

Digital Frequency Dividing Network DF-75



Accuphase Laboratory, Inc.

The DF-75 is a frequency-dividing network for a multi-amplifier system, dividing the music signal into multiple frequency bands.

In 1999, Accuphase launched the DF-35, a digital frequency dividing network that utilizes digital signal processing for implementing filters.

Subsequent model changes include the DF-45, DF-55, and DF-65. The DF-75 is the fifth-generation digital frequency dividing network.

Technical highlights of DF-75;

- The performance of the A/D and D/A conversion circuits has been improved
- Adoption of 64-bit floating-point arithmetic
- The cutoff frequency of the filter has been increased to 3101 points

Appearance

- Functionally organized front panel
- Aluminum hairline finished top panel
- Natural wood grain finished side panel



Accuphase Laboratory, Inc.

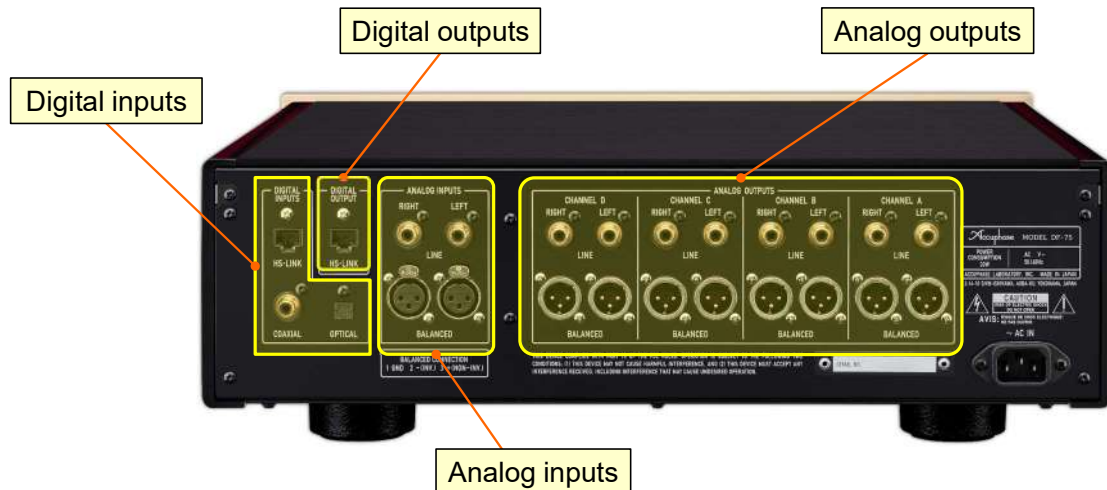
2

The design of the front panel has not changed significantly from the previous DF-65 model, but a new "display off switch" has been added as a feature.

This switch turns off all indications except for the Accuphase logo. In addition, all switches except the display off switch will no longer function.

Rearview

- Various types of input/output terminals



Accuphase Laboratory, Inc.

3

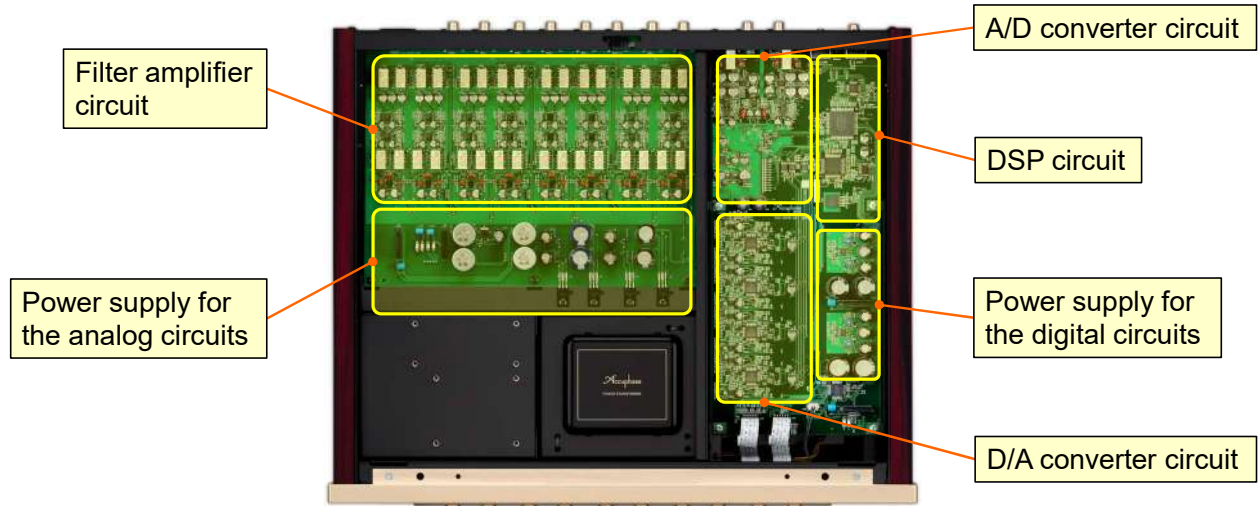
The DF-75 has multiple inputs and outputs as follows:

- Analog input
Balanced / Line
- Digital input
HS-LINK / Coaxial / Optical
- Analog output
Balanced / Line × 4 channel
- Digital output ✕for cascade connection
HS-LINK

HS-LINK: Accuphase original digital interface for audio signal

Internal View

- Isolated layout of analog and digital circuits



Accuphase Laboratory, Inc.

4

The DF-75 utilizes a layout that isolates analog and digital circuits.

The placement of each circuit block is designed to create the shortest signal path possible.

Filter settings

- Filter characteristics can be set precisely and flexibly
 - Cutoff frequency: **3101 points**, 10Hz ~ 50kHz
 - Slope characteristics: 6dB/oct, 12dB/oct, 18dB/oct, 24dB/oct, 48dB/oct, 96dB/oct
 - Absolute phase: Normal/Reverse, Independent setting for left and right channels
 - Level control: +12dB ~ -40dB, 0.1dB step
 - Delay: -3000cm ~ +3000cm, 0.5cm step
- Delay compensator function



Accuphase Laboratory, Inc.

5

The DF-75 can precisely and flexibly set filter characteristics.

In particular, the cutoff frequency has been greatly increased from 59 points for the previous model DF-65 to 3101 points.

The "Delay compensator function" compensates for the delay when a signal passes through the filter, and the amount of delay is automatically set based on the filter characteristics.

High-precision filter engine

- High-precision filter engine using Analog Devices' DSP ADSP-21565
 - 64-bit floating-point arithmetic when $F_s \leq 192\text{kHz}$
 - 40-bit floating-point arithmetic when $F_s > 192\text{kHz}$



Accuphase Laboratory, Inc.

6

The DF-75 is equipped with Analog Devices' DSP ADSP-21565 for high-precision computation.

For signal processing, 64-bit floating-point arithmetic is used for sampling frequencies F_s of 192 kHz or lower, while 40-bit floating-point arithmetic is used for F_s above 192 kHz.

Electrical performances

- Guaranteed specifications have evolved from the former model DF-65

Guaranteed specification

Specification*	DF-65	DF-75
S/N ratio	116dB	117dB
THD+Noise	0.0007%	0.0006%
Channel separation**	108dB	110dB

* All specifications are measured with analog input - analog output

** 20Hz - 20kHz

Accuphase Laboratory, Inc.

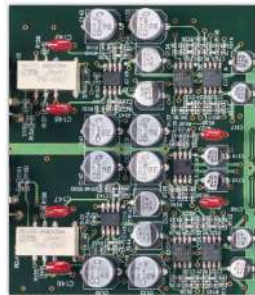
7

Analog performance is significant since the channel divider is usually connected between the preamplifier and the power amplifier.

The DF-75 has improved the electrical performance of the analog circuit section over the previous model by evolving the A/D and D/A conversion circuits.

High-performance A/D converter circuit

- 4 A/D converters per channel in parallel operation
- Ultra-low noise and distortion technology ANCC*
- Fully balanced configuration
- Featured Asahi Kasei Microdevices AK5578



* Refer appendix

Accuphase Laboratory, Inc.

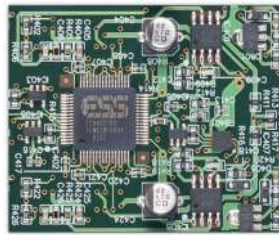
8

The A/D converter section is a fully balanced configuration, with four ADCs connected in parallel for each channel. Furthermore, ANCC, a noise and distortion canceling technology, is incorporated.

The A/D converter chip is Asahi Kasei Microdevices AK5578.

High-performance D/A converter circuit

- 4 D/A converters per channel in parallel operation
- DACs parallel technique MDS+* circuit
- Ultra-low noise and distortion technology ANCC*
- Fully balanced configuration
- Featured ESS Technology ES9028PRO



* Refer appendix

Accuphase Laboratory, Inc.

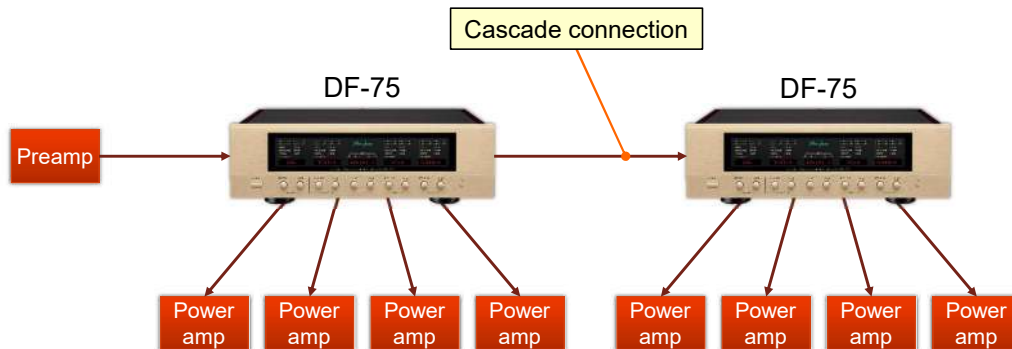
9

The D/A converter section is a fully balanced configuration, employing Accuphase's proprietary MDS+ conversion principle, with four DACs connected in parallel for each channel. It also features ANCC, a noise and distortion cancellation technology.

The D/A converter chip is ESS Technology ES9028PRO.

Furthermore

- Fully functional system backup
- Simple setting mode, Independent setting mode
- Cascade connection to increase the number of channels



Accuphase Laboratory, Inc.

10

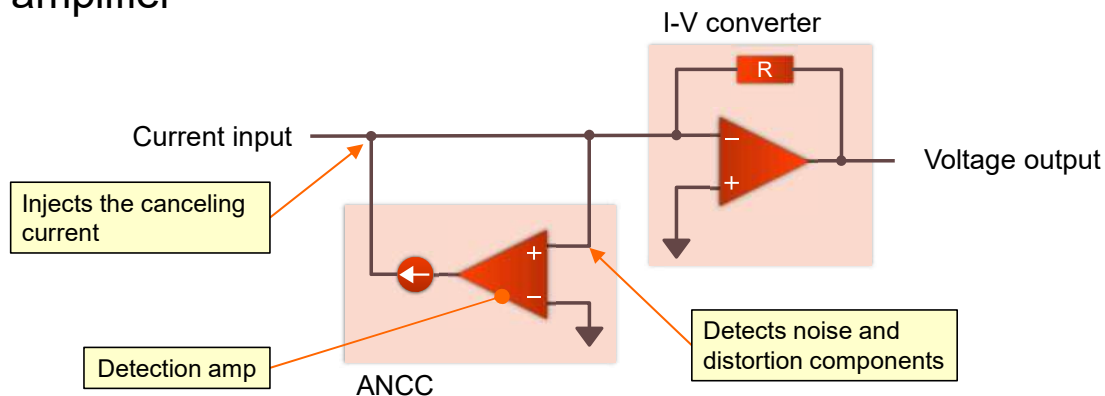
DF-75 offers a fully functional backup feature, allowing users to save all memories and basic setting parameters for restoration as needed.

While users can simultaneously set both the channel's level and delay values in simple setting mode, they can put the values for each channel separately using the independent setting mode.

DF-75 opens up possibilities with its cascade connection capability through HS-LINK. The signal from the preamplifier can be effortlessly distributed to another DF-75, creating a multi-amplified system with more than 4 ways.

Appendix “ANCC”

- ANCC: Accuphase Noise and distortion Canceling Circuit
 - To detect and cancel the noise and distortion at the input stage of amplifier



Accuphase Laboratory, Inc.

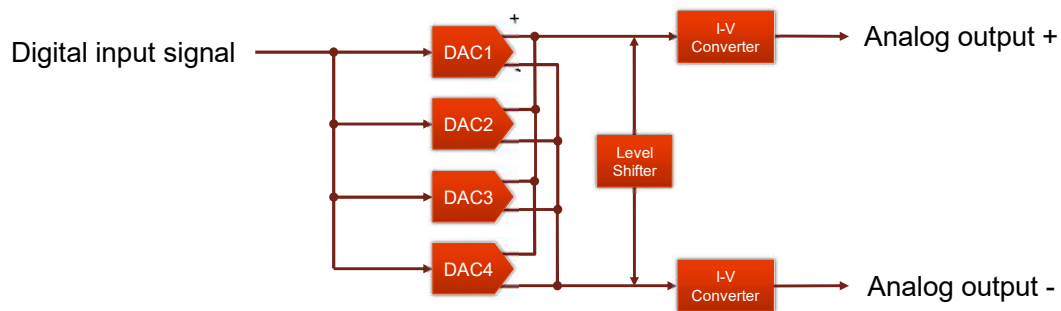
11

ANCC: “Accuphase Noise and distortion Canceling Circuit”

ANCC is a circuit technology that cancels noise and distortion by detecting noise and distortion components in the amplifier input and then injecting a cancellation current that inverts the polarity of the components.

Appendix “MDS+”

- MDS+: Multiple Delta-Sigma+
 - Technique to make D/A converter parallel operation
 - The root of the number of parallels improves performance



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, canceling the conversion error and the noise. 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 DF-75, all performances are improved by a factor of two.