

TOMATIS DEVELOPPEMENT S.A.

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THE TOMATIS® METHOD AND ANALOG vs DIGITAL ELECTRONIC EAR

This document clarifies the difference between an analog Electronic Ear and a digital Electronic ear in the application of the Tomatis® Method.

Historically, it was Alfred Tomatis himself that opened the debate in 1991 by raising the question of whether or not to make the turn and use digital instead of analog technology. He concluded that “at the present time” the quality of digital sound was not good enough for the Electronic Ear. Indeed, at that time, converting analog into digital sound could cause important loss of auditory information.

In 1994, and after important technological advances, Alfred Tomatis decided to use digital filters in his own center. The debate was therefore closed at that time.

But some analog enthusiasts have decided to continue using the old material, or even new analog material. It should be noted that none of these machines use an analogical musical sound source such as a cassette or magnetic tape. The music therefore, is digital sound. No equipment can transform a digital sound source into analog sound. **HOWEVER, ALTHOUGH SOME MACHINES ARE ANALOGICAL, NO PROFESSIONAL CAN TODAY CLAIM THAT THEY OFFER ANALOGUE LISTENING SESSIONS.**

Here are the details for the most motivated:

In the Tomatis® equipment, it is important to make a difference between the sound source and the device that filters sound.

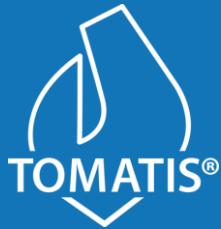
- The sound source can be either analog (magnetic tape) or digital (CD, memory card or hard drive¹);
- The electronic Gating® can be produced either by an analog Electronic Ear (called old generation) or by a digital Electronic Ear (called new generation).

On the sound source: Why use CDs, hard drives or memory cards rather than magnetic tape as a sound source for processing the Tomatis® Effect (before treatment of gating)?

Analog sound is “raw” sound. In contrast, digital sound is an analog sound that has been sampled and quantized. To put it simply, digitization has the effect of transforming infinite information into defined information. Thus, the signal from an analog tape delivers an infinity of information whereas the sound from a CD contains a defined quantity of information. So why then use CDs or hard drives as the sound source?

The first benefit concerns the frequency of the signal, that is to say, its pitch (low or high): a CD can reproduce a frequency spectrum extending to 20 kHz, while analog tape will play sound to 12 kHz. The harmonic richness of a CD is therefore far superior to that of a tape. The human ear is capable of hearing sounds up to 20 kHz. However, analog tape cuts sounds beyond 12 kHz. We all know the importance of high frequencies in the Tomatis® Method, consequently it seems logical that a tape that removes high frequencies is not as good as a source that can keep them.

¹ A hard disk stores files. We do not use compressed files such as MP3s.



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The second benefit concerns the sound dynamics, that is to say the change of intensity. The CD can restore the original dynamic of an orchestra playing at 90 dB whereas analog tape will necessarily cut the decibels beyond 65dB. The Gating® effect, calibrated on the sound dynamics, is compromised as a result since the amplitude of the sound contrasts (C1, C2) is lower.

The third benefit concerns the integrity of the sound and its recording medium. When you copy a sound file (digital), you make a faithful and perfect replica. Similarly, when playing a CD, there is no loss of information. In the same way, when you read a CD, there is no loss of reading information.

Conversely, analog tapes deteriorate from their first play due to friction (11% loss beyond 6 kHz after each play). This alteration of the sound and this frequential loss can have significant consequences in terms of comfort and listening quality.

Thus the choice of a digital source allows for better preservation of acute frequencies and variations in sound intensity. Finally, it allows an identical and unalterable duplication quality. It is currently impossible to offer new cassettes for each session, and yet this is the only way to get better analog sound.

Concerning the processing of the Tomatis® Gating®: If I use CDs, or a memory card or a hard disk as a sound source, why should I use a digital rather than an analog Electronic Ear?

If you use a CD or a memory card or a hard drive, remember that analog processing no longer serves any purpose. In fact, a sound that has been digitized cannot regain its original analog signal! It is very simple to understand. If the sound is converted into a line of code by the effect of sampling and quantization, information has been lost (infinite information becomes defined). This loss is irreversible since the missing information is deleted. Converting a digital sound into an analog sound cannot restore its original properties. There is therefore no purpose in using an analog Electronic Ear if the sound source used to run it is a CD or a hard disk.

In contrast, the digital processing of an Electronic Ear is a more efficient and reliable. It is more efficient because the setting of the gating depends on a program that, by definition, excludes error. Not only is it impossible for the program to be wrong, it can also be adjusted with significantly higher accuracy than with analog equipment. That is why our TalksUp® Electronic Ears operate with an interface that allows you to make extremely precise adjustments while an analog Ear works with manual buttons that necessarily imply a 20% margin of error. This is significant when one wants to fine-tune a program. For example, with an analog electronic ear, the setting of the gating or of a filter may vary from 20% higher to 20% lower than what the professional has expected.

The Electronic Ear Digital (TalksUp®) is also more reliable because the components are constantly checked by the program. If a component is defective the program instantly tells you so. Conversely, analog components may be defective or completely ineffective without you realizing it.

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76 Avenue de la Liberté | L-1930 Luxembourg | www.tomatis.com | info@tomatis.com | Tél. : (+352) 26 27 20 | Fax : (+352) 26 27 20 25
RC Luxembourg B76636 | TVA Lu 18389319



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Why do we still find a few analog Electronic Ears on the market?

Once again, if these analog Electronic Ears use CDs or hard drives or memory cards, this is totally nonsensical. We should point out that the components to make an analog Electronic Ear are much cheaper. Moreover, the manufacture of a digital Electronic Ear requires expertise that only TOMATIS DEVELOPPEMENT S.A. holds.

That is why hundreds of professionals have given us their trust and continue to use our material since 2001. They express their satisfaction every day with the results they obtain.

More information on www.tomatis.com

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