Accuphase

PRECISION SA-CD TRANSPORT

DP-900

PRECISION MDSD DIGITAL PROCESSOR

DC-901

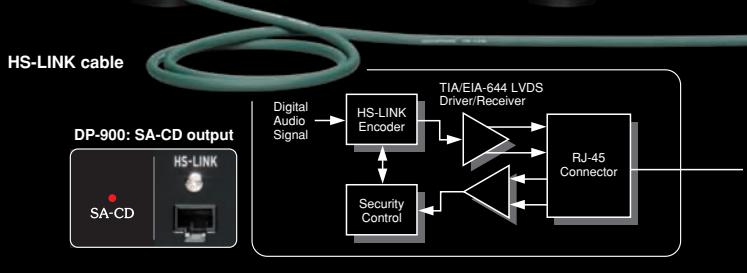
● DP-900: Digital-only SA-CD/CD transport ● High-rigidity, high-precision SA-CD/CD drive ●Accuphase original digital interface: HS-LINK ●DC-901: Digital processor with revolutionary SA-CD reproduction technology MDSD ●MDS type D/A converter with 16 circuits driven in parallel ●"Direct Balanced Filter" with totally separate line and balanced signal paths ●Seven inputs including HS-LINK and USB

DP-900

PRECISION SA-CD TRANSPORT

Dedicated digital-output SA-CD/CD transport —— Totally new ultra-massive SA-CD/CD drive. Highly rigid, high-precision construction with low center of gravity absorbs vibrations. Finely machined and utterly smooth disc loading mechanism with exquisite tray. High-performance digital audio interface HS-LINK.

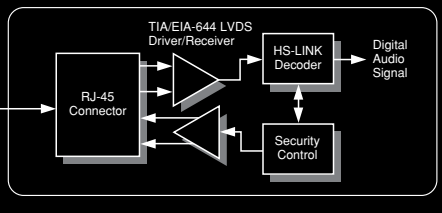
The center of the DP-900 features a high-rigidity, high-precision SA-CD/CD drive integrated directly with the ultra-massive bridge. Two super-efficient toroidal transformers and an array of filtering capacitors provide ample power. As an SA-CD/CD transport of the highest order, the DP-900 delivers a digital signal of the utmost purity.



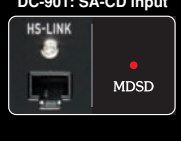
DC-901

PRECISION MDSD DIGITAL PROCESSOR

Digital processor designed for purest digital signal quality — Digital signal processing using ultra-high-speed FPGA. Further evolved original MDSD (Multiple Double Speed DSD) reproduction technology with double-speed high-precision moving-average filter circuit for straight D/A conversion of DSD signal. Seven digital inputs including HS-LINK and USB for enhanced versatility.



DC-901: SA-CD input



The DC-901 is the ultimate digital processor using only specially selected materials and super-advanced digital technology. Glass fluorocarbon resin PCBs in DAC section, and completely separate power transformers for digital and analog circuitry assure music reproduction that brings out the full sonic potential of the source.

DP-900

PRECISION SA-CD TRANSPORT

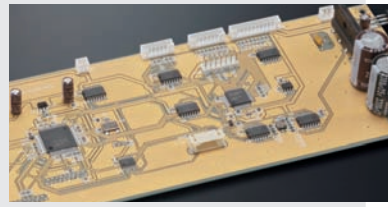
The SA-CD Transport DP-900 and the Digital Processor DC-901 are successor models to the highly regarded DP-800 and DC-801 combo. Incorporating the pinnacle of SA-CD playback technology know-how and inspired by a passion for true high-end audio sound, this new separate-type SA-CD/CD system harnesses latest digital technology for the ultimate in reproduction fidelity.

The SA-CD drive in the DP-900 was developed in-house by Accuphase to assure the best possible performance. Its ultra-massive design combines superior rigidity with outstanding accuracy. Compared to a CD drive, an SA-CD drive has a higher revolution rate, and pickup positioning accuracy as well as suppression of vibrations must be of a higher order, to allow full access to the enormous amount of information stored on the disc. The transport in the DP-900 meets these challenges in impressive fashion, being designed to extract the quality potential of the SA-CD one-hundred percent. It ushers in a new generation of SA-CD excellence.

In the transport, a digital servo with a dedicated DSP assures accurate readout of the signal recorded on the SA-CD using the DSD (Direct Stream Digital) principle. This is sustained by a single-lens/twin laser diode pickup mounted to a high-speed access mechanism. The mechanism not only realizes optimal reproduction of SA-CDs, it also is capable of extracting a super-accurate signal from conventional CDs. The output for both SA-CD and CD is provided via the Accuphase exclusive high-performance digital interface HS-LINK (RJ-45 connector). The CD output is also available via a dedicated coaxial connector. The HS-LINK cable supplied with the DP-900 can be used for connection to the DC-901 or to other components.

DP-900 Features and Functions

- **Dedicated digital output only SA-CD/CD transport with ultra-high-speed FPGA for digital processing and highly accurate signal pickup.**
- **Ultra massive chassis construction and newly developed high-rigidity, high-precision SA-CD/CD drive.**
- **Sophisticated signal processing technology assures excellent signal quality also from conventional CD media.**
- **Single-lens/twin pickup high-speed access mechanism employs two laser diodes, one for SA-CD (650 nm) and one for CD (780 nm).**
- **Accuphase's proprietary high-quality digital audio interface HS-LINK.**
- **RJ-45 output (HS-LINK) for SA-CD and CD, and dedicated coaxial output for CD. HS-LINK connection to DC-901 can carry both SA-CD and CD signals.**
- **Power supply with two high-efficiency toroidal transformers and custom-made high-quality filtering capacitors (3000 μF × 10) allows separate powering of signal processing circuitry and drive section.**
- **Display can show text data with disc title, artist information, etc.**
- **"High Carbon" cast iron insulator feet with superior damping characteristics ensure quiet operation of both DP-900 and DC-901, and further enhance sound quality.**
- **Both DP-900 and DC-901 feature massive cabinets with wood finish.**



System controller assembly

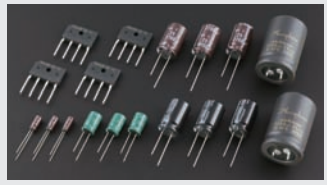
High-speed FPGA for digital signal processing

System controller chip

HS-LINK output connector

Coaxial output connector

High-efficiency toroidal transformers



High-quality parts selected for sound quality

Power supply assembly

Remote commander RC-110 supplied with DP-900

Controls DP-900 functions such as direct play, repeat, etc. Also controls DC-901 functions such as input switching and output level adjustment, and can serve for volume control of Accuphase amplifiers.

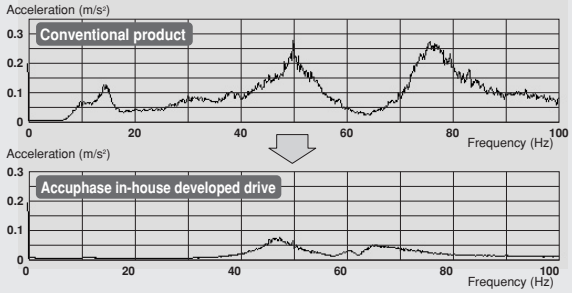
Newly developed high-rigidity, high-precision SA-CD/CD drive

- External vibrations are reliably blocked by super-massive sturdy chassis (total weight 10.7 kg)
- Highly rigid and precise construction
- "Traverse Mechanism" with floating design and viscous damping
- Integrated construction with large heavyweight aluminum alloy bridge mounted to mechanism base
- High-quality disc tray extruded from an aluminum block
- Super-quiet smooth disc loading mechanism featuring dual stay configuration for steel bearing shafts
- Low center of gravity further reduces vibrations

In order to extract the minute bits of information from the rapidly spinning disc and decode these accurately into a digital signal of high purity, vibrations emanating from the rotating medium as well as any external mechanical vibrations must be minimized. Compared to a CD drive, the disc in an SA-CD drive spins at higher rate. In order to extract the high-density information from the media, the mechanism must be built to a high degree of accuracy, to ensure precise pickup positioning and effective suppression of vibrations.
In the DP-900, the SA-CD/CD drive is mounted firmly to a strong aluminum frame, and the drive loading mechanism and mechanical base form a massive and highly rigid chassis constructed with utmost precision. Conversely, the traverse mechanism, an integrated structure consisting of the optical assembly including laser pickup and rotating parts, is designed for extremely light weight, and isolated from the loading mechanism by a floating suspension arrangement. A large, super-heavy bridge machined from a single block of aluminum is joined to the mechanism base to form an integrated structure.
The entire SA-CD/CD drive assembly is directly mounted to the bottom chassis, and four large cast iron insulator feet provide firm support.

Vibration transmission characteristics of pickup base

When there are resonant peaks in the frequency range below 100 Hz, the pickup may be subject to dropouts that will cause sound degradation. The Accuphase design effectively minimizes resonances in this range.



Accuphase Exclusive Digital Interface: HS-LINK

HS-LINK (High Speed Link) is an ultra high-quality digital audio interface developed by Accuphase using latest digital signal transmission technology. It allows a single dedicated HS-LINK cable to transmit all audio data with utmost fidelity.

- Capability to carry the SA-CD signal as well as conventional digital audio signals
- Transfer rate: min. 400 Mbps (logical limit 1923 Mbps)
- Transfer signal format: Low Voltage Differential Signaling (LVDS) TIA/EIA-644
- Send/receive clock fully synchronized
- Full bidirectional capability with simultaneous send/receive
- Full security capability with send/receive verification.
- Cable type: dedicated HS-LINK cable

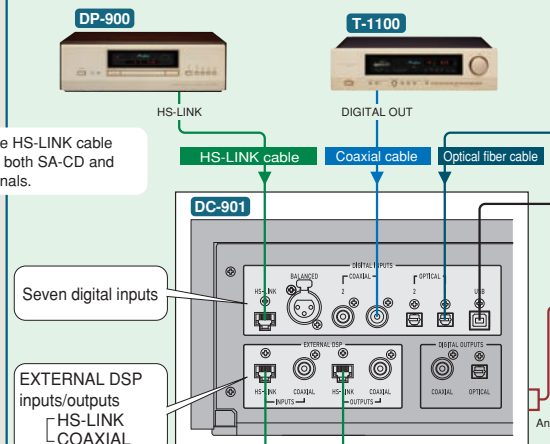
Sampling frequencies
32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz (24 bit, 2-channel PCM)
2.8224 MHz (1 bit 2-channel DSD)

Newly developed HS-LINK cable (supplied with DP-900)
- Cable length: 1.5 m
- Triple shielded twisted pair 8-conductor OFC cable

A single HS-LINK cable carries both SA-CD and CD signals.

Connection example: DC-901

The DC-901 is equipped with a total of seven inpu
here, this allows its use for reproducing music infor
a computer or other equipment at high quality. In ad
allow sound field compensation in the digital domain



EXT DSP butt
set to ON
Connecting the
DG-48 via HS-LI
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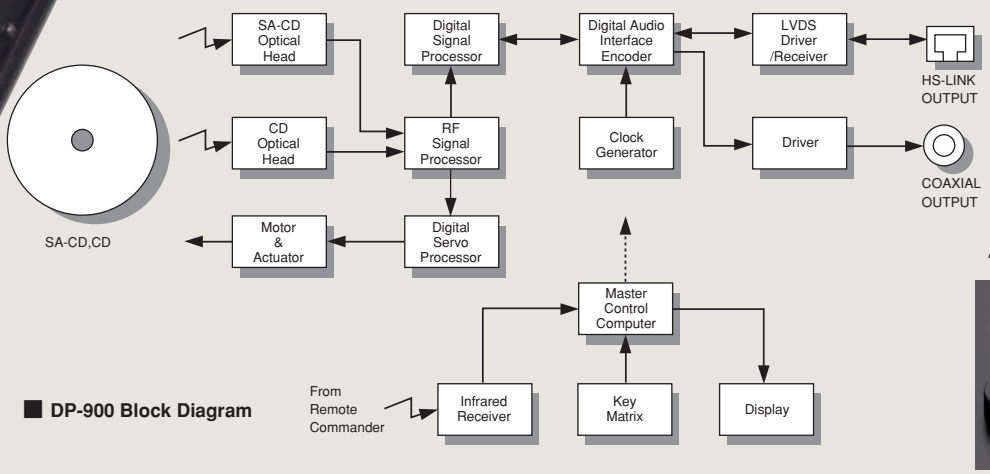
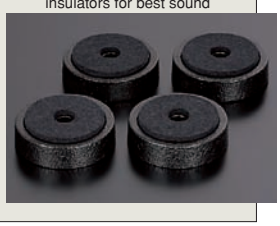
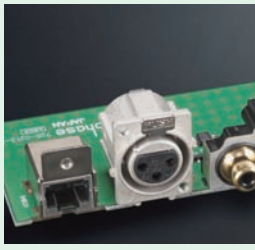


■ **DP-900 Block Diagram**

Advanced High Carbon cast iron insulators for best sound





DC-901

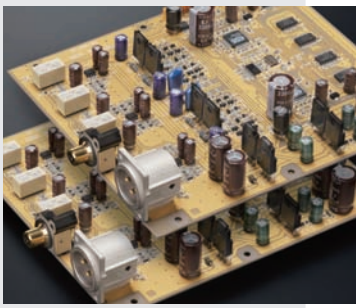
PRECISION MDSD DIGITAL PROCESSOR

The DC-901 showcases Accuphase's mastery of sophisticated digital technology and creative circuit topology. It is a digital processor designed to bring out everything the SA-CD format has to offer. A new technique called MDSD (Multiple Double Speed DSD) allows straight D/A conversion of the DSD signal. Multiple DSD signals delayed through digital processing in an ultra-high-speed FPGA (Field Programmable Gate Array) are converted by separate D/A converters. After D/A conversion, summation of the multiple data is performed, resulting in an ingenious moving-average filter circuit with double-speed accuracy. An important characteristic of MDSD is the use of MDS type D/A converters which keeps conversion errors to an absolute minimum. At the same time, the MDSD circuit acts as a high-cut filter with completely linear phase characteristics. The end result is a digital signal of outstanding quality, allowing the music to emerge in perfect clarity, demonstrating the ultimate potential of the SA-CD format.

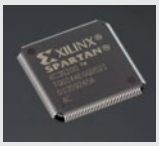
The DC-901 offers an array of seven digital inputs, namely HS-LINK, balanced, coaxial (2), optical (2), and USB. This enables use of the processor for reproducing music information from various sources, including the DP-900, a computer or other equipment at high quality. Digital outputs are also provided, allowing connection of a digital recorder, for recording of sources other than SA-CD. And there's even a set of EXTERNAL DSP input/output connectors that allows using the Digital Voicing Equalizer DG-48 for sound field processing in the digital domain. Dedicated power transformers for the digital and analog sections and completely separate construction prevent high-frequency noise and unwanted electrical interaction, ensuring that music signal retains its absolute purity.

DC-901 Features and Functions

- **Ultra-high-speed FPGA (Field Programmable Gate Array) harnesses digital processing power to implement innovative MDSD reproduction with double-speed high-precision moving-average filter circuit.**
- **Sixteen MDS type D/A converters driven in parallel. Each channel uses two Hyperstream™ DAC chips (ES9018 made by ESS Technology) in parallel. Each chip incorporates eight converters, resulting in 16 circuits. This improves performance by a factor of about 4 (= $\sqrt{16}$) compared to a single converter, providing the outstanding low-distortion results seen in the graph.**
- **"Direct Balanced Filter" performs totally separate analog low-pass filtering for line and balanced signal paths.**
- **D/A converter printed circuit boards made from glass fluorocarbon resin with low dielectric constant and low loss.**
- **EXTERNAL DSP input/output connectors (HS-LINK and optical) allow insertion of DG-48 in signal path.**
- **Seven digital inputs: HS-LINK, balanced, coaxial (2), optical (2), USB.**
- **Coaxial and optical digital outputs.**
- **Line and balanced analog outputs (1 each). Phase selector switch for balanced output.**
- **Completely separate construction of digital and analog sections, each powered by a dedicated high-efficiency toroidal transformer.**

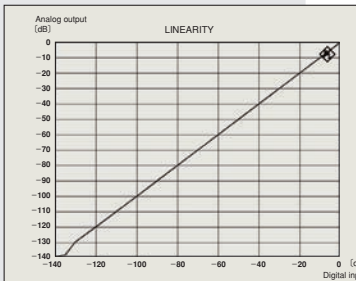


Left/right PCB assembly with MDSD and analog output circuitry

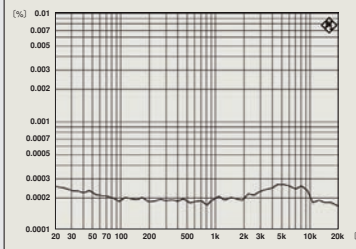


Ultra-high-speed FPGA

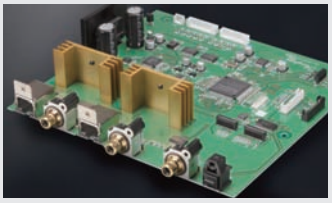
32-bit DAC (ES9018)



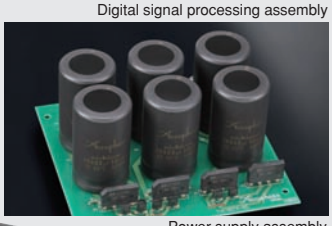
Linearity (digital input vs. analog output)



THD (including noise) vs. frequency respon



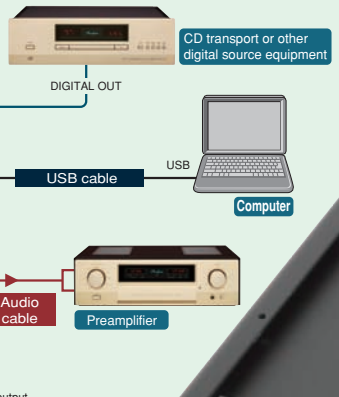
Digital signal processing assembly



Power supply assembly

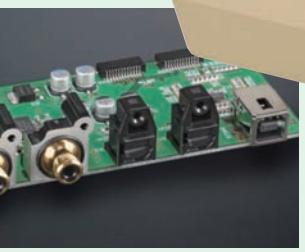
provides seven digital inputs

uts for digital signals from other devices. As shown rmation from various sources, including the DP-900, ddition, a set of EXTERNAL DSP inputs and outputs n, using the DG-48.



on on DC-901

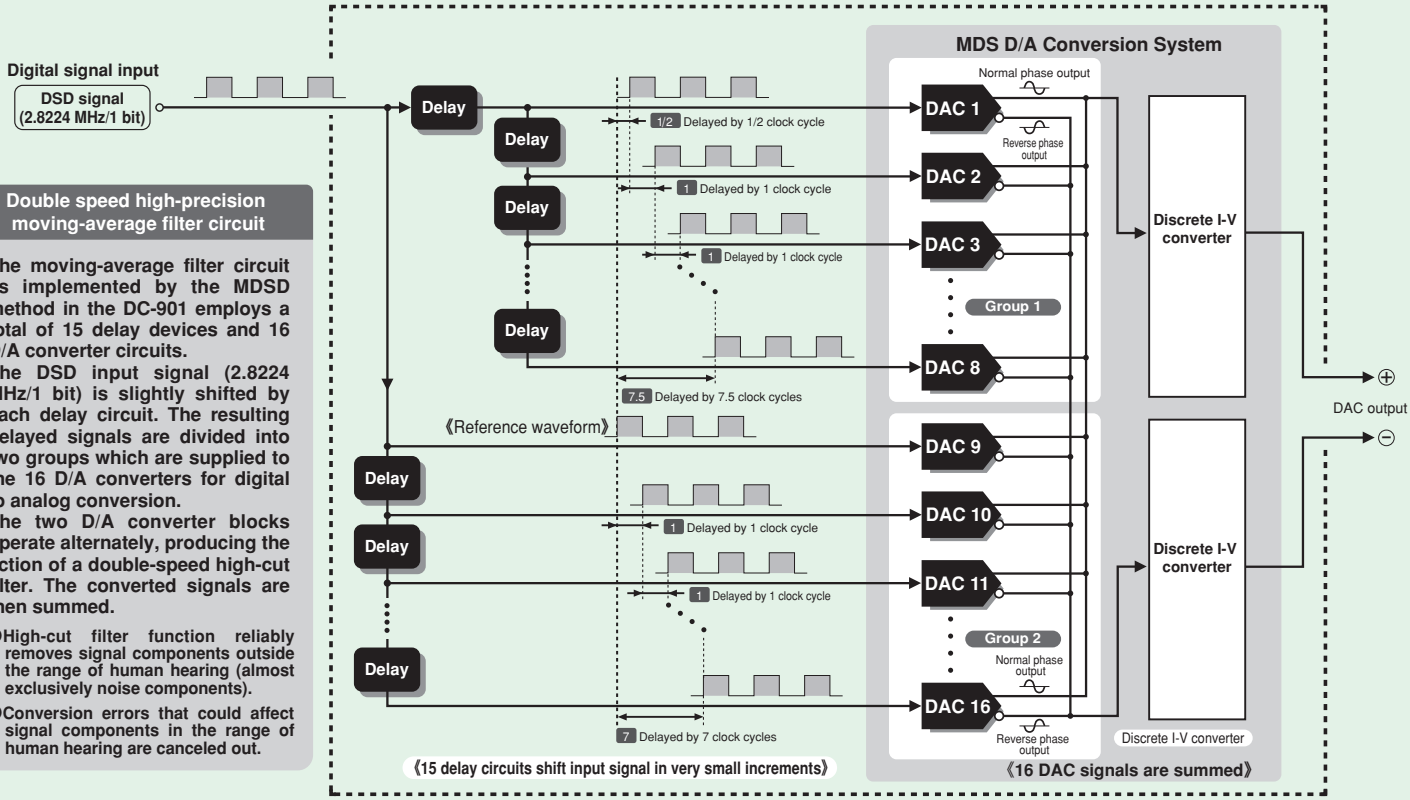
e DC-901 and INK cable allows npensation in the r all inputs.



Digital input assembly with 7 inputs: HS-LINK, balanced, coaxial (2), optical (2), USB

Innovative Digital Processing: MDSD (Multiple Double Speed DSD)

The DSD signal by principle contains increased quantization noise components outside the range of human hearing, which must be removed. For this purpose, the DC-901 employs an ultra-high-speed FPGA to implement innovative MDSD reproduction through digital processing, forming a double-speed high-precision moving-average filter circuit. The major distinction of this MDSD design is the fact that it combines signal summation after conversion by multiple D/A converters (to minimize any conversion errors) with an outstanding 15-pole high-cut filter function providing perfectly linear phase characteristics.



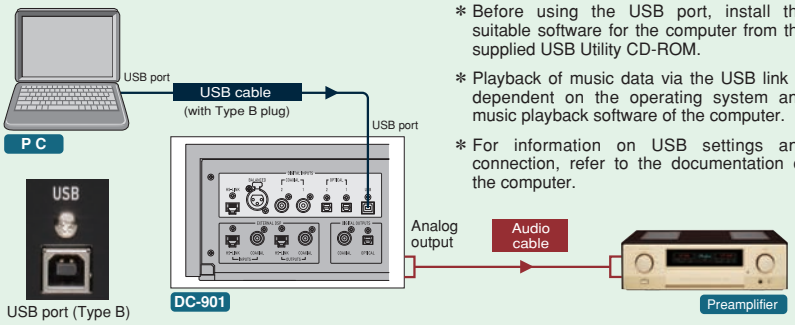
Double speed high-precision moving-average filter circuit

The moving-average filter circuit as implemented by the MDSD method in the DC-901 employs a total of 15 delay devices and 16 D/A converter circuits.
The DSD input signal (2.8224 MHz/1 bit) is slightly shifted by each delay circuit. The resulting delayed signals are divided into two groups which are supplied to the 16 D/A converters for digital to analog conversion.
The two D/A converter blocks operate alternately, producing the action of a double-speed high-cut filter. The converted signals are then summed.

- **High-cut filter function reliably removes signal components outside the range of human hearing (almost exclusively noise components).**
- **Conversion errors that could affect signal components in the range of human hearing are canceled out.**

Using USB cable to connect a computer

The DC-901 is equipped with a USB port (Type B). This allows a computer with a music library to be connected via a USB cable (with Type B plug), for playback of high-resolution music data (up to sampling frequency 192 kHz/24 bit) with high quality.



* Before using the USB port, install the suitable software for the computer from the supplied USB Utility CD-ROM.
* Playback of music data via the USB link is dependent on the operating system and music playback software of the computer.
* For information on USB settings and connection, refer to the documentation of the computer.

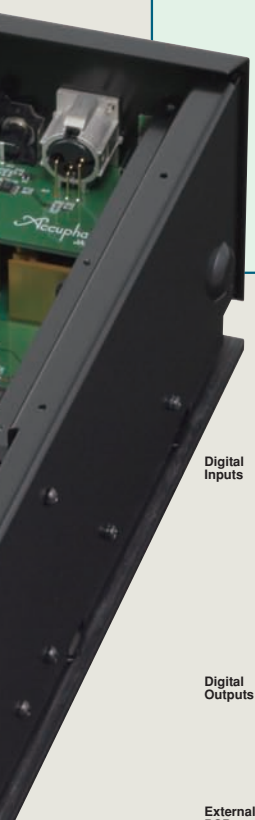
Direct Balanced Filter circuit

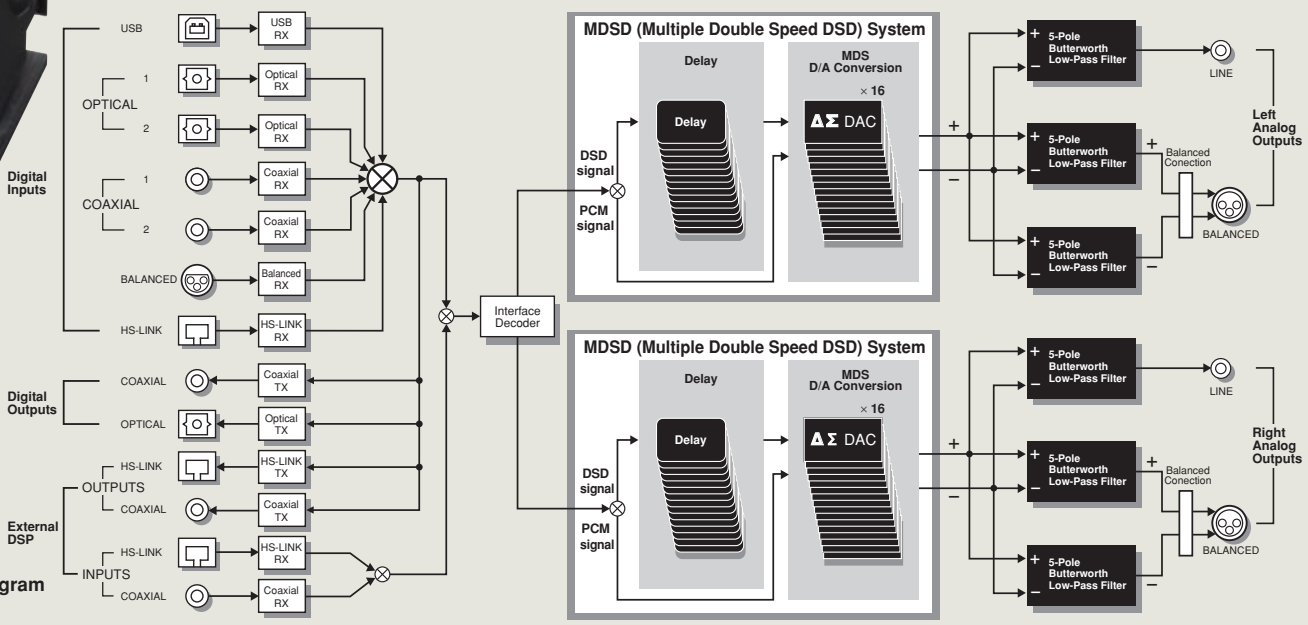
High-precision OP amp OPA1612

The analog filter section designed to remove aliasing noise from the output of the D/A converter employs completely separate 5-pole Butterworth low-pass filters for the line output and balanced output.

Phase selector switch for balanced output

- In the factory default condition, the switch is set to the left side ("pin ❸+").
- If the balanced input of the connected preamplifier or integrated amplifier has a "pin ❷ +" arrangement, the switch should be set to the right side.

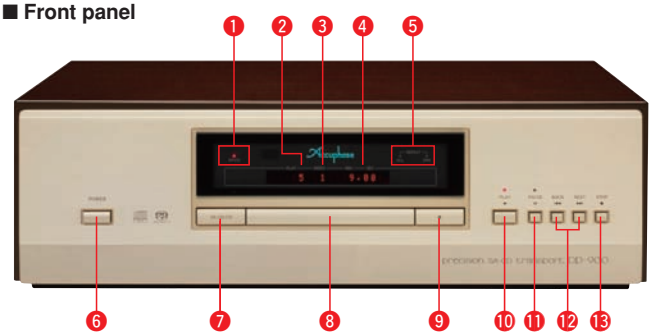




■DC-901 Block Diagram

DP-900

■ Front panel



■ Rear panel

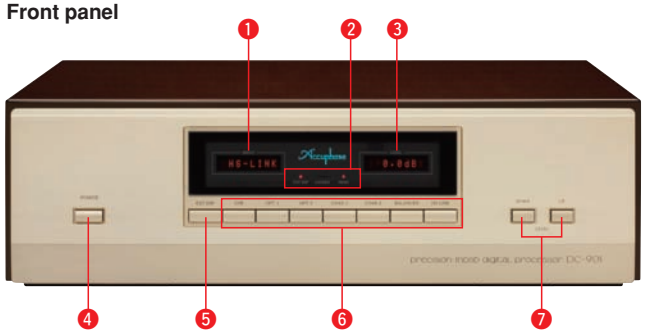
❶ SA-CD/CD indicator
- Lit: SA-CD
- Out: CD

❷ Track display
❸ Index display
❹ Time display
❺ Repeat indicator
ALL/ONE
❻ Power switch
❼ SA-CD/CD button
❽ Disc tray
❾ ⏏ Disc tray open/close button
❿ ▶ Play button
⓫ ⏸ Pause button
⓬ Track search buttons
⏮ BACK, ⏭ NEXT
⓭ ■ Stop button
⓮ Digital output connectors
- HS-LINK (SA-CD/CD signal)
- COAXIAL (CD signal only)

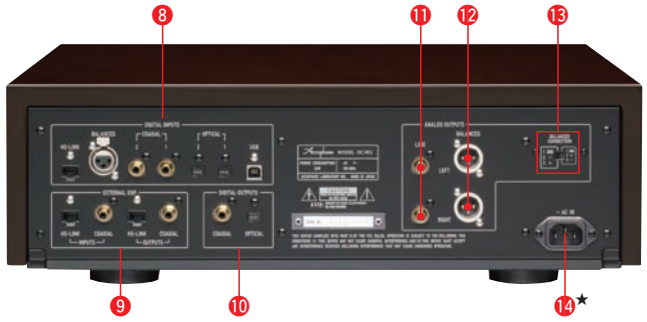
⓯ AC power connector★

DC-901

■ Front panel



■ Rear panel



❶ Alphanumeric input display
❷ Function indicators
EXT DSP, LOCKED, MDSD
❸ Output level display
❹ Power switch
❺ EXT DSP button ON/OFF
❻ Input selector buttons
USB, OPTICAL 1, 2, COAXIAL 1, 2
BALANCED, HS-LINK
❼ Output level control buttons
DOWN, UP
❽ Digital input connectors
HS-LINK, BALANCED
COAXIAL 1, 2, OPTICAL 1, 2
❾ EXTERNAL DSP connectors
- INPUTS (HS-LINK, COAXIAL)
- OUTPUTS (HS-LINK, COAXIAL)

❿ DIGITAL output connectors
COAXIAL, OPTICAL
⓫ Analog line output connectors
⓬ Analog balanced output connectors
Pin ② − Pin ③ +
(Can be switched with phase selector switch ⓭)
⓭ Phase selector switch
⓮ AC power connector★

Remarks

★ *This product is available in versions for 120/220/230 V AC. Make sure that the voltage shown on the rear panel matches the AC line voltage in your area.*

★ *The shape of the AC inlet and plug of the supplied power cord depends on the voltage rating and destination country.*

DP-900 Guaranteed Specifications

- **Compatible disc formats**: 2-channel SA-CD (Super Audio CD); CD
- **Data read principle**: Non-contact optical pickup
- **Laser diode wavelength**
  - SA-CD: 650 nm
  - CD: 780 nm
- **Digital outputs**
  - HS-LINK
    - Connector type: RJ-45
    - Suitable cable: dedicated HS-LINK cable
    - SA-CD: 2.8224MHz / 1bit DSD
    - CD: 44.1kHz / 16bit PCM
  - COAXIAL
    - Format: IEC 60958 compliant
    - CD: 44.1kHz / 16bit PCM
- **Power requirements**
  120 V, 220 V, 230 V AC (voltage as indicated on rear panel)
  50/60 Hz
- **Power consumption** 11 W
- **Maximum dimensions**
  477 mm (W) × 156 mm (H) × 394 mm (D)
- **Weight**
  30.0 kg (66.14 lbs) net
  36.0 kg (79.37 lbs) in shipping carton

DC-901 Guaranteed Specifications [Guaranteed specifications are measured according to JEITA standard CP-2402A]

- **Digital inputs**
  - HS-LINK: Connector type: RJ-45
  - BALANCED: Format: IEC 60958/AES3 compliant; Suitable cable: 110 ohm digital balanced cable
  - COAXIAL: Format: IEC 60958/AES3 compliant; Suitable cable: 75 ohm digital balanced cable
  - OPTICAL: Format: JEITA CP-1212 compliant; Suitable cable: JEITA standard optical fiber cable
  - USB: Format: USB 2.0 High Speed (480 Mbps compliant); Suitable cable: USB cable with Type B connector
- **Supported sampling frequencies**
  - HS-LINK
    - 32 kHz to 192 kHz / 24 bit (2-channel PCM)
    - 2.8224 MHz / 1bit (2ch DSD)
  - USB, COAXIAL, BALANCED
    32 kHz to 192 kHz / 24 bit (2-channel PCM)
  - OPTICAL
    32 kHz to 96 kHz / 24 bit (2-channel PCM)
- **Digital outputs**
  - COAXIAL Format: IEC 60958 compliant
  - OPTICAL Format: JEITA CP-1212 compliant
- **D/A converter**: MDSD principle (DSD signal); MDS principle (PCM signal)
- **Frequency response**: 0.5 to 50,000 Hz +0, −3 dB
- **Total harmonic distortion**: 0.0005% (20 to 20,000 Hz)
- **Signal-to-noise ratio**: 120 dB
- **Dynamic range**: 117 dB
- **Channel separation**: 120 dB (20 to 20,000 Hz)
- **Output voltage and impedance**
  - BALANCED: 2.5 V 50 ohms, balanced XLR type
  - LINE: 2.5 V 50 ohms, RCA phono jack
- **Output level control**: 0 dB to −80 dB (digital)
- **Power requirements**: 120 V, 220 V, 230 V AC (voltage as indicated on rear panel) 50/60 Hz
- **Power consumption**: 26 W
- **Maximum dimensions**: 477 mm (W) × 156 mm (H) × 394 mm (D)
- **Weight**: 23.4 kg (51.59 lbs) net; 30.0 kg (66.14 lbs) in shipping carton

Supplied with DP-900

- AC power cord
- HS-LINK cable (AHDL-15 equivalent)
- Remote Commander RC-110
- Cleaning cloth

Supplied with DC-901

- AC power cord
- Audio cable with plugs (1 m)
- USB Utility Setup Guide
- USB Utility CD
- Cleaning cloth

Optional HS-LINK cable

- **AHDL-15 (1.5 m)**

＊ AHDL-30 (3.0 m) available by special order

• Specifications and design subject to change without notice for improvements.

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