

Cable and Connectors

This article was inspired by the realisation that a local guitarist, otherwise experienced and accomplished, did not know that there is a difference between a guitar cable and a speaker cable. Quite simply nobody had ever told him. So here is an explanation of common audio cables, their connectors and the jargon that goes with it all.

There are two main types of (analogue) audio cable; line-level also known as 'signal' or 'instrument' cable and high-level or 'speaker' cable. These serve quite different purposes and are therefore made in different ways.

Line-level.

This type includes instrument (eg. guitar) cables, microphone cables and also signal cables such as from your CD player. All these cables serve the same purpose, to get the signal from your source (guitar, mic, CD player) into an amplifier. The signal from these devices is at a relatively low level and so the cable must be electronically efficient and shielded from outside interference (from TVs, radios etc.). Because of the low signal level these cables can also be prone to 'handling noise' where movement of the cable creates noise that is almost as loud as the signal itself.

Line-level cables have an important sub-division into two main types, 'unbalanced' and 'balanced'.

Unbalanced cables make up the vast majority of domestic and instrument cables. They have a single conductor (the bit that passes the signal) and a layer of shielding wrapped around it. They are often known as single-core cables. We are probably all familiar with a domestic stereo cable. This is essentially two single-core cables joined side-to-side (giving a figure-of-eight cross section) terminated in two separate 'phono' connectors - more about them later. A guitar cable is a single version of much the same thing but a good quality one will have better shielding for a longer useful length, a more robust construction to avoid damage and handling noise and a bigger, stronger connector.

Balanced cables have a similar construction but use two conductors or cores with a layer of shielding wrapped around both. The signal is divided into two parts (positive and negative or 'Hot' and 'Cold') passed down the cable and re-combined at the amplifier input. This process effectively cancels out any noise picked up by the cable and guards against mains-borne interference or 'Hum'. The most common type of balanced cable is a microphone cable. This will typically have a three-pin connector, hot, cold and shield. Many recording studios will use balanced cable for other signals because they tend to have more equipment working at higher levels (more interference) and longer cable runs than domestic users. The balanced cable will maintain higher signal levels and provide a better signal-to-noise ratio.

High-level.

This type includes all speaker cables. Their purpose is to get the output from your amplifier to the speaker. The output from an amplifier is at a relatively high level (hence the name) so outside interference is not an issue and shielding is not necessary. The cable needs to pass a high-level signal for as long a distance as possible without frequency loss - especially the bass - and for this reason these cables are often physically bigger than line-level cables. They're not normally shielded and look a lot like two-core mains cable (e.g. a table lamp).

Connectors.

There are many and varied types of audio connectors but there are a few common standard types that most of us will be using.

Line-level connectors:

Phono - Also known as: RCA.



These are normally used in pairs on a figure-of-eight stereo cable for connecting Hi-Fi units, VCR audio connections and other domestic equipment.

Mini Jack - (3.5mm).



Very common in computer audio connections as well as portable devices such as walkmans, laptops and camcorders. Usually comes as a stereo connector but can also be mono. Also common on domestic headphones

1/4" mono Jack - (6.35mm).



The most common instrument connector. Used for guitars, keyboards mixing desks etc.

XLR - Also known as cannon



The industry standard microphone connector. Also used for balanced connections to amplifiers, DI boxes, mixing desks and other professional audio devices.

High-level connectors:

1/4" mono jack



Used for mono speaker connections such as instrument speaker cabinets (guitars etc).

1/4" stereo jack - also known as TRS (Tip, Ring, Sleeve) jack.



Most commonly used for headphone connections and extension cables. Domestic headphones sometimes use a mini version (3.5mm). TRS jacks are sometimes found as a line-level connector for old microphones and some mixing desk insert connections. Notice the two black insulating bands separating the three poles of the connector.

XLR



Sometimes used for amplifier outputs or old instrument cabinets. Can also be found in four and five-pin versions.

Speakon.



Industry standard high-powered speaker connector, used for most PA applications.