shared the same line and could hear and join all conversations at once. It is often called conference systems, 2-wire or TW, which stands for two-wire (see 2-wire description). A Partyline system allows a group of people to intercommunicate. A partyline is classically used when several users, such as beltpacks, are active in a common task and they must communicate with each other all the time.

Characteristics of partylines:

- When the party line is already in use, if any of the other subscribers to that line pick up the headset, they can hear and participate in the conversation.
- Completely non-private lines
- Systems are created from building block components to correspond the demand of the event.

Conference systems can be distributed or centralized. Most of the systems are distributed conference systems. Distributed means that a station can be plugged-in at any arbitrary point along the bus or channel.

Pigtail: A group of cables that converge into one large connector at one end and at the other ends each cable has its own separate connector. It is designed to patch into an existing line or to terminate the ends of a long run.

Point-to-Point: One path to one person.

Power Supply: The source of electrical power ("power outlet"). In North America this source is generally 120 volts AC, 60 hertz. In Japan the source is generally 100 volts, 50 or 60 hertz. In Britain the source is 240 volts, 50 hertz. In Europe the power is usually 220 volts, 50 hertz. In addition, some equipment is operable off of DC sources such as batteries.

Power Supply - Clear-Com: A specific power supply to operate Clear-Com beltpacks and remote stations. This supply provides low noise DC power (30 VDC ± 0.5V) up to 1.2 amperes per channel and an audio line impedance of 200 ohms.

Program: Audio source that is fed into the intercom channels.

Program Interrupt: Disconnects the audio source while the talk button on the Main Station is pushed. (IFB)

Push-To-Talk (PTT): Usually used on handsets or push-to-talk microphones. Pushing the button enables the microphone talk circuit on.

Q

R

Rating: In audio electronics a rating of .05 to 2 Amp at 24 volts AC/DC maximum is common. A "Phoenix" type connector plug is also common and it plugs into the relay contact port on the rear of the base station for wiring to external devices. A use for a relay is sometimes associated with turning on a light for attention such as an on-air light.

Relay: A relay is an electrically operated switch. Commonly these relays are Normally-open (NO) contacts which mean they connect the circuit when the relay is activated; the circuit is disconnected when the relay is inactive. It is also called a Form A contact or "make" contact. Typically, in audio electronics, these relays are of the dry contact type. Dry contact refers to a contact of a relay which does not make or break a current. They simply turn something on or off.

Remote Mic Kill (RMK): The ability for certain Main Stations to shut off all talk circuits on an intercom line in a system.

Remote Station: Like the beltpack, this would be any of the products connected to the intercom line that allow duplex or half-duplex conversation, but do not contain a Power Supply. A Remote Station cannot power other Stations.

RF: Radio Frequency.

S

Sidetone: This is a small amount of your own voice heard in your earphone as you are speaking.

Splitter: Usually refers to a passive audio device that takes one audio source in and provides two or more outputs.

Stage Announce (SA): Typically a voice page made over a loudspeaker. In wired intercom when a SA control is pressed, either at a base station or a assignable beltpack, the user's audio is routed to the stage announce connector on the back of the base station. This is usually an analog line level audio output. The user may lose their headset side tone as an indication that stage announce is activated. The other users do not hear the announce audio. The button is non-latching.

Station: A station is connected to one or more channels. For example, if you have six people who need to hear one director you have a seven-station single-channel need. If the same director needs to speak privately to any one of the six, add a second channel. You now have a seven-station, two channel system.

T

Termination: Passive network that is connected in each channel, usually on the Power Supply or Main Station.

Tie Lines: Generally cables that have no dedicated use that link one section to another. Tie lines usually terminate at patch panels or other IO panels.

Two-Wire (2-wire): A communications system where the path is the same for both talk and listen. In intercom channels there are two wires (one path). Two-wire systems can be two- wire balanced or two-wire unbalanced.

Turn Around: A term used to describe an audio interface cable or barrel type tube device, sometimes called couplers, that coverts a female-to-female or male-to-male connector used to turn snake channels from a send to a return or vice versa, but they also come in handy when a stage hand has inadvertently run a very long XLR cable in the wrong direction.

U

V

W

Wet Line: An intercom that carries both audio and DC voltage / current. As opposed to a dry line that carries only the audio.

X

XLR: Standard connector for audio, most commonly with three pins or contact points. Four and five pin versions are used for intercom headsets and multi-channel microphones. Cannon Electric invented the connector and made it part of its "X" series or connectors. Because of its locking mechanism the "L" was added, and the fact that it has rubber insulation resulted in the final "R" designation.

Y

Z