



SUPER AUDIO CD

# Welcome to the world of Super Audio CD

*Super Audio CD is an audio breakthrough developed by Philips and Sony – the same companies who introduced the Compact Disc to the world. This evolution of the CD format offers superior sound quality with remarkable realism. Multi-channel sound adds life to any performance and places the listener at the heart of the soundstage.*

## **What is Super Audio CD?**

Super Audio CD is a new standard for pure audio, which offers much richer playback quality than conventional CD. It is the next generation music format that provides ultra-high quality music reproduction and 5.1 uncompressed multi-channel sound.

Super Audio CD has three key elements:

1. Direct Stream Digital (DSD)
2. Multi-channel sound
3. CD compatibility through its hybrid disc

### *1. Direct Stream Digital – The key digital processing technology behind Super Audio CD*

DVD and CD use Pulse Code Modulation (PCM) as their fundamental audio technology but this is over 25 years old and now nearing the end of its development possibilities. This is why DSD was developed as a brand new technology. It is already outperforming the latest generations of PCM and it has a lot of development potential left so it can be improved even further in the future.

Compared to PCM, where numerical data is expressed in a relatively coarse way, digital data processed with DSD is very similar to analogue data. DSD simplified mechanism for recording and playback results in a frequency response of over 100kHz and a dynamic range of over 120 DB across the audible frequency range. The end result is music reproduction that is remarkably pure and faithful to the original.

Radically different from conventional PCM digital recording used in CD, the DSD process utilizes a 2.8224 MHz sampling rate (64 times faster than CD) to record a stream of 1-bit pulses capable of capturing a full range of naturally occurring sounds with unparalleled resolution.

The Super Audio CD format uses more than four times the data rate of current CD. However the availability of large capacity discs allows us to get both stereo and multi-channel Super Audio CD on one disc, and still have similar playing times to CD.

A side benefit of recording directly in DSD is that apart from getting a great sounding SA-CD layer, the CD layer can be made to sound better than a normal CD. This is because a single step down-conversion can be done to generate a very clean PCM CD layer directly from the DSD master.



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### 2. Multi-channel sound – be emerged by the music

One of the most significant advances in Super Audio CDs listening experience is multi-channel-sound. Super Audio CD multi-channel totally envelopes the listener in a new sensory experience that can capture the atmosphere of a live performance, recreate the acoustic space of a large cathedral and give pop artists and engineers the ability to create very new listening experiences.

Both stereo and multi-channel Super Audio CD are on one disc.

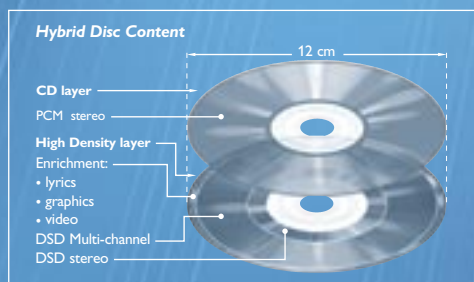
In Super Audio CD there can be a number of different disc types as discussed in the following section but on all of them the Super Audio CD layer can include both stereo and multi-channel. There are a number of important reasons to have both mixes:

- Super Audio CD includes discrete stereo and multi-channel mixes to enable artists and producers to control exactly the way the listener hears their music. This means that the stereo mix has been created especially and is not an automatic down-conversion from the multi-channel mix produced by the player. This gives the artist the opportunity to control and deliver the experience just as he wants to.
- Another advantage of having both mixes is that they can be very different creative expressions of the music. (If it was a down-conversion it would always be similar.)
- Super Audio CD is the only format that makes no compromises on quality in any of the channels. This means customers always get the same high DSD quality with no “reduced quality” versions.

### 3. CD compatibility through its hybrid disc – a cornerstone of Super Audio CD

Three disc variations are available for the Super Audio CD format. The single-layer and dual-layer Super Audio CD discs contain either one or two high density (HD) layers respectively (please note this disc is a dual layer disc so will not play in CD players).

However the most significant version is the hybrid disc, which consists of one HD layer and one CD layer. Since the CD layer of the hybrid disc can be read by conventional CD players and Super Audio CD players can play back standard CDs, forwards and backwards compatibility between the Super Audio CD and CD formats is achieved.



From the picture on the left it can be seen that a hybrid disc contains:

- A standard CD layer – playable on any CD player in the world
- A Super Audio CD stereo mix
- A Super Audio CD multi-channel mix
- Possible enrichments such as text, graphics and video clips

### Super Audio CD is the future of music

Currently SA-CD titles are available in a wide range of musical genres from classical to jazz to club and pop music from international top artists and local super stars. Around 80 new SA-CD titles are being released every months from more than 250 record labels. To elaborate the compatibility of the Super Audio CD format, nearly all new releases are in the hybrid version. More than 4 million Super Audio CD players have been sold worldwide in 2003 and this market is expected to grow to a sale of up to 7 million SA-CD players in 2005. Super Audio CD is becoming the true successor to the CD for the future of music.

To look at some of the latest Super Audio CD releases, and for further information on Super Audio CD, please visit the Super Audio CD website [www.superaudio-cd.com](http://www.superaudio-cd.com).