



FullSound

Bring your MP3 music to life

Compressed audio quality enhancement

Technology Background



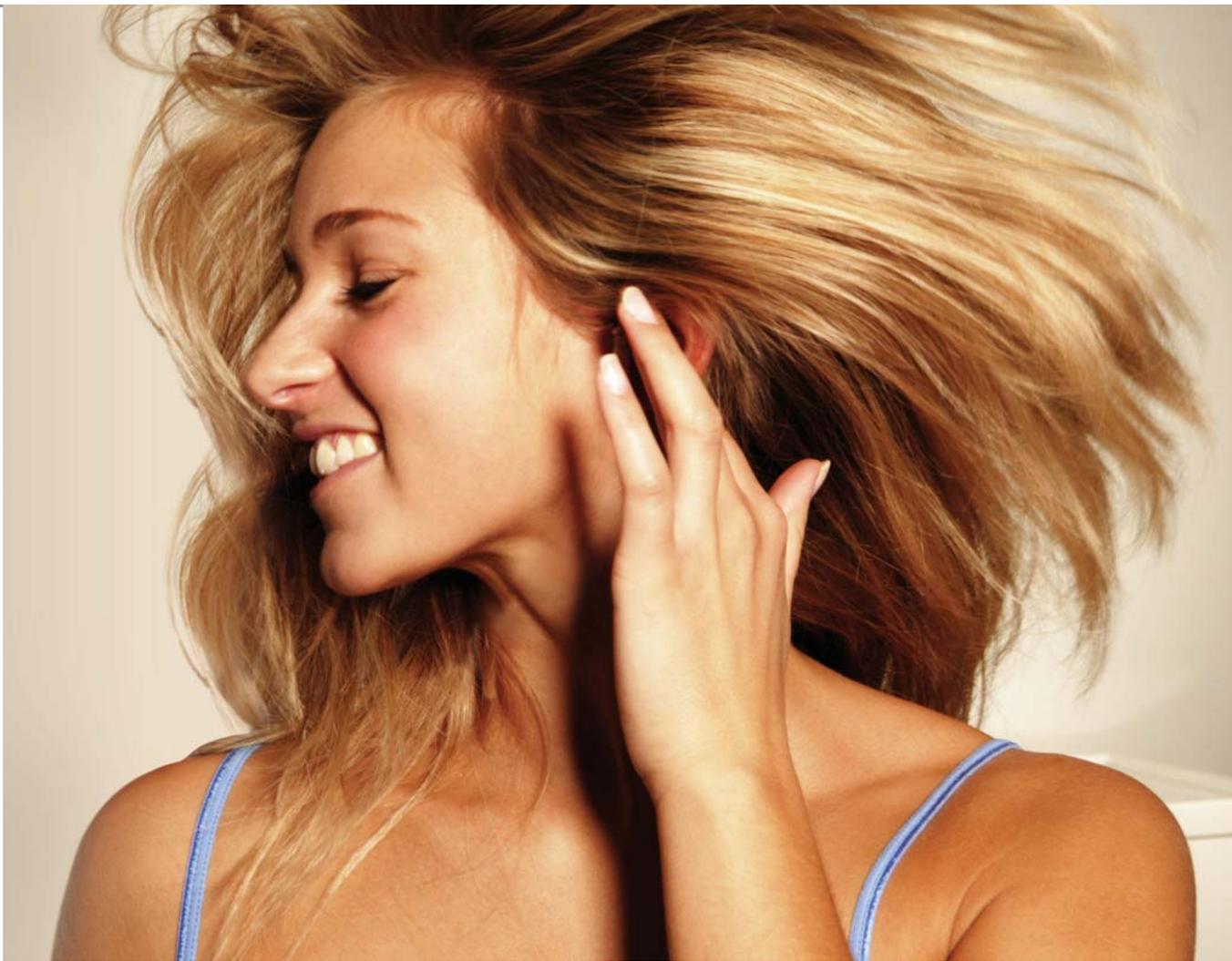
PHILIPS
sense and simplicity

Sound quality limitations of audio compression

The MP3 music revolution has drastically changed the way music lovers access, buy share, store and listen to music. Convenient and popular, MP3 has become the primary format for music enjoyment today. However, when it comes to the audio quality of MP3s, there are mixed reactions.

Essentially, MP3 is a compression format that reduces file size and therefore overall sound quality. Using psychoacoustic models, the compression process removes certain sound data beyond our hearing range and efficiently records the residual data. MP3 files encoded with a lower bit rate will have a smaller file size and be of lower quality. Compression artifacts (sounds not present in the original recording) can be detected, sometimes accompanied with pre-echoes (an echo occurring before the actual sound).

MP3 and other compressed formats sound less dynamic and lack depth and emotion. So, to help correct this quality compromise, many audio systems and players offer sound processing functions that boost certain frequencies, enhance clarity or expand the sound stage. However, these functions tend to reveal compression artifacts, produce flaws – such as distortion due to unoptimized behavior of dynamic signals, or simply fail once the volume is turned up.



Innovative sound processing software for improved MP3 quality

When listening to music, you want to be able to hear nuances and appreciate details – like the heady vocals of a jazz soloist weaving through a lush string arrangement, or the heart-thumping rhythms of a dance hit that will bring you to your feet. Chances are, your MP3 music does not deliver this dynamic, vivid experience.

Introducing Philips' patented FullSound technology, created to enhance the sound quality of your MP3 music while you play it. With this innovative sound processing software, your music will sound richer, clearer and more alive than ever. Even though some of the music data lost during compression cannot be wholly restored, FullSound is able to bestow the remaining data with sonic characteristics, allowing you to actually perceive the original, uncompressed sound.

The building blocks for dynamic audio enhancement

FullSound is a unique digital audio feature that combines Philips' expertise in music reproduction with the power of the latest generation Digital Signal Processor (DSP). Most audio products have a DSP, which performs complex modifications of the audio signal while it is still in digital format. It is then converted into analog format before being transmitted to the speakers or headphone.

With FullSound, the DSP analyzes the music signal and enriches it by dynamically enhancing its frequency spectrum and density. Performing 10 million operations per second, FullSound reprocesses the signal before sending it to the speakers. What you will hear is richly immersive sound with improved depth, clarity and impact. FullSound dramatically optimizes your sound system's acoustic processing capabilities, revealing the fine details and emotive nuances that will redefine your MP3 music experience.

Delivering bass, clarity, dynamism and balance

FullSound utilizes four key audio processing techniques to deliver an all-round, enriched sound experience – without the usual distortions and artifacts associated with most audio enhancement techniques.

Bass and weight boost

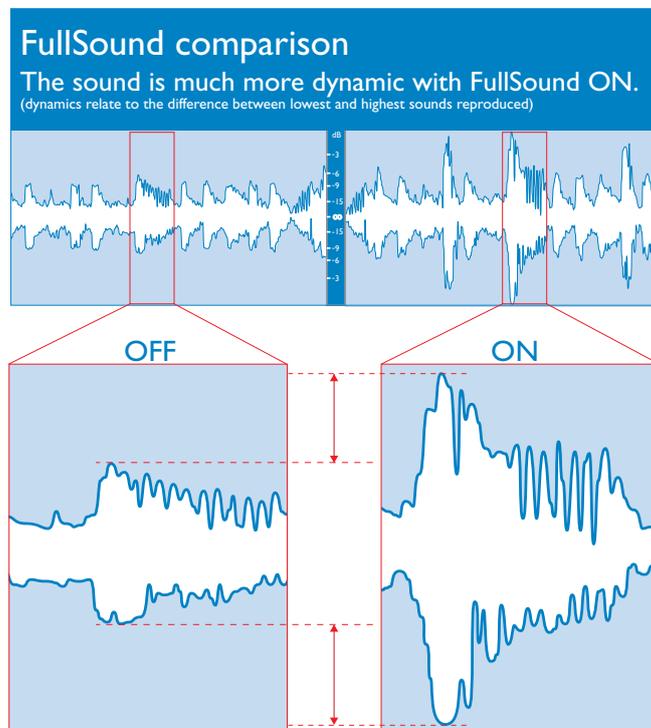
Philips' patented bass enhancement technique continually seeks out available space in the audio signal and loads it with additional bass energy. Unlike traditional bass boosts, there is no distortion or pumping effect – even at maximum volume. This meticulous algorithm can only be performed in the digital domain, resulting in impressively deep and rich bass that is balanced across the frequency spectrum.

Clarity and detail enhancement

Transient signal amplification combines with multi-band frequency compensation to emphasize sound precision and details, while keeping the frequency balanced and therefore natural-sounding. Traditional treble boosts usually result in overly bright sound but with FullSound, you will be able to discern the ambience of the original recording as well as lead vocals and instruments. These nuances are faithfully reproduced and harmonized so you get sparkling clarity alongside consistent timbre.

Improved dynamics

The chart below illustrates sound dynamics – the relationship between the lowest /softest and highest/loudest reproduced sounds – when FullSound is on (right) and off (left). Clearly, when FullSound is activated, the dynamics vastly improve. The thing to note is that it's not merely about sound amplification but enhancement. Most sound dynamic boosts result in aggressive noise with pumping effects. With FullSound, you get pure, potent sound without the 'bite'.



Dynamics are improved jointly in low and high frequencies, producing much more involving and true-to-life sound characteristics.

Stereo immersion

FullSound factors in a minor stereo restoration to recover the sense of spaciousness that is lacking in compressed audio formats, due to joint stereo encoding and the loss of high frequency resolution. The restoration effect is kept to a minimum – more about adding depth and therefore realism to the sound – so that compression artifacts are not emphasized. What you will experience is sound that is truly immersive yet clear and natural.

Recognizing the FullSound difference

FullSound is a pre-configured sound setting that does not require fiddling with complicated equalizer settings or multiple boost buttons. On your Philips audio system, the feature is 'on' by default – you can choose to disable it and select your own equalizer settings, but why would you?

And as with every Philips innovation, FullSound matches highly advanced technology with ease of use and enjoyment.

What consumers say about it

Philips conducted extensive research in various markets to determine how to improve the quality of MP3 music in order to ensure a desirable and enjoyable sound experience. Through evaluation trials, many music-loving consumers shared their observations and preferences with our research team. Our goal was to develop an innovative technology that significantly enhanced MP3 music without surrendering quality.

Here's what consumers had to say when they experienced Philips' FullSound effect:

“The music makes me want to get up and dance.”

“There's better impact and body – I can feel the bass and rhythm in my heart!”

“It's like being in a movie theater! The sound definition is clearer and I can distinguish between the vocals and the music accompaniment.”

“Music feels more spacious, enveloping and alive ... there's a lot more going on.”

For inquiries, please contact:

Hyesun Yang
Brand Communications
BLC Audio & Multimedia Applications
Philips Consumer Electronics
hyesun.yang@philips.com

www.philips.com

You can also contact our Philips office in your region:

Asia Pacific

Naeem Shahab
naeem.shahab_2@philips.com

Europe

Arthur Van Rest
arthur.van.rest@philips.com

Latin America

Luiz Camargo
luiz.camargo@philips.com

North America

Wieger Deknatel
wieger.deknatel@philips.com



©2007 Koninklijke Philips Electronics N.V.

All rights reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent or other industrial or intellectual property rights.