

# PRECISION MDSD SA-CD PLAYER DP-770



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The DP-770 is the succession model of the DP-750 launched in 2018.

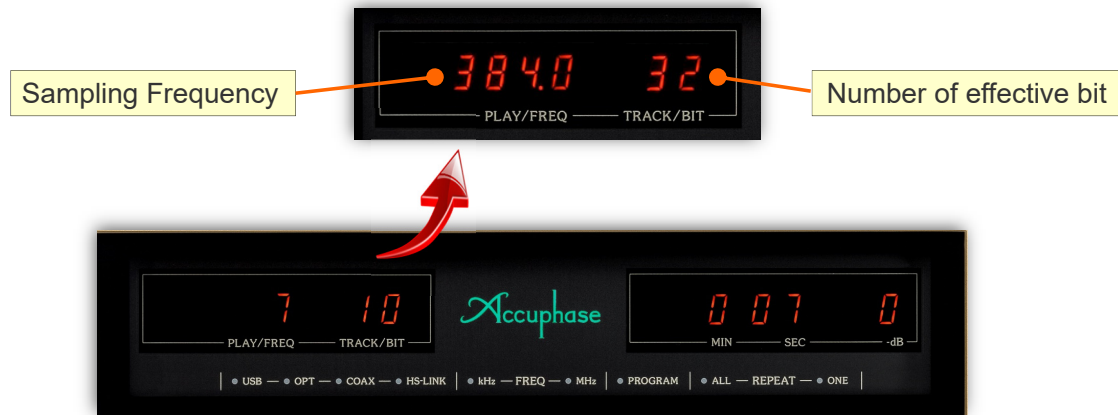
It is the superlative integrated SA-CD/CD player that reflects great technologies of the DP-1000/DC-1000 combo, aiming for the best performance and sound quality.

The newly developed SA-CD/CD drive features a new damper that effectively reduces vibration, and it shows a great improvement in the vibration resistance.

The DP-770 has thoroughly reviewed the disc reading performance and the accuracy of the D/A converter. It contributes to achieve the excellent low distortion and low noise performance that surpasses its predecessors, and to revive beautiful sounds vividly.

# Front display

- Easy to see: Sampling Frequency & Number of effective bits



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The DP-770 can show the sampling frequency and the number of effective bits of all input signals on the front display.

Quantization bits are counted directly from the raw data by using a high speed Field Programmable Gate Array.

# Dimensions and Weight

- Dimensions are almost the same, but heavier weight



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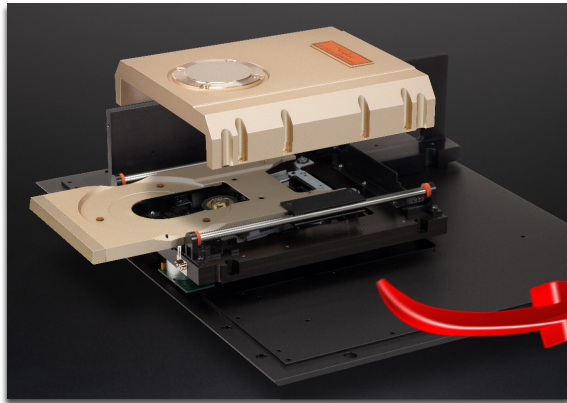
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The dimensions of the DP-770 are almost the same as the DP-750.

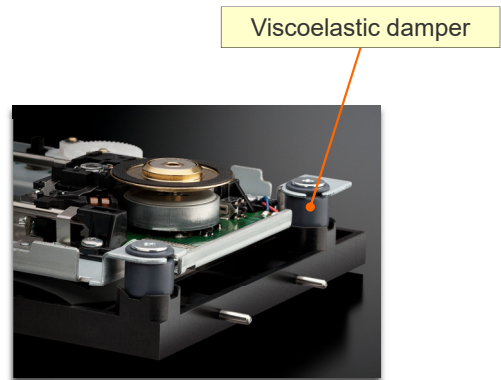
The weight becomes slightly heavier than the DP-750. This is due to the long and heavy bridge, mechanical base and other frames dedicated to the new SA-CD drive mechanism.

# Newly designed SA-CD drive mechanism

- Offering a quiet listening environment
- High torque and less vibration by the outer rotor brushless DC motor



New SA-CD/CD Drive Mechanism



SA-CD Pickup Unit

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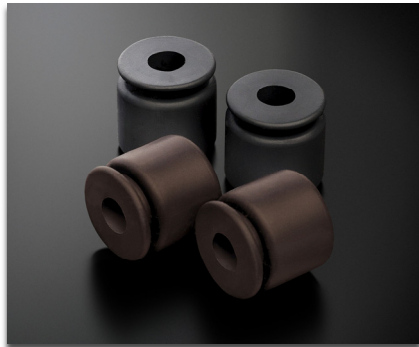
Creating a quiet listening environment is a vital component in enjoying music, so the DP-770 enforces the thorough anti-vibration measures.

The newly designed SA-CD/CD drive is directly mounted on a completely flat and high-rigidity chassis, with its low center of gravity, the operational noises are kept to a minimum.

The SA-CD pick up unit is interconnected using newly-developed viscoelastic dampers separated from external vibrations, and an outer rotor brushless DC motor with an accurate rotation axis that guarantees a powerful and stable operation.

# Newly designed SA-CD drive mechanism

- Optimizing the vibration-isolation effect with new Viscoelastic Dampers
- Large Bridge Base as the shielding wall for the airflow



Viscoelastic Damper



Bridge Base

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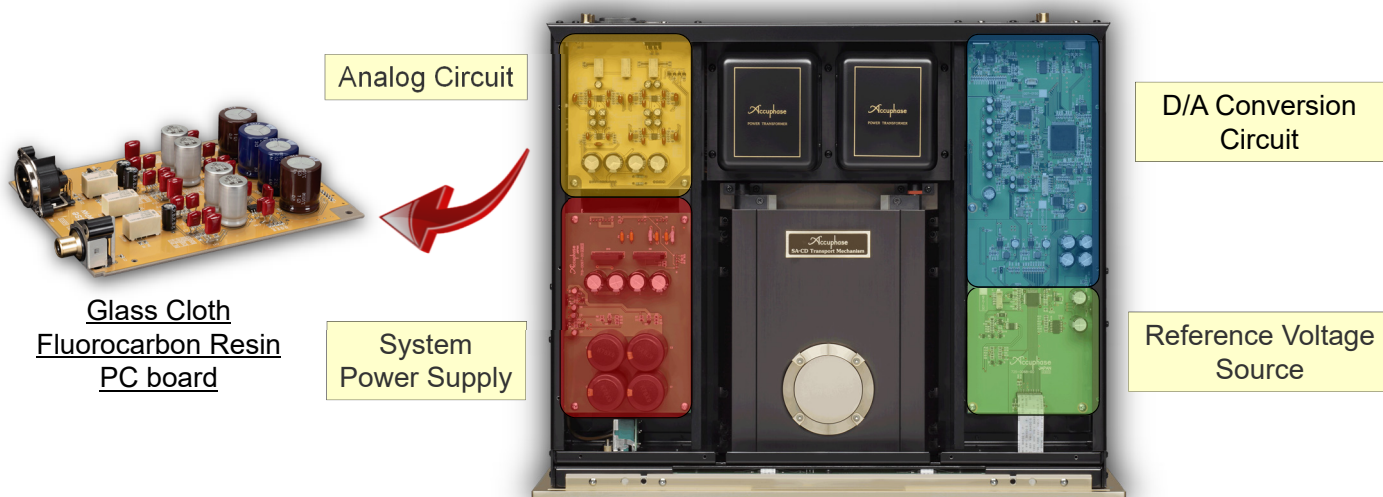
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The newly developed viscoelastic dampers of two different hardnesses reduce the magnification of natural resonances in the objective lens and actuator.

The large bridge base that elegantly finished with a gold anodized works not only as a vibration absorber, but as a rectifier for the turbulence occurred by disc rotation.

## Internal view

- Completely separated circuit layout & solid construction



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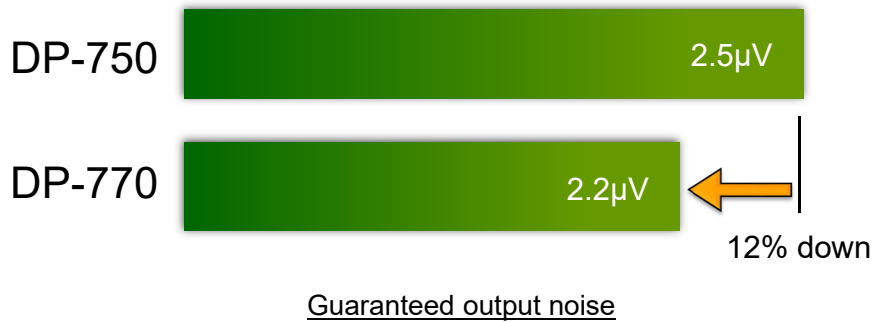
The DP-770 applies the systematical layout. Each circuit block is logically placed to make the signal path short as possible.

A D/A conversion circuit is on the right side, and an analog circuit equipped with glass cloth fluorocarbon resin PC board is on the left side at the back panel side.

A reference voltage source is on the right side of the SA-CD drive mechanism, and on the left side, a reinforced power supply is located.

# Electrical Performance

- Ultra Low Noise

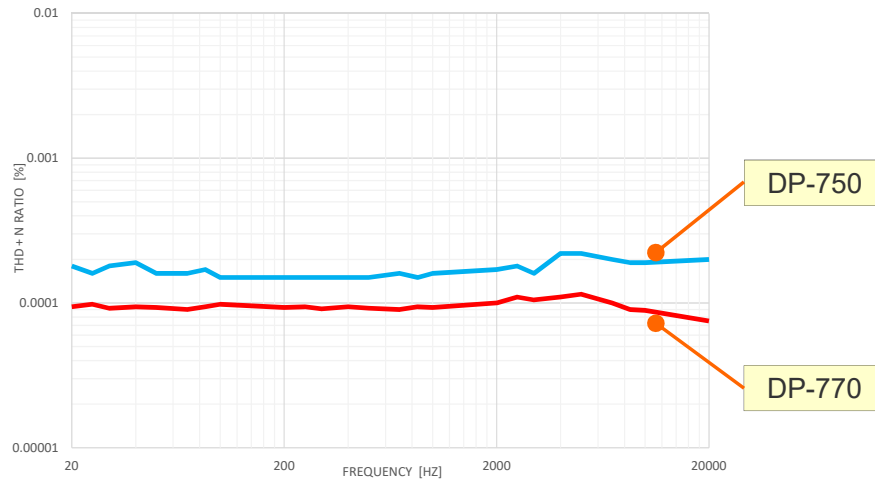


“Ultra Low Noise” is one of the main technical features of the DP-770.

The former model, DP-750 has the excellent noise performance, however, the DP-770 achieves another 12% lower output noise voltage.

# Electrical Performance

- Ultra Low THD+Noise



THD + Noise to Frequency

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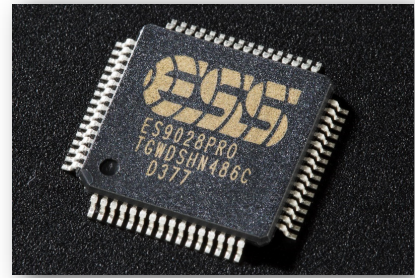
The DP-770 proudly shows the great THD+Noise characteristics which are quite important for sound quality.

The DP-770 makes an almost flat response from the low frequency through to the high frequency, and it obtains less than 0.0001% THD+Noise in most frequency ranges.



## D/A converter

- 8 parallel D/A converters per channel
  - ES9028PRO 32bit Hyper Stream II DAC
  - Multiple Delta-Sigma++ for PCM signal
  - Multiple Double Speed DSD for DSD signal



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For a D/A converter section, Accuphase adopts the ESS Technology's 32bit Hyperstream II DAC ES9028PRO. DP-770 uses the 8 DACs connected in parallel per channel.

These DACs are essential for Accuphase's unique circuits, MSD++ (Multiple Delta-Sigma) converter for PCM signals and MDSD (Multiple Double Speed DSD) principle for DSD signals.

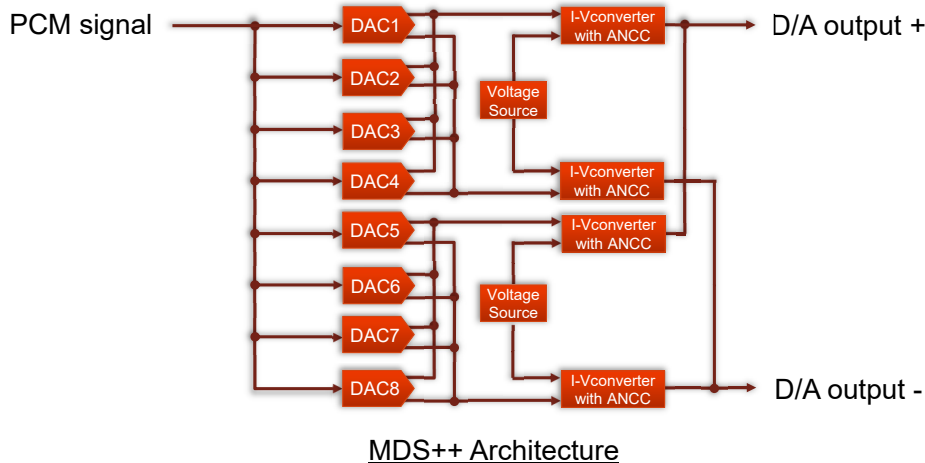
The DP-770 has a stronger and more stable reference voltage source and an ideal ground pattern for DACs, resulting in even better noise and distortion performance.

By adopting the ANCC circuit in the I/V converter section,

The DP-770 shows a significant impact on the superb low noise and distortion characteristics.

# Multiple Delta-Sigma++

- Technique to make DACs parallel
- Performances improved by a factor of 2.8



MDS++ Architecture

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The MDS++ is a technique to make DACs parallel. The same digital signal is supplied to each converter, and the output of each DAC is summed before being sent to subsequent stages.

The audio signal values are added up, but the conversion error and noise themselves are canceled.

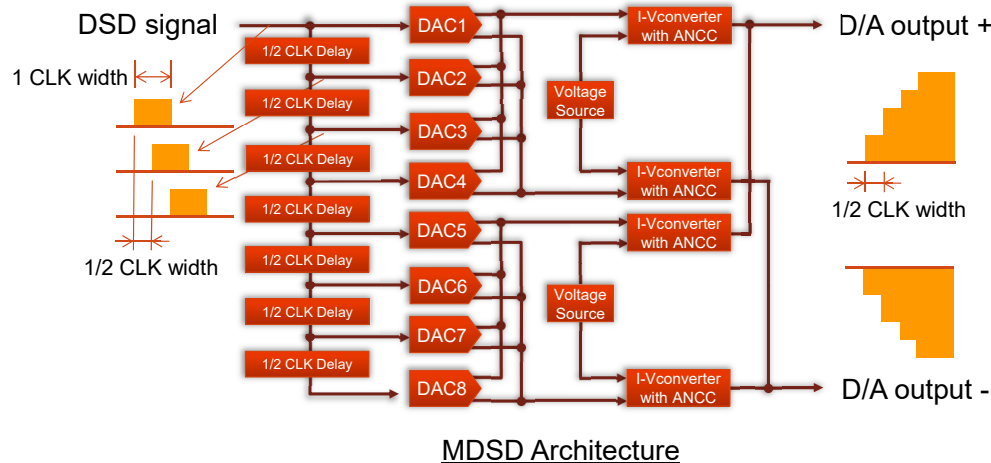
The ratio between the signal and conversion errors increases, so the converter performance is improved.

The improvement degree works by a square root of the number of DACs.

In the DP-770, all performances are improved by a factor of 2.8.

# Multiple Double Speed DSD

- In the high frequency, works as a low pass filter
- In the low frequency, works as MDS++ Principle



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“MDS” stands for Multiple Double Speed DSD.

The DSD signal has a big noise in the high frequency. It must be removed even if it is outside the range of human hearing.

The MDS works as a low pass filter to cut the noise in the high frequency and also works as the MDS++ principle to improve the characteristics in the low frequency.

An important point of MDS is the delay elements.

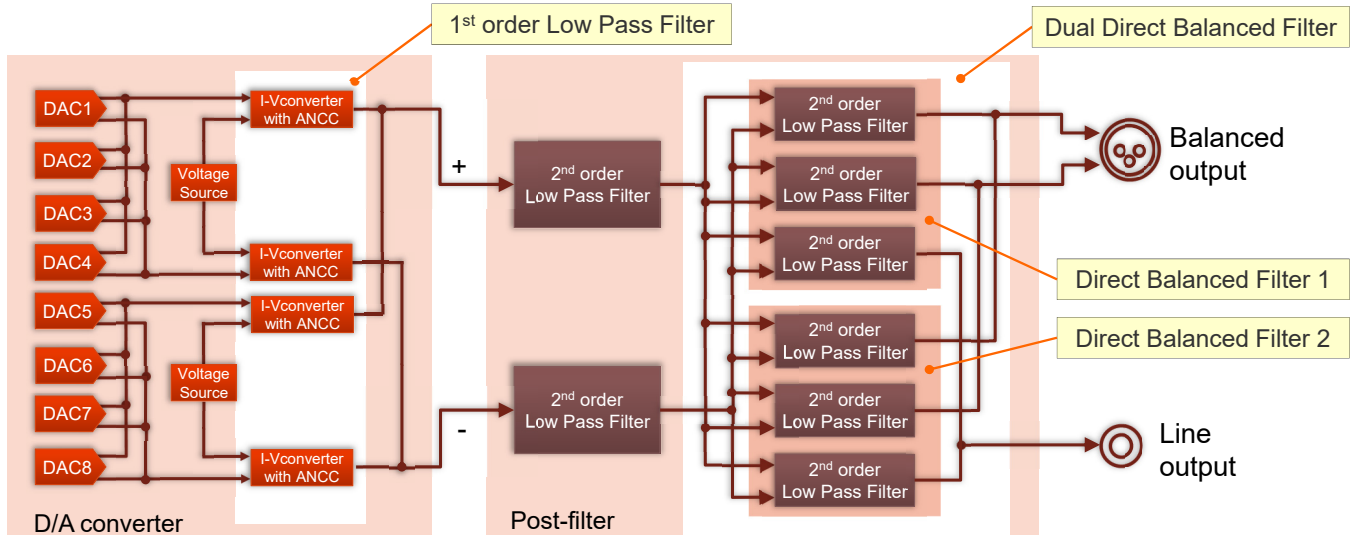
The DSD signal in the DP-770 is D/A converted with half-delayed clocks and is combined when it comes to the output. As the analog output becomes a half-clock time resolution, it allows the signal to work as a double-speed operation.

This configuration means a moving-average filter.

It works completely as a linear phase low pass filter and removes the high-frequency noise of DSD signal.

# Post-filter configuration

- Fully balanced structure



The fully-balanced post-filter eliminates the image noise in high frequency of D/A converter output.

The I-V converter with ANCC\* in the D/A converter circuit works as the 1<sup>st</sup> order low pass filter as well, and it passes through 2 sections of the 2<sup>nd</sup> order filters inside the post-filter, so it is composed of the 5<sup>th</sup> order low pass filter in total.

The Dual Direct Balanced Filter, that drives two circuits of Direct Balanced Filter in parallel, is installed at the final stage of the post-filter, it contributes to the further improvement for noise and distortion characteristics.

\*\*The Direct Balanced Filter is a circuit configuration in which each output circuit is made independent. This helps the line output and the balance output not interfere with each other due to load fluctuations.

\* ANCC : "Accuphase Noise and distortion Canceling Circuit" , Refer to Appendix.

# Furthermore

- Programmable play mode available



High quality Insulators

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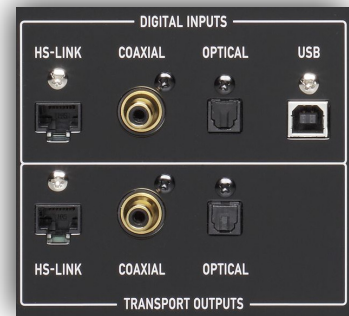
The DP-770 features the programmable playlists function with the remote commander RC-140 so that you can enjoy your music in the order you like.

RC-140 also allows you to operate the volume control and input selection on the Accuphase amplifiers.

The legs are the advanced high-carbon cast iron insulators with excellent anti-vibration properties, and it lets you enjoy every detail of music perfectly reproduced by the DP-770.

# Digital Inputs / Outputs

- HS-LINK INPUT / OUTPUT
  - Version1: 192kHz / 24bit, 2.8MHz / 1bit
  - Version2: 384kHz / 32bit, 5.6MHz / 1bit
- Coaxial INPUT / OUTPUT
  - 192kHz / 24bit
- Optical INPUT / OUTPUT
  - 96kHz / 24bit
- USB-B INPUT
  - 384kHz / 32bit
  - 5.6MHz / 1bit (DoP / ASIO)
  - 11.2MHz / 1bit (ASIO)



Digital Terminals

The DP-770 has 4 digital inputs, Coaxial, Optical, HS-LINK and USB.

A USB Input accepts 384kHz/32bit-PCM or 11.2MHz-DSD. DSD data can be received both DoP (DSD over PCM) and ASIO2.1 (11.2MHz: ASIO only).

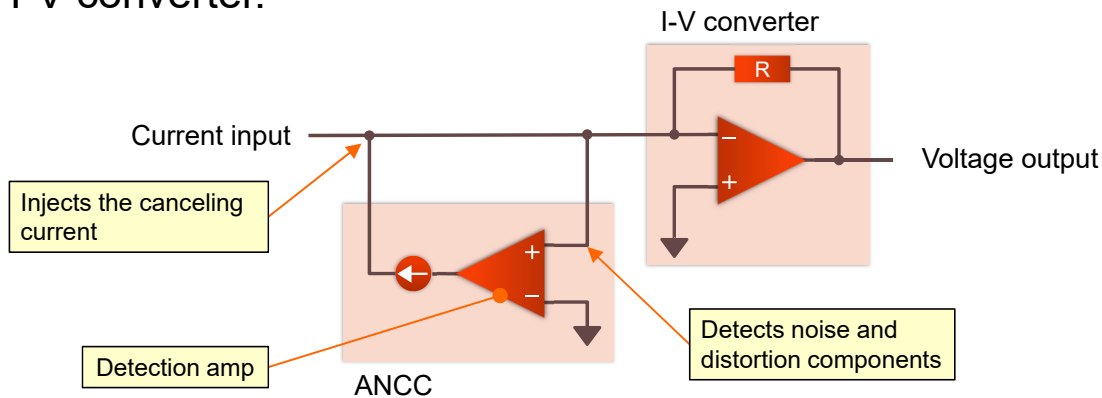
An HS-LINK has been evolved into Version2.

The original HS-LINK(Ver.1) transmits and receives only 192kHz/24bit-PCM or 2.8MHz-DSD, but Ver.2 comes to be able to transmit and receive 384kHz/32bit-PCM, 5.6MHz-DSD.

The DP-770 automatically recognizes either Ver.1 or Ver.2 transmissions.

## Appendix “ANCC”

- ANCC: Accuphase Noise and distortion Canceling Circuit
  - To detect and cancel the noise and distortion at the input stage of I-V converter.



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ANCC: “Accuphase Noise and distortion Canceling Circuit” is installed in the I-V converter.

Canceling noise and distortion is realized by detecting the components of noise and distortion at the input stage of an I-V converter module, and also by injecting the canceling current which contains the reversed polarity of those components.