

Accuphase

COMPACT DISC PLAYER

DP-75

● MMB type D/A converter achieves 20-bit linearity and minimum noise ● Ultra jitter-free PLL circuit ● High-precision sampling frequency converter ● Fully digital CD mechanism control ● 40 Mbps optocouplers for complete separation of digital and analog sections



COMPACT
disc
DIGITAL AUDIO



The ultimate CD transport/processor system in a single body:MMB type D/A converter, ultra jitter-free PLL circuit, high-precision sampling frequency converter. Fully digital CD mechanism control allows optimization of servo performance .

The DP-75 incorporates a wealth of technology originally developed for top-of-the-line separate-type CD reproduction systems. Rather than calling it a CD player, it therefore can be justly called a CD Transport/Processor System. It offers all the advantages of separate components, conveniently housed in a single enclosure.

The D/A converter in the processor section uses the amazingly precise MMB principle which delivers performance pushing physical limits. This converter system stands at the pinnacle of the multi-bit universe. It is complemented by the Ultra Jitter-Free PLL Circuit developed by Accuphase and a high-precision Sampling Frequency Converter (SFC). Pulse distortion and jitter are virtually absent, assuring absolutely faithful conversion of the input signal. To allow use of this ultimate D/A conversion system also with external components, the DP-75 provides versatile digital input and output facilities. The unit therefore can function as a digital control center which enhances the sound quality of the entire system.



External signal display

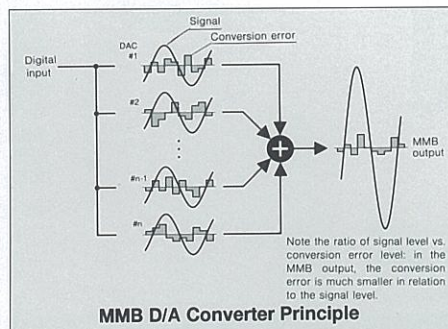
The CD transport side of the DP-75 is impressive as well. For example, it uses fully digital circuits for mechanism control. This allows optimizing servo performance for each individual disc, assuring improved operation stability and a drastic reduction in error rate. The laser pickup is an ultra-compact type with integrated RF amplifier, and all actuators are driven by balanced circuits which do not conduct any current to the ground line. The tray lock feature firmly secures the tray during playback, to maintain the high purity of the digital signal.

[Digital Processor Section]

MMB Type D/A Converter Takes 20-Bit Linearity and Low Noise Performance to New Limits

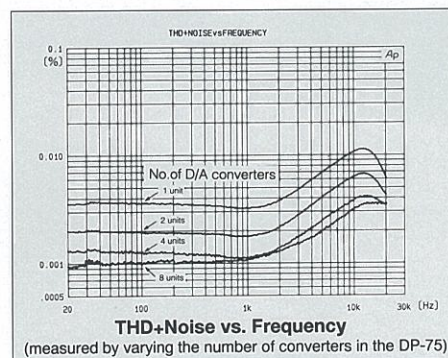
The D/A converter uses the amazing MMB

(Multiple Multi-Bit) principle which delivers performance and sound quality previously unattainable. It consists of eight strictly selected



20-bit D/A converters connected in parallel. This revolutionary approach yields a dramatic improvement in every important performance aspect.

As can be seen from the illustration, the high-speed output of an 8-times oversampling digital filter is connected in parallel to the individual converters. Immediately after D/A conversion,



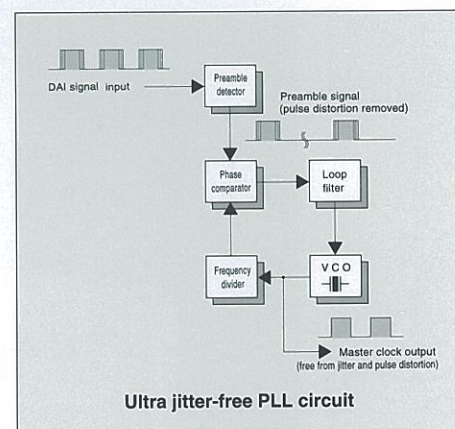
the output of the converters is combined while still in high-speed form. But rather than simply linking the converter elements in parallel, the

MMB circuit drives each converter separately, so that it can develop its full potential. Special attention was devoted to phase response at high frequencies. Parts selection, layout and wiring patterns were optimized to achieve perfect phase matching. The end result is performance which sets new standards regarding linearity and absence of distortion and noise.

Ultra Jitter-Free PLL Circuit

The operation of the D/A converter must be synchronized with the digital audio interface (DAI) signal. For this purpose, a phase-locked loop (PLL) circuit generates a master clock which is used as system reference. If jitter or pulse distortion are present, the master clock precision will suffer, which has a detrimental effect on the entire system.

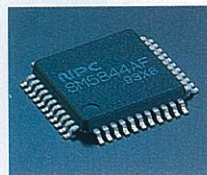
The Ultra Jitter-Free PLL circuit in the DP-75 consists of a preamble detector and a voltage-controlled oscillator (VCO) using a quartz crystal



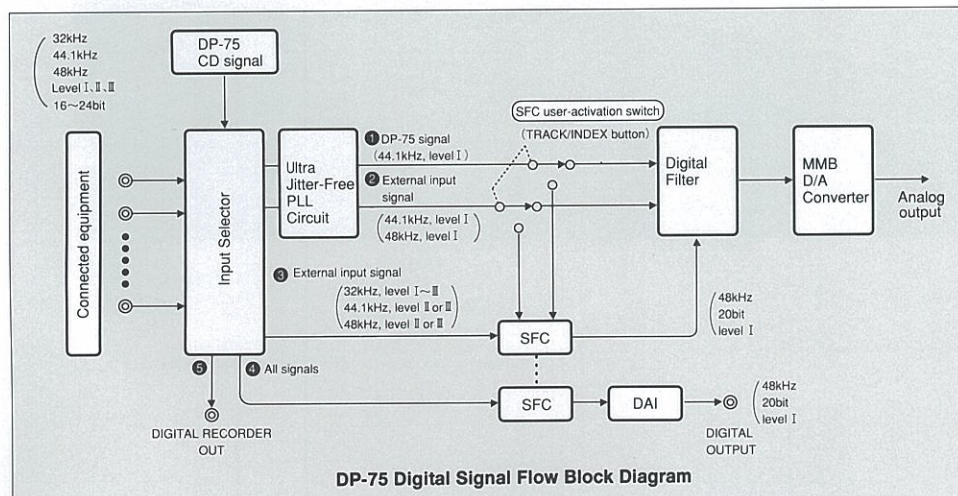
element. Pulse distortion occurs when the signal fluctuates randomly in the intervals between "0" and "1". But the so-called preamble signal (which indicates the start of the L and R signals) occurs in regular intervals at a constant level, it is not subject to the effects of pulse distortion. Therefore the DP-75 uses a detector which extracts the preamble component from the DAI signal and supplies it to the PLL circuit, for elimination of pulse distortion. The VCO uses a quartz crystal oscillator element with a very narrow locking range and optimized loop filter constant, to remove any jitter components from the preamble signal.

High-Precision Sampling Frequency Converter

A sampling frequency converter (SFC) serves to transform the sampling frequency of a digital input signal to a different value. In the DP-75, the sampling frequency is converted to 48 kHz, resulting in a 48-kHz, 20-bit, level I signal for decoding. The highly



High-precision sampling frequency converter

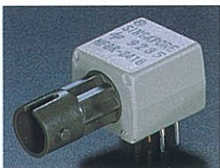




precise quartz oscillator used for conversion assures jitter-free performance. By transforming the sampling frequency of every input signal to the highest level, optimum D/A converter operation is always assured, allowing the outstanding D/A conversion system in the DP-75 to develop its full performance potential.

Versatile Digital Input Configuration Permits Use as Digital Control Center

The DP-75 provides three optical and three coaxial digital inputs which can accept signals of up to 24-bit resolution. The optical inputs are rated for ultra-high-speed links using the ST-format HPC (High Performance Connection) standard, which supports a data transfer rate of up to 150 megabits per second. The coaxial inputs use BNC connectors. In addition, up to two digital recorders can be connected to the DP-75, via a set of Toslink and coaxial RCA-type input/output connectors.



150 Mbps ultra-high-speed HPC link

Digital Output Supports 48-kHz 20-bit Data Width

The integrated SFC in the DP-75 converts all digital input signals to a 48-kHz, 20-bit, level I signal. This signal is available at the digital outputs. Since a digital level control is also provided, the DP-75 can be used as a digital preamplifier.

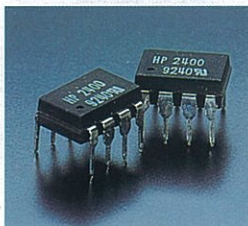
Digital Level Control Prevents Sound Quality Deterioration

Since the 20-bit MMB D/A converter of the DP-

75 has a 4-bit margin, digital noise cannot occur by principle and precise attenuation is possible down to -40 dB.

Thorough Separation of Digital and Analog Sections Shuts Out Interference

Because a digital signal consists of regular, periodic codes, it can--if allowed to enter the analog signal path--cause noise that is clearly distinct from analog sources. The result is muddy, unclear sound. To prevent this danger, a thorough separation of the digital and analog sections is necessary, in terms of static as well as induced interference. The DP-75 achieves this by using ultra high performance optoisolators manufactured by Hewlett-Packard, rated for a transmission rate of 40 megabits per second.



40 Mbps ultra-high-speed optocoupler

GIC 3-Pole Analog Filter With Selected Components

The analog filter in the DP-75 is a GIC (Generalized Imittance Converter) 3-pole Butterworth type with a gentle rolloff curve. In this discrete filter stage, the audio signal passes no active components, which assures sonic purity and total musical accuracy.

[CD Transport Section]

Fully Digital Control of CD Mechanism

The control circuitry of the mechanism section

Remote Commander RC-13

Allows input source selection and control of functions such as direct play, repeat play, program play, and display brightness adjustment.



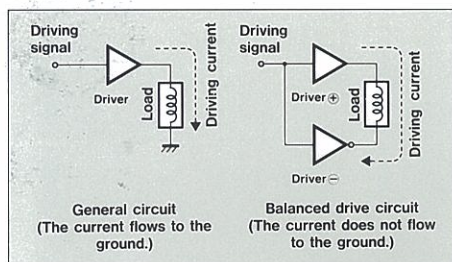
is fully digital, allowing the use of adaptive filters to optimize servo performance for each individual disc. This assures enhanced operation stability and a drastic reduction in error rate. Long-term reliability and performance uniformity are also improved, since fluctuations in ambient temperature can have no adverse influence.

Laser Pickup With Integrated RF Amplifier for Error-Free Operation

Since the output level of a laser pickup is very low, it is highly vulnerable to externally induced noise. To prevent such problems, the pickup used in the DP-75 employs an RF amplifier which is so compact that it can be directly integrated in the pickup assembly. This assures that the high-level output signal remains free from noise interference, which in turn reduces the error rate.

Balanced Drive Circuitry for Servo Motors

The motors and actuators which drive the disc tray, spindle, sled, and the focussing and tracking assembly require a rapidly fluctuating drive current, which can affect other circuit areas and cause sound quality degradation. In the DP-75, the drive current for each actuator is provided by two amplifiers arranged in a balanced configuration. Because there is no circuit flowing in the ground line, the operation of other circuits in the player remains entirely unaffected.

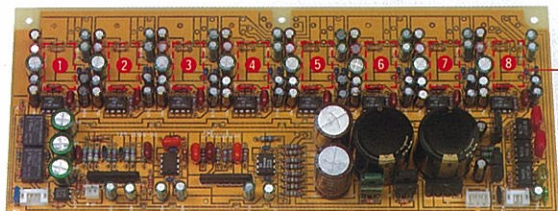


Strong Structural Design Effectively Absorbs Vibrations

The chassis supporting the CD mechanism uses 8-mm thick aluminum panels, and the massive aluminum front panel is 15 mm thick. This effectively suppresses external vibrations and assures stable operation. Symmetrical layout and weight distribution are further advantages which help to increase mechanical stability.

Tray Lock Prevents Resonances

If the tray is detached from the rotating mechanism during playback, it can resonate and dilute the purity of the digital signal. In the DP-75, the tray is firmly secured during playback, to eliminate any possibility of harmful resonances.



20-bit D/A converter
(8 chips mounted on rear)

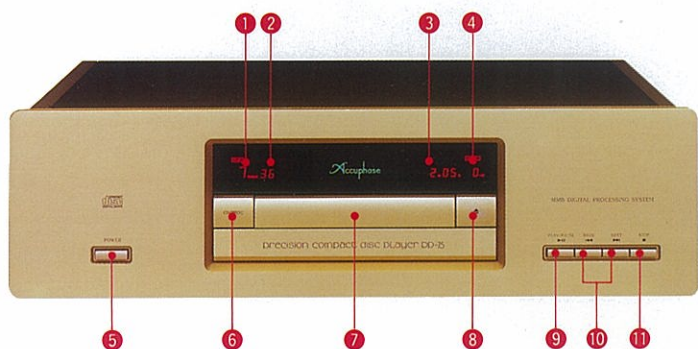


■ **D/A converter and analog circuit assembly (one channel)**
Contains the 40 Mbps ultra-high-speed optocouplers, MMB type D/A converter, GIC type Butterworth filter balance audio output circuits, etc.

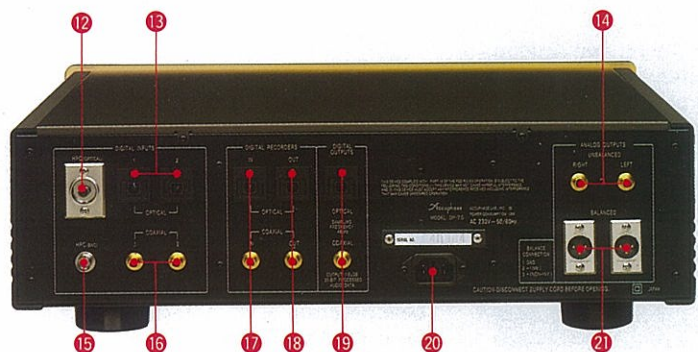
■ Digital assembly

Contains the servo control ICs digital signal processing ICs, digital filter, ultra jitter-free PLL circuit, sampling frequency converter, etc.

■ FRONT PANEL



■ REAR PANEL



- 1 PLAY TRACK Indicator (Sampling frequency display)
- 2 TRACK/INDEX indicator (Frequency precision display)
- 3 TIME Indicator
- 4 Output level indicators
- 5 POWER Switch
- 6 CD/Processor selector
- 7 Disc tray
- 8 Disc tray open button
- 9 Play/pause button
- 10 Track search buttons
- 11 Stop button
- 12 HPC optical fiber input connector
- 13 Toslink optical fiber input connector
- 14 Unbalanced type output jack for audio output
- 15 HPC coaxial (BNC) input
- 16 Coaxial input jack
- 17 RECORDER input connector (Toslink/Coaxial)
- 18 RECORDER output connector (Toslink/Coaxial)
- 19 48-kHz, 20-bit digital signal output (Toslink/coaxial)
- 20 AC power connector (for supplied power cord)
- 21 Balanced type output connector for audio output:
 - 1 Ground,
 - 2 Inverted (-),
 - 3 Non-inverted (+)

GUARANTEED SPECIFICATIONS

Guaranteed specification are measured according to EIAJ standard CP-2402.
Test disc: CP2403

Performance Guaranty

All Accuphase product specifications are guaranteed as stated.

[Digital signal player exclusively for CDs]

- **Format**
Compact disc standard format
Number of quantizations: 16 bits
Sampling frequency: 44.1 kHz
Error correction method: CIRC
Number of channels: 2
Spindle speed: 200 to 500 rpm (CLV)
Scan velocity: 1.2 to 1.4 m/s
- **Data read**
Non-contact optical pickup (semiconductor laser pickup)
- **Laser**
GaAlAs (double heterodyne diode)

[Digital processor]

- **Input Format**
EIA standard format
Quantization bits: 16 to 24 bits, linear
Sampling frequency (automatically selected): 32.0 kHz, 44.1 kHz, or 48.0 kHz
- **Digital Input Format (EIAJ CP-1201)**
Format: DIGITAL AUDIO INTERFACE
HPC OPTICAL: Optical input, -10 to -30 dBm
OPTICAL: Optical input, -15 to -27 dBm
COAXIAL: 0.5 Vp-p, 75 ohms
- **Digital output format level (EIAJ CP-1201)**
Format: digital audio interface
Optical: output -21 to -15 dBm
wavelength: 660 nm
Coaxial: 0.5 Vp-p at 75 ohms
4.0 to 20,000 Hz ± 0.3 dB
- **Frequency characteristics**
MMB type, 20 bits
- **D/A converter**
20 bits, Eight-time oversampling
- **Digital filter**
Digital deemphasis function; Deviation: ± 0.001 dB
- **Total harmonic distortion**
0.0024% (20 to 20,000 Hz)
- **Signal-to-noise ratio**
120 dB
- **Dynamic range**
98 dB
- **Channel separation**
110 dB
- **Output voltage and impedance**
Balanced: 2.5 V at 50 ohms balanced XLR type
Unbalanced: 2.5 V at 50 ohms RCA phono jack
0 to -40 dB, 1 dB steps

● Digital level control

● Power Requirements

● Power consumption

● Maximum Dimensions

● Weight

● Supplied remote commander RC-13

Remote control system: Infrared pulse
Power requirements: 3V DC with two batteries IEC designation R03 (size AAA)
Dimensions: 66 mm width (2-1/2"), 204 mm height (8"), 20 mm depth (1-1/16")
Weight: 250 g (including batteries)

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

Accuphase
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K9410Y

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