



LEONARDO MANI AUDIO

AUDIO SERVICING

Ten Commandments

When comparing our components with the alternatives, never forget the following basic facts of physics apply to all equipment trying to record, transport or recreate a musical event:

I - Thou shalt not invert phase -check the absolute phase of your components and make sure that your chain performs in phase!

II - Can you imagine the sound of a violin covered by a sack? **Damping** is poison for natural sounds- seek equipment solutions that operate without needing damping!

III - Negative Feedback is an (attempted) correction that operates only *after* the problem exists. Life-like dynamics and sounds are real only without feed-back correction, whether it's applied in massive or "homeopathic" amounts.

IV - Temporal Distortions - be it jitter in digital transports, or mechanical micro-vibrations in turntables, electronics or speakers - often exist below our conscious awareness, but we are certainly affected them. If you consider the physical dimensions of a 15 kHz acoustic signal, and imagine how little movement it takes to negatively affect these dimensions, you'll get an idea of how stable things must be located in space to maintain the accurate presentation of the original signal!

V - Music lives on dynamics -micro as well as macro. Often only 20-40 dB of the 80-110 dB dynamic range of live music makes it to the recording, but 30 dB of dynamics require a power reserve of 30 times, and 40 dB needs 100 times!. So even if you use an average of 2 to 3 W, the peaks may need much more than 100W not to clip, and this power must be available into the lowest *instantaneous* impedance of your speakers. This can drop as low as 1-2 ohms at certain frequencies, so check that your amp will operate into 2 ohms without serious limiting, and for a quick check from published specifications, at 4 ohms you should have *twice* the power of the 8 ohm rating

VI - Check the **dynamic behaviour** -the initial wave-front of a transient should be in phase, and fast: look for *Rise-time* specs in real terms of microseconds-not just the "*fast*" or "*ultra-fast*" language of the advertising copywriter'

VII - Sound waves resemble their original character only if presented in a **COHERENT** plane, and not if cut up into all kinds of individual "*happenings*". Choose speakers and other components that are able to reproduce a coherent sound wave in phase!

VIII - Time is of the Essence! Everyone has experienced hearing something fall down behind them: Instantly you know what has fallen, not only recognising the harmonic structure of metal, glass, porcelain etc., but also *where* it fell. And from this sound we also recognise something of the size and architecture of the room; if it's small or large, well damped or with reflective surfaces. We unconsciously decipher this via the staggered times of arrival of the direct and reflected sound waves reaching our ears. If this is calculated in terms of distance or time increments, it appears that our ear/brain system must be able to differentiate increments in the order of *1/100.000 th* of a second! With this inherent ability, and knowing the phase errors and temporal distortions of all stages in an audio chain from microphone to speaker, realise that our brain cannot accept *any* recorded and reproduced sound as truly LIVE. We consider that audio designers should put far more attention on the accuracy of their equipment's time domain performance, rather than focusing (as most do) on frequency response flatness - to which our aural perceptions are drastically less sensitive!

IX - The MAGIC of cables sound: yes, they all sound different, depending on structure, architecture, materials, and most of all: the shielding. But don't forget, what you're most likely going to hear is the cable's effect on the interaction of the reverse current from your speakers hitting the negative feed-back loop of your amps!

X - "Less is More" - if you concentrate on the ESSENTIALS and search for the shortest, most direct way in an elegant and stable solution - your music should come through unfiltered and in its natural glory!

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