Accuphase

MDSD DIGITAL PROCESSOR

DC-37

● MDSD type D/A converter using eight parallel circuits ● Direct Balanced Filter with totally separate line and balanced signal paths ● Support for 5.6448 MHz 1-bit 2-channel DSD and 384 kHz 32-bit 2-channel PCM ● Six digital interface inputs including HS-LINK and USB ● Phase selector for balanced outputs ● Sampling frequency and quantization bit display for input signal ● Separate power transformers for digital and analog sections

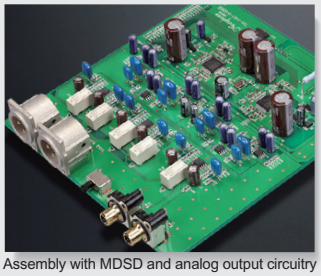
State-of-the-Art Digital Processor — Innovative MDSD (Multiple Double Speed DSD) digital processing circuitry with double-speed high-precision moving-average filter circuit configuration for straight D/A conversion of DSD signal. Support for playback of high-resolution sources in 5.6448 MHz (1-bit 2-channel DSD) and 384 kHz (32-bit 2-channel PCM) format. Six digital inputs including HS-LINK and USB. Informative readout shows sampling frequency and number of quantization bits of input source, based on actual measurement.

In 2011, Accuphase introduced the ultra high-end separate type Precision SA-CD/CD Transport DP-900 and Precision MDSD Digital Processor DC-901 combo, which was positioned as the second entry in the company's 40th anniversary commemorative model lineup. In 2013 Accuphase followed these with the integrated type SA-CD/CD player DP-720 featuring a further evolved MDSD D/A converter with support for a variety of sources. Both the technical excellence and stunning sound quality of these products were highly lauded, earning them a secure place as reference components in Japan as well as abroad.
The DC-37 inherits the outstanding technology of the DC-901 and DP-720, while opening a new chapter in ultra-advanced and innovative digital signal processing technology. It features an MDSD type D/A converter that achieves straight conversion of the DSD signal and supports 5.6448 MHz (1-bit 2-channel DSD) sources. In keeping with this development, the HS-LINK interface has also been upgraded to Version 2 with significantly expanded sampling frequency and quantization support up to 5.6448 MHz (1-bit 2-channel DSD) and 384 kHz (32-bit 2-channel PCM).
The DC-37 also offers convenience and flexible functionality. External digital sources can be connected via a total of six digital inputs: HS-LINK, COAXIAL 1, COAXIAL 2, OPTICAL 1, OPTICAL 2, and USB. Accepting digital data for example from a computer or other components, this new standalone processor turns the information into musical signals of unprecedented quality. A front panel display shows not only the sampling frequency of the selected source, but also the number of quantization bits, based on actual measurement of the signal. Two completely separate power supplies, each with a dedicated power transformer, are used for the digital and analog sections, to prevent any possibility of RF noise or electrical interference that could degrade the sonic purity of the output.
The DC-37 is a digital processor that redefines the state-of-the art and has its sights firmly set on the future, including computer-based and high-resolution audio. Only strictly selected circuit components, materials and other parts of the highest quality are used, resulting in an immense richness of information that translates into a spectacular musical experience.

Features and Functions

- **Ample clean power is provided by separate power supplies for the digital and analog sections, each with a dedicated power transformer and large filtering capacitors.**
- **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.**
- **MDS++ type D/A converter with eight circuits driven in parallel.**

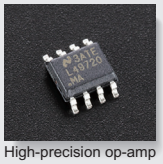
  One 32-bit Hyperstream™ DAC chip (ES9018 from ESS Technology Inc.) is used per channel, each comprising eight circuits driven in parallel. This improves overall performance by a factor of about 3 as compared to a single converter circuit, thereby achieving outstanding low-distortion results.
- **Direct Balanced Filter uses high-precision op-amps and performs totally separate analog filtering for line and balanced signal paths, to prevent any risk of interference when both are used simultaneously.**
- **Six digital inputs: HS-LINK, coaxial (2), optical (2), USB.**
- **Line and balanced analog outputs (1 each). Phase selector switch for balanced output.**

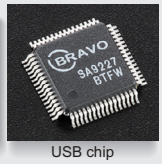

Assembly with MDSD and analog output circuitry


Power transformer

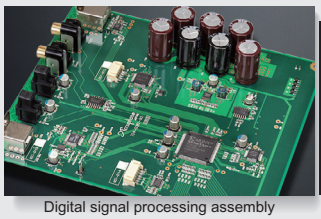

Power supply assembly

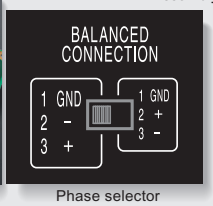

Input selector


High-precision op-amp


USB chip


Assembly with 6 digital inputs

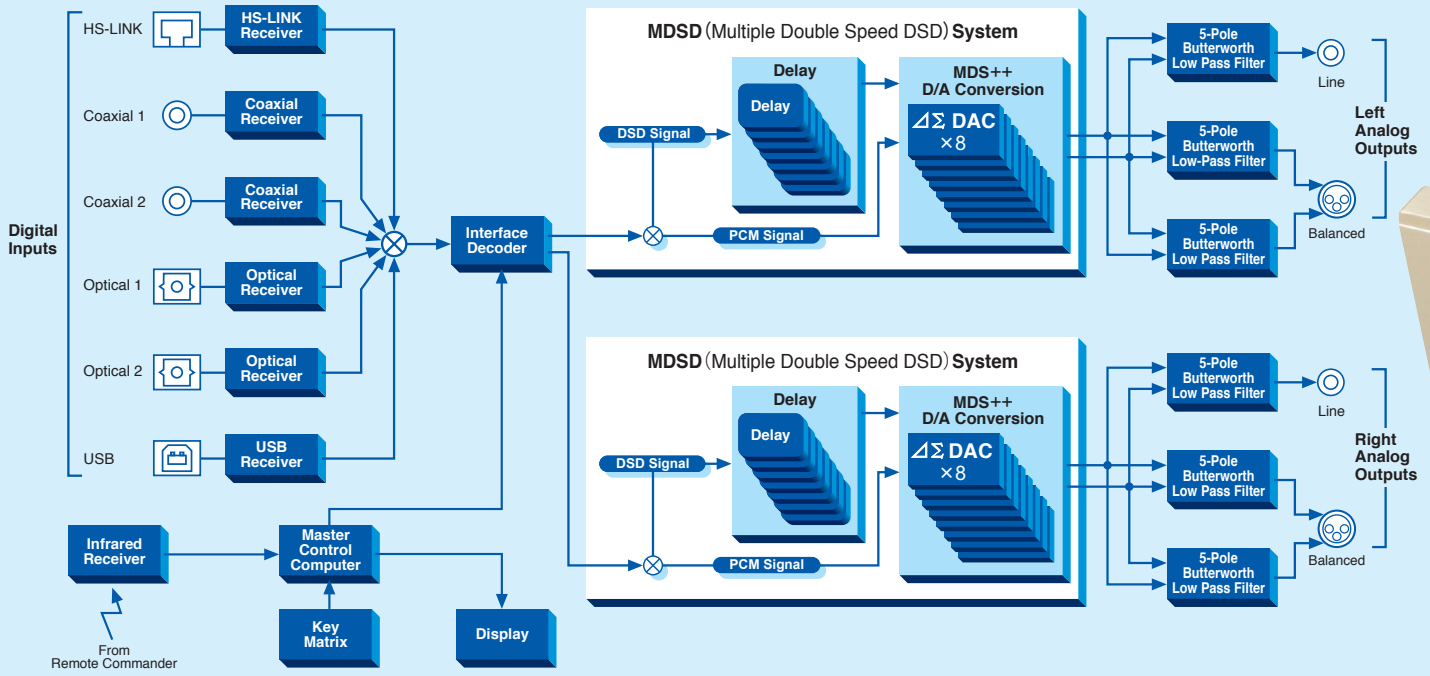

Digital signal processing assembly



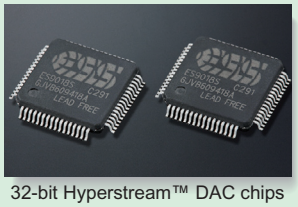
Phase selector


Parts selected for high sound quality and reliability

Block Diagram

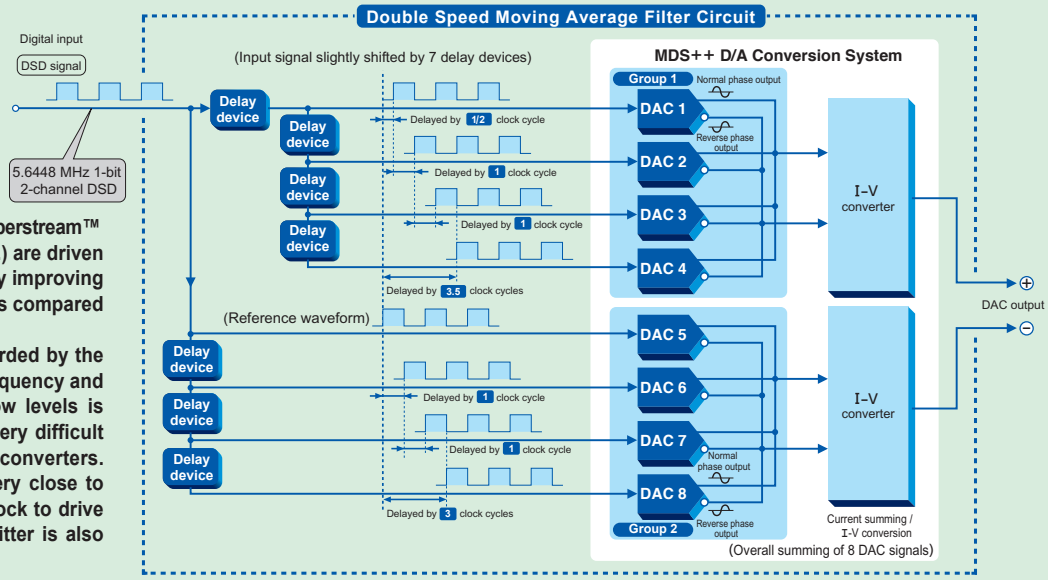


Innovative Digital Processing: MDSD (Multiple Double Speed DSD) Playback Principle



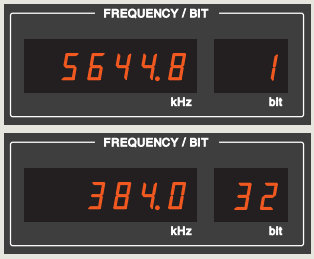
32-bit Hyperstream™ DAC chips

In the DC-37, the eight circuits of the 32-bit Hyperstream™ DAC chip (ES9018 from ESS Technology Inc.) are driven in parallel (using clock shift for DSD), thereby improving overall performance by a factor of about 3, as compared to a single converter circuit.
Because the performance improvement afforded by the MDS++ principle is independent of signal frequency and signal level, output signal noise at very low levels is also successfully minimized, a feat that is very difficult to achieve with conventional delta-sigma converters. By locating a dedicated quartz oscillator very close to the ES9018 chip and using it as a master clock to drive the D/A converter in asynchronous mode, jitter is also significantly reduced.



Sampling frequency and number of quantization bits shown on display

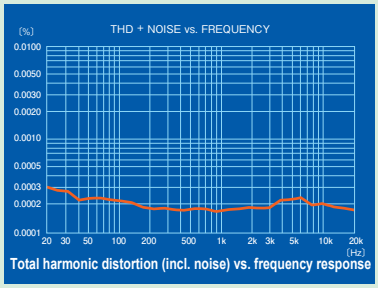
The readout shows the sampling frequency of the source chosen by the input selector, as well as the number of quantization bits input to the DAC, as determined by actual measurement.



Display example

FREQUENCY
Indicates locked-in sampling frequency (kHz) of signal.

BIT
Indicates actual number of bits (in 1-bit steps) as input to DAC.



Total harmonic distortion (incl. noise) vs. frequency response

Eight D/A converter circuits driven in parallel ensure outstanding performance in all aspect, including superb S/N ratio and amazingly low harmonic distortion.

HS-LINK Ver. 2

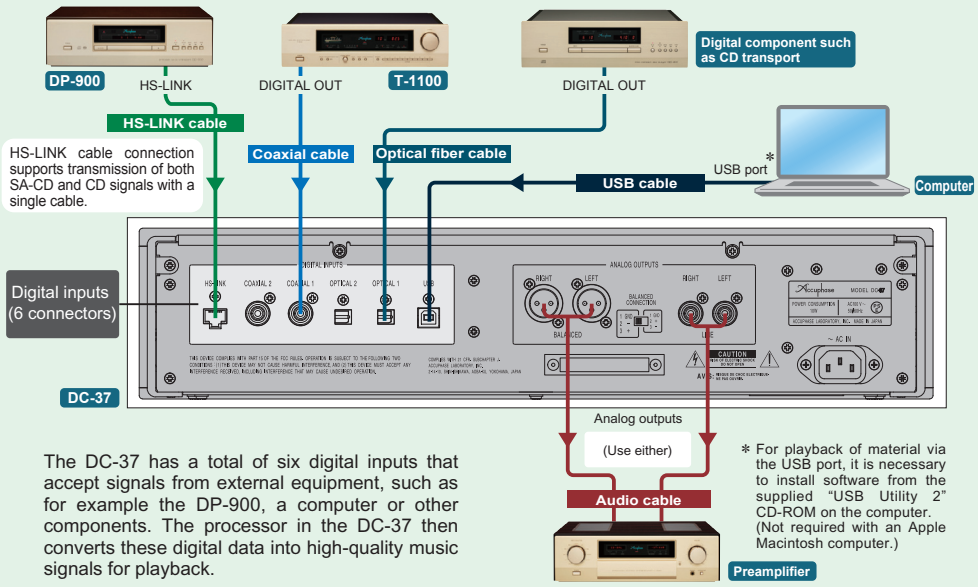
HS-LINK Ver. 2 is an upgraded version of the Accuphase HS-LINK interface, providing significantly expanded sampling frequency and quantization support up to 5.6448 MHz (1-bit 2-channel DSD) and 384 kHz (32-bit 2-channel PCM).

● The DC-37 supports HS-LINK Ver. 2 and is therefore compatible with both HS-LINK and HS-LINK Ver. 2 signals.

HS-LINK	HS-LINK Ver.2
Sampling frequency/Quantization bits	
32.0 kHz, 44.1 kHz, 48.0 kHz, 88.2 kHz, 96.0 kHz, 176.4 kHz, 192.0 kHz / 16 to 24-bit 2-channel PCM	32.0 kHz, 44.1 kHz, 48.0 kHz, 88.2 kHz, 96.0 kHz, 176.4 kHz, 192.0 kHz, 352.8 kHz, 384.0 kHz / 16 to 32-bit 2-channel PCM
2.8224 MHz / 1-bit 2-channel DSD	2.8224 MHz, 5.6448 MHz / 1-bit 2-channel DSD

* HS-LINK is a registered trademark of Accuphase Laboratory, Inc.
* HS-LINK cable can be used both for HS-LINK and HS-LINK Ver. 2 signal transmission.

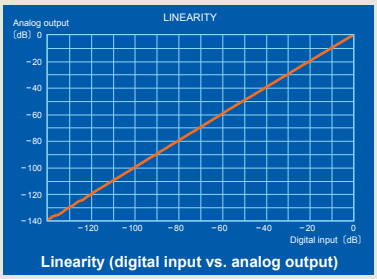
Connection Example: DC-37 has six digital inputs



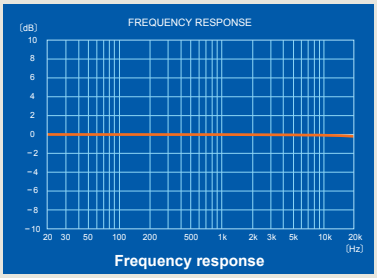
The DC-37 has a total of six digital inputs that accept signals from external equipment, such as for example the DP-900, a computer or other components. The processor in the DC-37 then converts these digital data into high-quality music signals for playback.

* For playback of material via the USB port, it is necessary to install software from the supplied "USB Utility 2" CD-ROM on the computer. (Not required with an Apple Macintosh computer.)

Performance Graphs

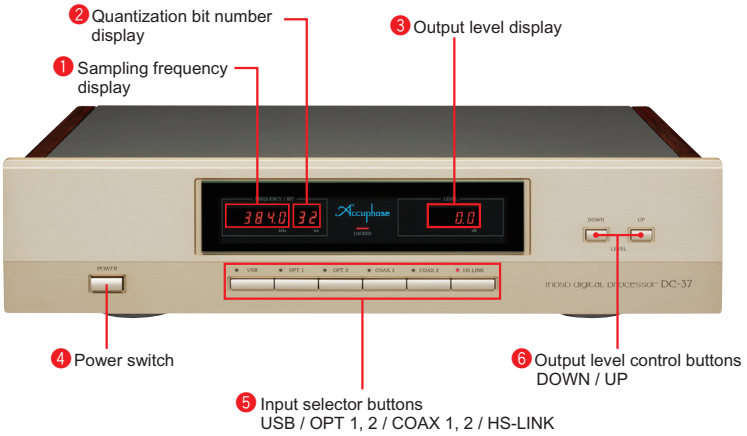


Linearity (digital input vs. analog output)

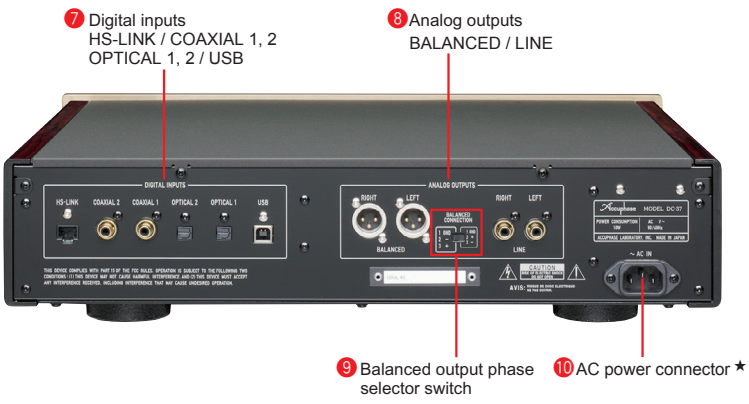


Frequency response

◆ Front panel



◆ Rear panel



■ **Supplied accessories:**
- **AC power cord**
- **Audio cable with plugs (equivalent to ASL-10, 1 m)**
- **"USB Utility 2" CD-ROM (Windows Install Disc)**
- **"USB Utility 2" Setup Guide**
- **Cleaning cloth**

DC-37 Guaranteed Specifications

[Guaranteed specifications measured according to JEITA standard CP-2402A]

- **Digital inputs**
  - HS-LINK: Connector type: RJ-45; Suitable cable: Dedicated HS-LINK cable
  - COAXIAL: Format: IEC 60958 AES-3 compliant; Suitable cable: 75-ohm coaxial digital cable
  - OPTICAL: Format: JEITA CP-1212 compliant; Suitable cable: JEITA standard optical fiber cable
  - USB: Format: USB 2.0 Hi-Speed (480 Mbps) compliant; Suitable cable: USB 2.0 cable with Type B connector
- **Sampling frequencies**
  - HS-LINK: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz, 352.8 kHz, 384 kHz (16 to 32-bit 2-channel PCM); 2.8224 MHz, 5.6448 MHz (1-bit 2-channel DSD)
  - COAXIAL: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz (16 to 24 bit 2-channel PCM)
  - OPTICAL: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz (16 to 24 bit 2-channel PCM)
  - USB: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz, 352.8 kHz, 384 kHz (16 to 32 bit 2-channel PCM); 2.8224 MHz, 5.6448 MHz (1-bit 2-channel DSD)
- **D/A converter**: MDSD principle (DSD signal); MDS++ principle (PCM signal)
- **Frequency response**: 0.5 to 50,000 Hz +0, -3.0 dB
- **Total harmonic distortion**: 0.0006% (20 to 20,000 Hz)
- **Signal-to-noise ratio**: 119 dB
- **Dynamic range**: 116 dB
- **Channel separation**: 117 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)
- **Sampling frequency / Quantization bit display**: 2-channel PCM: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz, 352.8 kHz, 384 kHz; 0 to 32 bit (0: No data). 2-channel DSD: 2.8224 MHz, 5.6448 MHz; 1 bit
- **Power requirements**: 120 V, 220 V, 230 V AC (voltage as indicated on rear panel), 50/60 Hz
- **Power consumption**: 10 W
- **Maximum dimensions**: Width 465 mm (18.31"); Height 114 mm (4.49"); Depth 385 mm (15.16")
- **Mass**: 14.4 kg (31.7 lbs); 20.0 kg (44.1 lbs) in shipping carton

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.*

★ *230 V version has an Eco Mode that switches power off after 120 minutes of inactivity.*

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

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ACCUPHASE LABORATORY, INC.

• The specifications and appearance of this product are subject to change without notice.

http://www.accuphase.com

L1405Y PRINTED IN JAPAN 850-2190-00(B1)