

INTERFACING ANSWERS

What is the difference between an electronically-balanced and a transformer-balanced input and how does ground lift help?

In an electronically-balanced input stage the loudspeaker's electronics are directly connected to the source equipment and so source-generated noises are transmitted directly to the loudspeaker for reproduction.

A transformer-balanced input stage uses a high-quality audio transformer to decouple the source from the loudspeaker. Then there is no electrical connection between the two pieces of equipment (galvanic isolation) so there is complete immunity from source-generated noises.

Additionally, if the source-receiver ground voltages are different, ground loops and their associated noises (humming and/or buzzing) may be heard. To overcome this, the ground of the loudspeaker can be disconnected using the ground lift switch fitted to most of the products.

The disadvantages of transformer-balanced input stages are that they cost more than electronically-balanced input stages. Transformer-balanced input stages have a patented design that offers a higher than normal common-mode rejection ratio of >60 dB.

Transformer-balanced inputs are available as standard on the [O 500 C](#), [O 300 D](#), [O 110](#) (transformer-balanced input version only), [M 52 D](#) and [M 52](#).

The [TIM 1](#) accessory can be added to the [O 410](#) to convert the electronically-balanced input into a transformer-balanced input.

Subwoofers are not available with transformer-balanced inputs as the number of channels makes it rather expensive.

My loudspeaker is humming, buzzing, or making some other unwanted noise?

"Poor earthing and RFI carried as radio waves, entering either a poor earth or all cables and equipment in your studio will always be a problem, easily solved the old-fashioned way, with good earthing and good cabling."

Audio Media October 2008 pp 48-50, "Power Fact and Fiction, part 2" by Andrew Graeme.

Therefore the order of priority for removing unwanted noises is:

- **Cabling** – Use good quality microphone (analog signals) or AES/EBU (digital signals) cable, and check the wiring of the cable. Always connect pins 2 and 3 in balanced-line XLR connectors.
- **Electrical noise generators** – Remove from the building, e.g. hair dryers, fridges, motors, machines.
- **Earthing** – Ensure that the electrical earth is good. Consult an electrician for this.
- **Transformer-balanced input** – fitted to some loudspeakers as standard or available as an option on others ([TIM 1](#))
- **Ground lift** – Use the ground lift function if it is available in the loudspeaker.
- **Multi-socket power strips** – Generally best avoided, especially when daisy-chained. Also try to avoid remote mains switches.



- **Power conditioners** – For use in poor quality power supply areas.
- **Balanced power** – Generally the problem should already be fixed by this stage. See quote below.

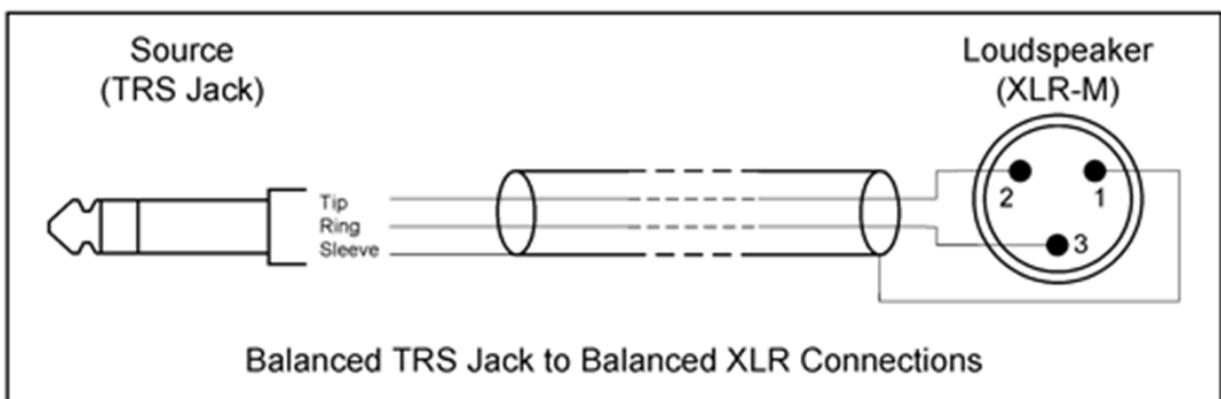
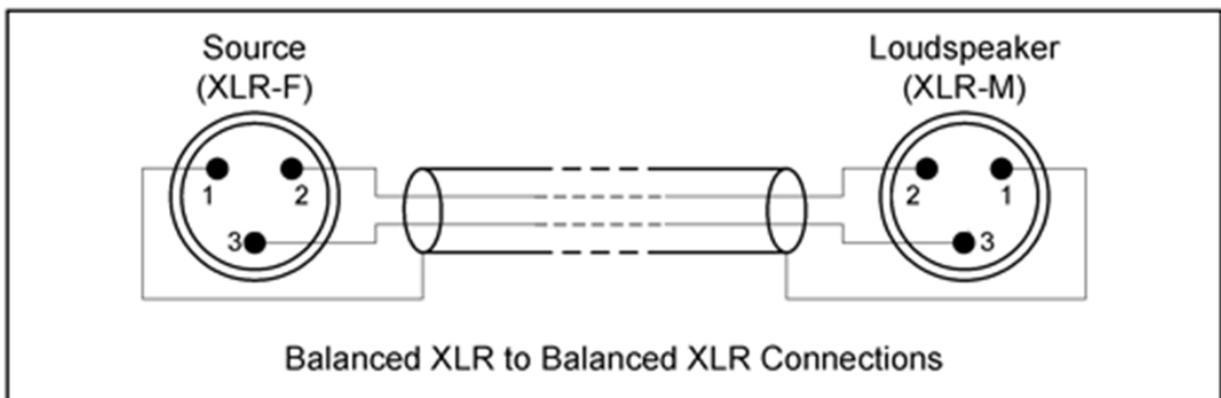
Generally solving noise problems does not cost much money as there is usually a simple explanation once the source is found.

“Balanced power is extremely expensive when done properly and within the law. It does have specific applications, such as scientific laboratories and some operating theatres, and all connections and the combined usage have to be overseen by a qualified electrician, both in the US and within the EU. In some EU and US states, a government accredited certificate of safety is required annually. This is because balanced power, especially when used together with unbalanced power, or just incorrectly installed, can be very dangerous.”

Quotation from same source as above.

How do I connect the balanced outputs (XLR or TRS Jack) on my source equipment to the loudspeakers?

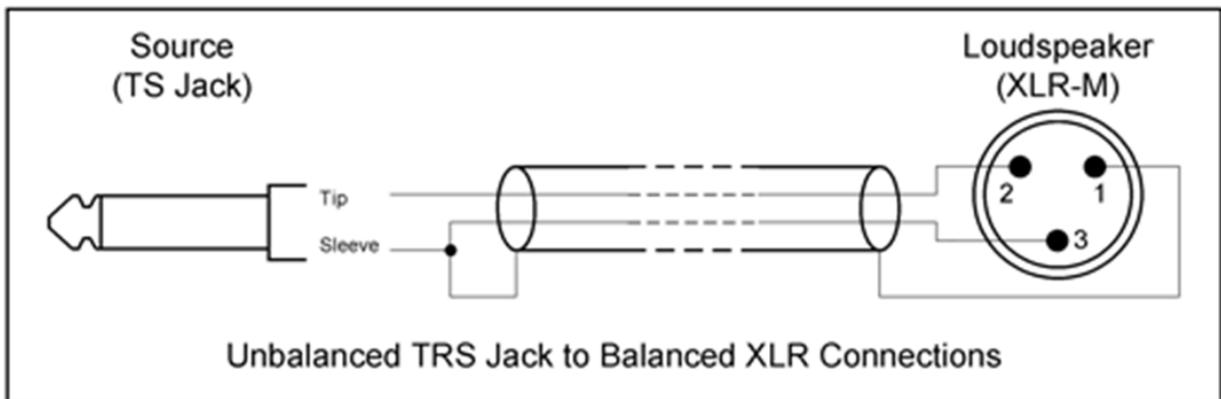
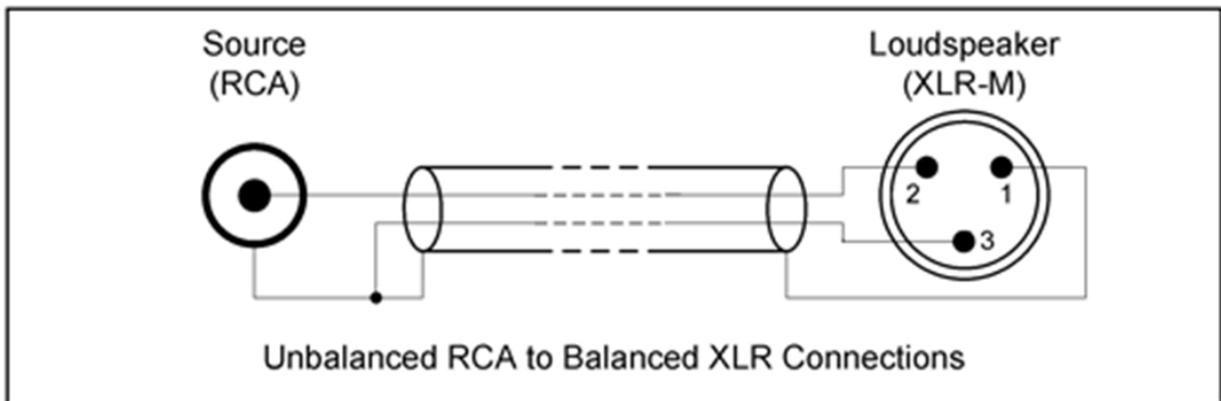
Here are the wiring diagrams for the cables.





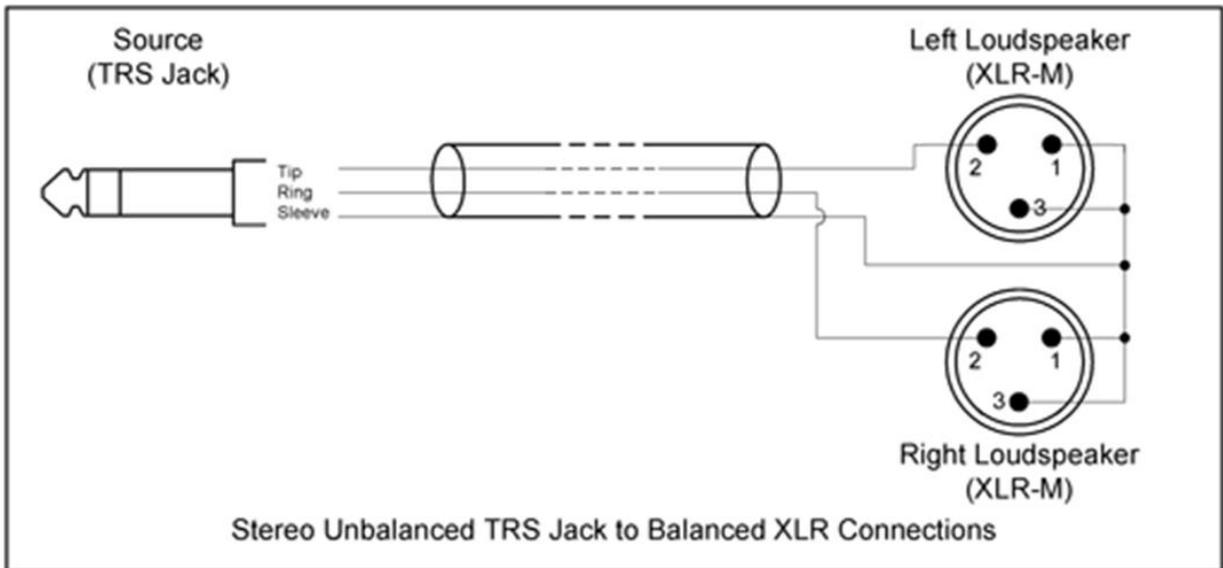
How do I connect the unbalanced outputs (RCA or Jack) on my source equipment to the loudspeakers?

It is highly recommend that balanced connections are used whenever possible. Failing that, here are the wiring diagrams for the cables.



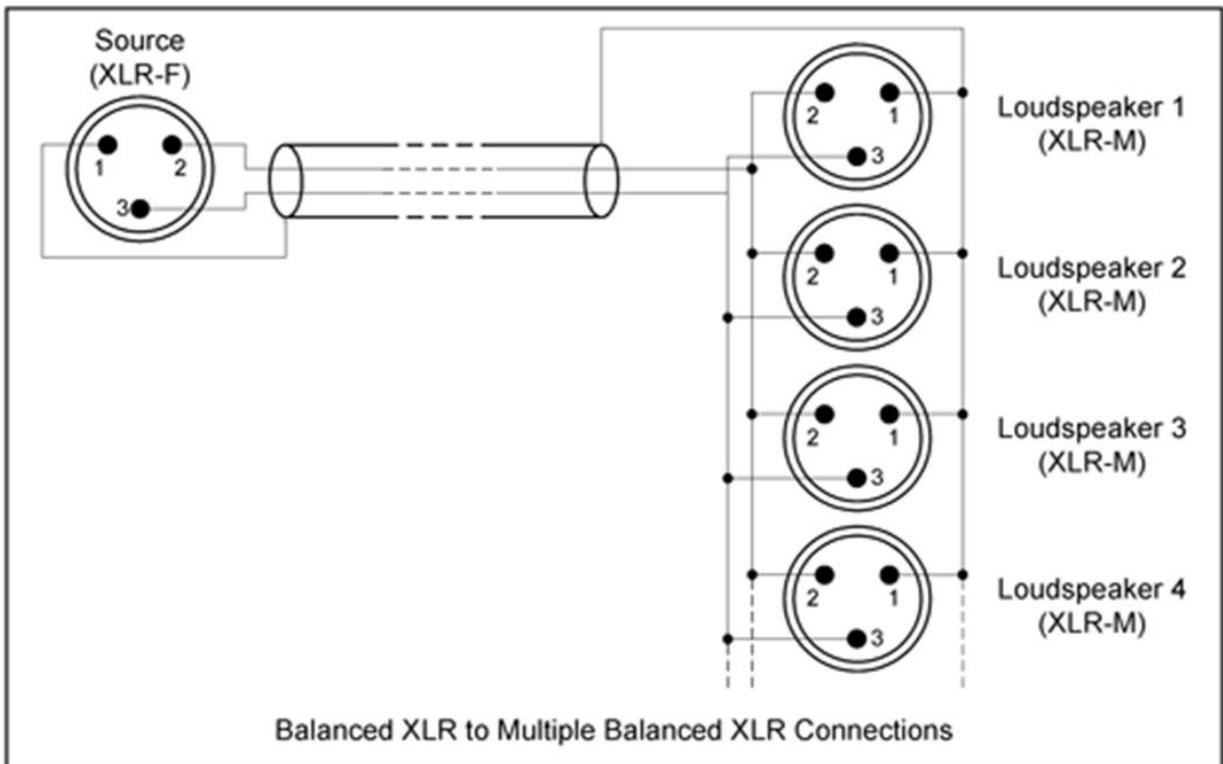
How do I connect the stereo unbalanced output (TRS Stereo Jack) on my source equipment to the loudspeakers?

It is highly recommend that balanced connections are used whenever possible. Failing that, here are the wiring diagrams for the cables.



How do I connect more than one loudspeaker to a single output?

Up to 10 inputs can be connected to a typical single line output, however this is dependent on the impedance of the output stage and input stages. To be sure of no degradation of the reproduced audio, use a signal distribution amplifier.



I have no pre-amp outputs on my equipment, so how do I connect the loudspeaker to the loudspeaker outputs of my power amplifier?

Loudspeaker level outputs from amplifiers should never be connected to the inputs of active loudspeakers as the voltage level is too high and damage will occur to the input stage electronics. Use a source with line-level outputs.

How do I control the output level of the loudspeakers?

There are various ways to control the volume of the loudspeaker system:

- The source controls the level of the output signals.
- A [Pro M 1012](#) controls the level of the signals to the loudspeakers and subwoofers.
- An [SRC 1](#) or RS-232 data is used to control the system volume in a subwoofer equipped with a 7.1 High Definition Bass Manager.

What kind of cables (mains, signal, and loudspeaker) do recommended?

Mains cables

Suitable mains cables are supplied with every product so please use them. If they are not available use a mains cable that has a current rating exceeding that shown next to the mains socket on the back of the product.

Signal cables – analog

Ideally balanced line connections should be used. If this is not possible, take care to wire unbalanced cables correctly. The cable itself should be mechanically robust, be non-microphonic, have low capacitance, and be shielded. The connectors should be mechanically robust and offer good electromagnetic shielding.

Signal cables – digital

Firstly, do not use microphone cable as it has the wrong characteristic impedance resulting in unreliable transfer of the digital data. There are three types of digital audio signal that require three different types of cable: S/P-DIF, AES3 on XLR, AES3 on BNC.

S/P-DIF

Characteristic impedance	75 Ohm
Cable type	Coaxial cable for S/P-DIF signals
Connectors	RCA - RCA
Maximum length	10 m

AES3 on XLR

Characteristic impedance	110 Ohm
Cable type	2-core and screen cable for AES-EBU signals
Connectors	XLR-M to XLR-F
Maximum length	100 m

AES3 on BNC

Characteristic impedance	75 Ohm
Cable type	Coaxial cable for AES3 on BNC signals
Connectors	BNC - BNC
Maximum length	300 m

The maximum length shown is that specified in the specification. The practical maximum length can be affected by the source transmitter, the receiver circuit, and/or the cable quality.

Loudspeaker cables

Loudspeaker cables should be thick enough to conduct the signal over the required distance. CP nn and SC nn are suitable loudspeaker cables for use with the remote electronics kits.

How do I wire-up and configure my surround sound system?

Please refer to the operating manual for extensive advice on setting up the loudspeakers you have purchased. The latest version of the operating manual can be found in the [downloads section](#) of our website.

Can I use digital signals in a multichannel system?

AES/EBU signals typically carry two channels of audio so three or four AES/EBU signals are needed for 5.1 or 7.1 multi-channel signals. The channel order is typically:

- AES/EBU 1: Left / Right
- AES/EBU 2: Center / LFE
- AES/EBU 3: Left Surround / Right Surround
- AES/EBU 4: Left Back / Right Back

The wiring of the system depends on how it is being used:

- Music mixing: all channels connected to a 7.1 High Definition Bass Manager fitted with a DIM 4.
- Theatrical movie mixing: main channels connected directly to main loudspeakers, LFE channel connected directly to a subwoofer with a digital input.