Avoiding damage to your hearing !!!

<u>OSHA standards</u>

85 dBA and higher - prolonged exposure will result in hearing loss
90 dBA - no more than 8 hours per day (lawn mower, truck traffic, hair dryer)
95 dBA - no more than 4 hours per day
100 dBA - no more than 2 hours per day (chain saw)
105 dBA - no more than 1 hour per day
110 dBA - no more than ½ hour per day
115 dBA - no more than ¼ hour per day (preferably less)

<u>Limitation to standards</u>

Specific spectral content and temporal patterns matter

Very loud but very short is still dangerous

<u>Headphones and Ear-buds are particularly dangerous</u>

Usually boosted to be above the ambient noise, which itself has a big dynamic range

MEL philosophy

Run by engineers.

Find it and leave it in the "ground state".

Use studio computer or bring your own computer.

Club mentality, help each other, preserve and protect the facility.

Avoiding damage to the studio

Microphones

Dropping them.

Pulling over mike stands (run cord under the base).

Having a mike stand droop.

Speakers

Shredding them with too much bass.

Burning them out with too much treble (can happen with distortion, since clipping enlists high frequencies).

Near field monitors (on recording console) are <u>not</u> for live music.

Piano

Hitting it with a microphone, cymbal, or chair.

Spilling a drink.

"Playing" the piano with something other than your fingers.

Virtual Drums

See specific rules below.

Acoustic Tiling (ceiling)

Fragile! Don't hit with mike stand.

Audio Connectors

RCA connector

For Hi-Z line level (consumer audio).

"Tip-Sleeve" (TS)

One conductor and shield, 1/4" or 1/8".

Hi-Z instrument level guitar cords.

"Tip-Ring-Sleeve" (TRS)

Two conductors + shield, 1/4" or 1/8".

Low-Z line level.

Stereo Hi-Z line level, headphones.

XLR (Cannon)

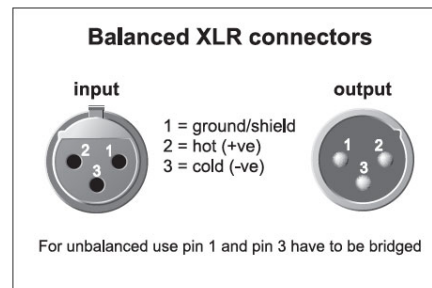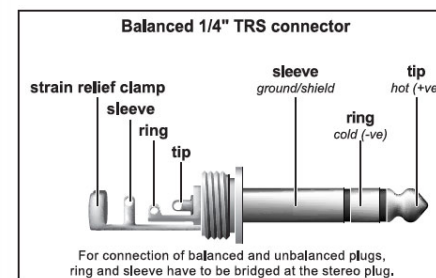Two conductors and shield.

Low-Z line level, Low-Z microphone.

Combination XLR, TRS, and TS connector

Balanced XLR connectors

input   output

1 = ground/shield
2 = hot (+ve)
3 = cold (-ve)

For unbalanced use pin 1 and pin 3 have to be bridged

Fig. 4.1: XLR connector

Balanced 1/4" TRS connector

strain relief clamp   sleeve   tip
                             ground/shield   hot (+ve)
          sleeve
          ring   ring
          tip   cold (-ve)

For connection of balanced and unbalanced plugs,
ring and sleeve have to be bridged at the stereo plug.

Fig. 4.3: 1/4" TRS connector

Unbalanced 1/4" TS connector

strain relief clamp   sleeve   tip
                             ground/shield   signal
          sleeve
          tip

Fig. 4.2: 1/4" TS connector

**Headphones, AUX IN & DIRECT IN
connection with 1/4" TRS connector**

strain relief clamp   sleeve   tip
                             ground/shield   left signal
          sleeve
          ring   ring
          tip   right signal

Fig. 4.4: 1/4" TRS connector for headphones operation

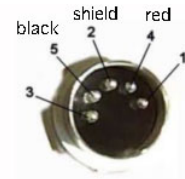www.behringer.com

Plugs can activate switches

e.g., turn off speaker when headset plug inserted, or interrupt signal in patch bay
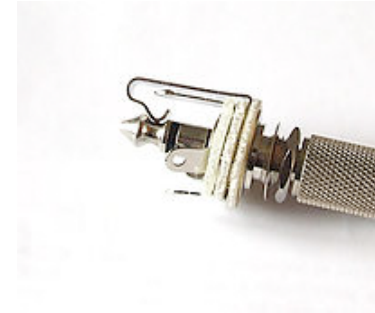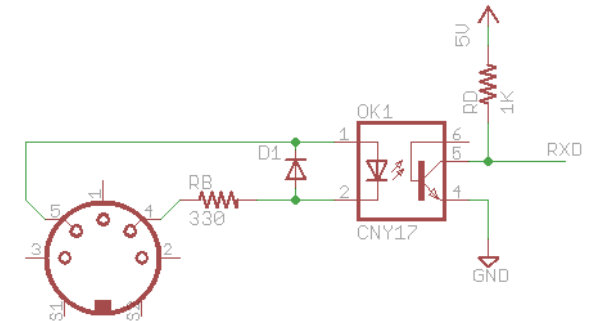
DIN-5 180° (Deutsches Institut für Normung)
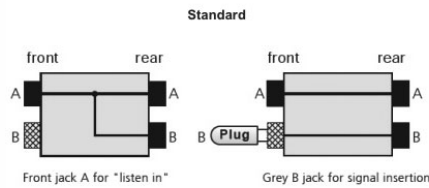
For MIDI

Optically isolated to prevent ground loops

MIDI

Dual banana plug

Low resistance, high current, reversible, stackable.

Mainly for speakers.

Patch Bays

Standard

front   rear   front   rear

Front jack A for "listen in"   Grey B jack for signal insertion

Neutrik NYS-SPP-L1

Audio Normalling

Audio Normalling is usually used with audio patch panels and is a wiring pattern in which a circuit path is established from one piece of audio equipment to another without the use of a patch cord. This pattern is then considered to be the „normal" circuit path that is desired most of the time. If a patch cord is inserted, the normal circuit path is interrupted and rerouted to a different circuit path.

Normalled patch panels are most commonly found in vertical jack pairs: the top jack is designated as the source and the bottom jack is the destination.

Normalling example: HALF NORMALLED BOTTOM ROW

This is the most common configuration, very often called HALF NORMALLED. In this configuration internal normalling contacts

connect the top jack contact with the corresponding bottom jack contact. Inserting a plug in the bottom jack will interrupt this internal normalling connection, while inserting a patch cord into the top jack doesn't interrupt the circuit. (Can be used to monitor the normalling circuit)
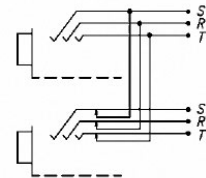
Other versions of normalling are Half Normalled Top Row, Full Normalled, Parallel and Isolated.

Audio Formats

Mike Level

Low Z, 2-conductor "balanced" to reduce noise, very small voltages (XLR).

Instrument Level

High impedance (guitar, bass, really cheap mikes) very small voltages (TS 1/4").

Line Level

-10 dBV high-Z unbalanced (RCA or TRS 1/8" for stereo)

+4 dBu generally low-Z balanced (TRS 1/4" or XLR)

Headphone Outputs

Various impedances 32 – 600 ohm

Medium voltage, like a volt or two

Speaker Outputs

Various Impedances (8 ohm, 4 ohm).

Higher voltage and especially higher current

S/PDIF

2-channel up to 48KHz 24 Bit

RCA plug, 75ohm Coax video cable (We use this for connecting V-Drums at 44.1KHz 24 bit)

Fiber optic (TOSLink for "Toshiba Link")

ADAT Lightpipe

8-channel fiber optic up to 48KHz 24 Bit (We use to connect 8pre to 828MK3)

MIDI

Musical Instrument Digital Interface

General MIDI

1-3 bytes asynchronous serial data, includes which note, how loud, pedals, and which instruments in orchestra.

Traditionally uses DIN-5 connector

MIDI-out from one device powers LED and phototransistor (optically isolated) to MIDI-in of another device.

Total isolation, even ground.

Most equipment now uses USB.

Communicates setup information in addition to MIDI

Digital Audio Formats

16 bit, 24 bit

44.1KHz (CD), 48KHz

Lossless File Formats

.wav (non-compressed, Windows)

.aiff (non-compressed, Apple)

.flac (Free Lossless Audio Codec)

Lossy File Formats

.mp3 (lossy compressed, varying amounts of compression vs. fidelity)

.m4a (Advanced Audio Coding or "aac", Apple, lossy compressed)

Basic Digital Recording Studio

Line in   Line out   Line in

no
delay

A-to-D   D-to-A

Mikes &
Electric
Instruments

trim
&
phantom
power

Preamp

Computer

Amp

Speakers &
Headphones

MIDI
Instruments