

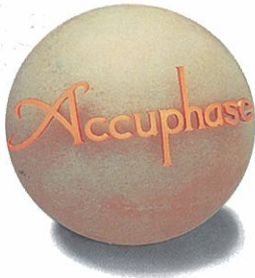
Accuphase

MMB DIGITAL PROCESSOR

DC-61

- MMB type D/A converter achieves 20-bit linearity and super low noise
- Ultra jitter-free PLL circuit
- High precision sampling frequency converter
- Versatile digital input/output configuration
- MD REC switch allows recording from any source
- 4-pole analog filter with hand-selected components





New-generation digital processor section with superb sound quality — MMB type D/A converter featuring excellent conversion precision, ultra jitter-free PLL circuit, high-precision sampling frequency converter and many other highlights guarantee top performance. Versatile digital inputs can handle signals with all three prevailing sampling frequencies, and two digital recorders can also be connected. MD REC switch allows problem-free recording from any source.

As we move towards the 21st century, digital program sources such as CD, MD, DAT and others are occupying center stage in the audio arena. These formats are increasingly found not only in audiophile equipment for home use but also in car stereo systems and portable units as well. The DC-61 is a digital processor designed with this situation in mind. It incorporates Accuphase's extensive know-how in digital technology, allowing it to reproduce digital sources with unsurpassed sound quality and to make optimum use of the new generation of digital recorders.

The D/A converter section features the MMB principle that guarantees conversion with ultra-high precision. Six hand-selected 20-bit D/A converters are connected in parallel, resulting in a further increase in all vital performance parameters. Thanks to advanced techniques such as the Ultra Jitter-Free PLL Circuit and High-Precision Sampling Frequency Converter (SFC), pulse distortion and jitter are virtually absent, assuring absolutely faithful conversion of the input signal.

Connectors for digital recorders make it easy to hook up for example a DAT deck or MiniDisc recorder, for direct recording and playback of the digital signal. An MD REC switch lets the user convert the sampling frequency of the input signal to a high-precision 44.1 kHz level I signal for MD recording with optimal quality, regardless of the type of input.

The digital/analog section employs ultra high-speed optoisolators and digital couplers for perfect electrical separation, thus preventing sound quality degradation due to high-frequency noise and electrical interference. The analog output circuitry employing fully balanced topology and a digital level control are further advantages which assure sonic purity.

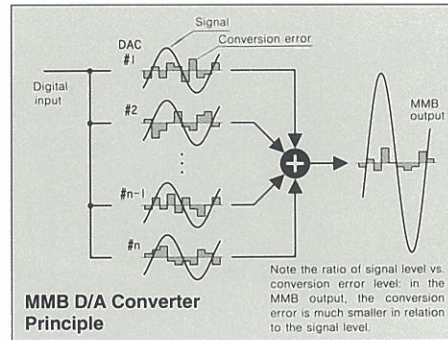
The elegant and refined design complements the outstanding performance of the DC-61. This top-

class processor provides unlimited enjoyment of digital audio at its best.

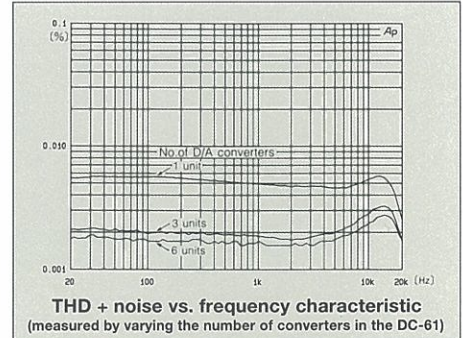
MMB Type D/A Converter Achieves 20-Bit Linearity and Super Low Noise

The D/A converter uses the amazing MMB (Multiple Multi-Bit) principle which delivers top-notch performance and sound quality. It consists of six hand-selected 20-bit D/A converters connected in parallel. This revolutionary approach yields a dramatic improvement in linearity, THD, dynamic range, and S/N ratio.

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

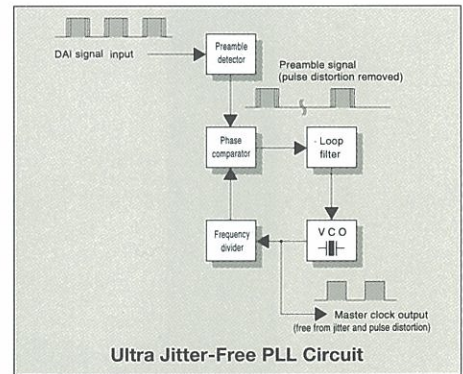


new standards regarding linearity and absence of distortion and noise.

An important characteristic of the MMB principle is the fact that it improves performance regardless of signal level and frequency. The converter therefore maintains excellent linearity even at extremely low levels that present insurmountable problems for conventional converter designs. The audible advantages are immediately apparent as more precise localization of sound sources and a heightened sense of space and ambience.

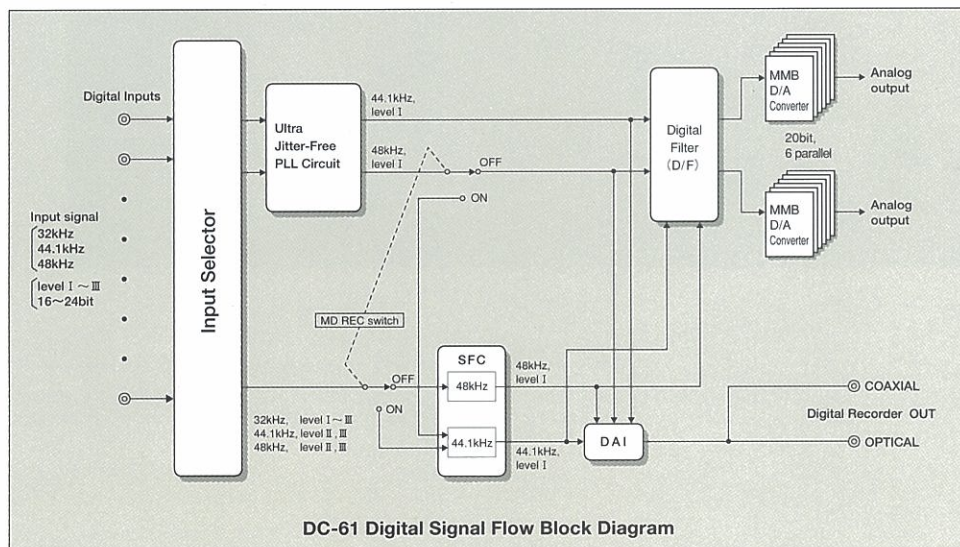
Ultra Jitter-Free PLL Circuit

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 detri-

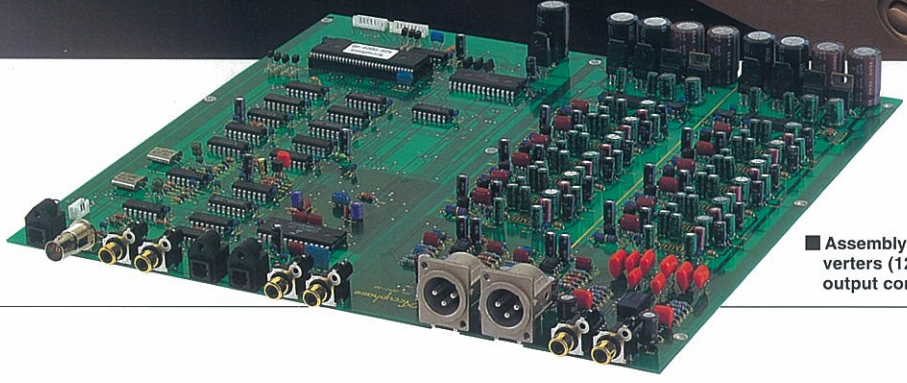


mental effect on the entire system. The Ultra Jitter-Free PLL circuit in the DC-61 consists of a preamble detector and a voltage-controlled oscillator (VCO) using a quartz crystal element.

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 DC-61 uses a detector which extracts the preamble component from the DAI signal and supplies it to the PLL cir-



DC-61 Digital Signal Flow Block Diagram



■ Remote commander RC-17
Allows control of all functions except power on/off, and can also activate some functions of Accuphase CD players.



■ Assembly with digital circuitry including MMB D/A converters (12 units on rear), analog circuit, digital input/output connectors, and audio output connectors.

cuit, 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 DC-61, the sampling frequency is converted to a 48 kHz or 44.1 kHz level I signal for decoding. The highly 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, even when the clock precision of the input signal is less than perfect.



High-precision sampling frequency converter

Versatile Digital Input Configuration Including Optical, Coaxial and BNC Connectors

For connection of a CD transport, MD player, satellite PCM tuner or other digital source components, the DC-61 provides a rich array of inputs: two optical, two coaxial and one BNC connector. All of these inputs can accept signals of up to 24-bit resolution and with sampling frequencies of 48.0, 44.1 or 32.0 kHz.



Optical and Coaxial Connectors for Digital Recorders

When dubbing digital signals, level or balance adjustments are not necessary, so that perfect recordings are easy to



achieve every time. The DC-61 provides two sets of inputs/outputs for digital recorders, one using Toslink optical connectors and one with coaxial connectors.

MD REC Switch Allows Recording Any Source on MD

When the MD REC switch is set to ON, the input signal is converted into a high-precision 44.1 kHz level I signal by the SFC sampling frequency converter. This makes it possible to flawlessly record any type of program source on a MiniDisc recorder.



20-Bit, 8-Times Oversampling Digital Filter

The purpose of a digital filter is to multiply the sampling frequency by an integer, thereby moving any spurious noise



20-bit digital filter

components far outside the audible range.

The filter in the DC-61 is manufactured by NPC and offers state-of-the-art characteristics in all vital aspects, such as absence of group delay, passband ripple, and attenuation. The filter approaches the theoretical limits of performance.

4-Pole Analog Filter With Hand-Selected Components

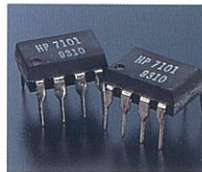
To reduce noise in the upper frequency range and achieve high S/N ratio, a 4-pole Butterworth design is used for analog filtering. The cutoff frequency point is optimized to keep phase shifts in the passband range at an absolute minimum. Strict selection of all filter components assures sonic purity and total musical accuracy.

Digital Level Control Prevents Sound Quality Deterioration

The 20-bit MMB D/A converter in the DC-61 has a 4-bit margin, which allows precise level attenuation down to -40 dB without any loss in signal quality.

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



40 MBPS high-speed optocoupler

digital and analog sections is necessary. The DC-61 achieves this by using ultra high-performance Hewlett-Packard 80 MBPS ultra-high-speed digital couplers optoisolators with a transmission rate of 40 megabits per second, in conjunction with ultra high-speed 80 MBPS digital couplers made by Burr-Brown.

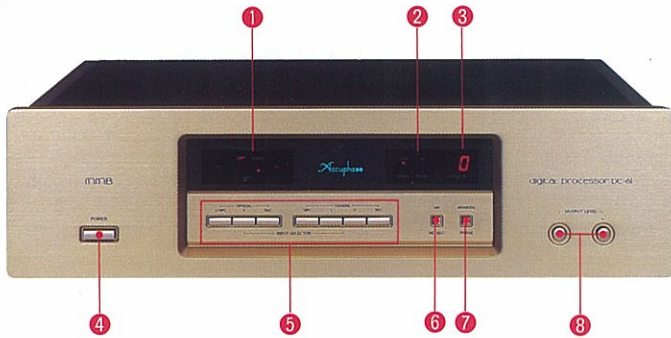


80 MBPS ultra-high-speed digital couplers

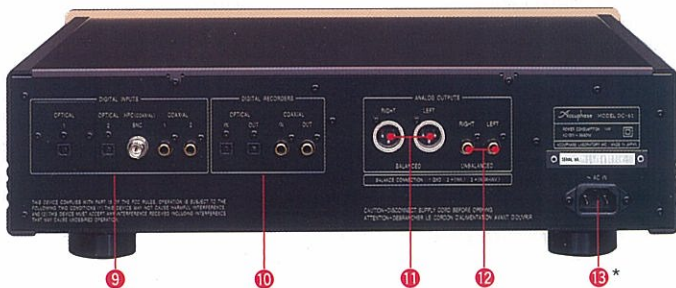
Fully Balanced Analog Output Circuitry

The audio output section features completely balanced circuitry which is isolated from the ground line. Any noise that may be induced in the signal path will be canceled out, so that the playback sound remains utterly pure and undiluted. For utmost flexibility, balanced XLR connectors as well as unbalanced RCA-type connectors are provided.

FRONT PANEL



REAR PANEL



- | | |
|--|--|
| 1 Input position indicator OPT/COAX: HPC, 1, 2, REC | 9 DIGITAL INPUTS OPTICAL 1,2 COAXIAL 1,2 HPC (BNC) |
| 2 Function indicator LOCK, SFC, MD REC, PHASE | 10 DIGITAL RECORDERS OPTICAL IN, OUT COAXIAL IN, OUT |
| 3 Output LEVEL indicator Power switch | 11 Balanced output connector (analog output) (1) : ground (2) : inverted (-) (3) : non-inverted (+) |
| 4 INPUT SELECTOR buttons | 12 Unbalanced output connector (analog output) |
| 5 MD REC button | 13 AC connector (for supplied power cord) * |
| 6 Output PHASE selector | |
| 7 OUTPUT LEVEL buttons | |

Remarks

*The shape of the plug of the supplied power cord depend on the voltage rating and destination country

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

GUARANTEED SPECIFICATIONS

Guaranteed specifications are measured according to EIAJ standard CP-2402.

Performance Guaranty

All Accuphase product specifications are guaranteed as stated.

- **Input format:** Quantization bits: 16 to 24 bits, linear
EIA standard format Sampling frequency (automatically selected):
32.0 kHz, 44.1 kHz, or 48.0 kHz
Timing precision : level I, II, III (auto detect)
- **Digital input format level:** Format :digital audio interface
(EIAJ CP-1201) OPTICAL :Optical input, -15 to -27 dBm
COAXIAL :0.5Vp-p, 75 ohms
- **Digital output format level:** Format :digital audio interface
(EIAJ CP-1201) OPTICAL :output -15 to -21 dBm (EIAJ)
wavelength:660nm
COAXIAL :0.5Vp-p at 75 ohms
- **Frequency characteristics:** 4.0 to 20,000Hz ± 0.3dB
- **D/A converter** MMB type, 20bits
- **Digital filter:** 20 bits, Eight-time oversampling
Digital deemphasis function
Deviation: ± 0.001dB
- **Total harmonic distortion:** 0.0024% (20 to 20,000Hz)
- **Signal-to-noise ratio:** 120dB
- **Dynamic range:** 98dB
- **Channel separation:** 110dB
- **Output voltage and impedance:** Balanced :2.5V at 50 ohms balanced XLR type
Unbalanced:2.5V at 50 ohms RCA phono jack
- **Digital level control:** 0 to -40dB, 1 dB steps
- **Power requirements:** 100V, 120V, 220V, 230V, 240V (Voltage as indicated
on rear panel) AC, 50/60 Hz
- **Power consumption:** 14W
- **Maximum dimensions:** 475mm (18-11/16") width,
140mm (5-1/2") height,
395mm (15-9/16") depth
- **Weight:** 11.2kg (24.7lbs.) net
16.2kg (35.7lbs.) in shipping carton
- **Supplied remote commander RC-17:** Remote control system: Infrared pulse
Power requirements:3V DC
(IEC R6 batteries x 2)
Dimensions :55mm width (2-3/16"),
194mm height (7-5/8"),
18mm depth (11/16")
Weight :100g (including batteries)

Optional accessories

- Toslink optical fiber cable LG-10 (1 m)
(2 m, 3 m, and 5 m cables also available)



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