

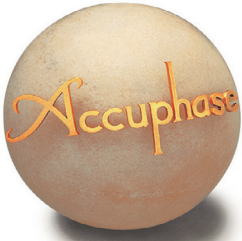
# Accuphase

INTEGRATED STEREO AMPLIFIER

## E-360

- Revolutionary AAVA volume control
- Output stage with high-power transistors in parallel push-pull arrangement delivers high quality power: 100 watts x 2 into 8 ohms
- Instrumentation amplifier principle for power amplifier input stage allows fully balanced signal transmission
- Logic-control relays for shortest signal paths
- Robust power supply with large high-efficiency transformer and high filtering capacity
- Numeric indication of volume level





**High class 100 W/channel (8 ohms) integrated amplifier — AAVA volume control principle ensures optimum sound quality and performance, with precise numeric indication of volume level. Instrumentation amplifier principle in power stage enables fully balanced signal transmission, combined with current feedback design. High-power transistors in parallel push-pull output stage, and power supply with massive high-efficiency transformer and large filtering capacitors provide ample reserves for high output power.**

The extremely well regarded E-300 series of integrated amplifiers occupies a central position in the Accuphase lineup, and enjoys enduring popularity both in Japan and abroad. The E-360 represents a full model change from the E-350, incorporating the AAVA volume control and other sophisticated technological know-how gained by Accuphase over the years. Only strictly selected high-grade materials and parts are used, resulting in an integrated amplifier that brings out the full potential of every source, for a truly enchanting musical experience. AAVA is a revolutionary principle that redefines the concept of volume control from the ground up. Unlike the digital approach involving A/D and D/A processing, it operates purely in the analog domain for high performance and ultimate sound. Because the music signal does not pass through any variable resistors, it is not subject to the adverse effects of impedance changes. Adjusting the volume level is accomplished practically without altering the sonic quality. As the amplification and volume control tasks are integrated in a single electronic entity without any variable resistors, performance and sonic purity do not deteriorate over the years, providing excellent reliability. The selected volume level is clearly shown by the numeric display in the center of the front panel, allowing the user to set precisely the desired level every time. The power amplifier section is built as an advanced instrumentation amplifier, which enables fully balanced signal transmission throughout. Together with the highly acclaimed current feedback principle, this makes for even better electrical characteristics. In the output stage, high-power audio-grade transistors are arranged in a parallel push-pull configuration which significantly enhances drive capability of low-impedance loads. Output operation is sustained by a massive transformer and large filtering capacitors, providing high-quality power output of 140 watts x 2 into 4 ohms or 100 watts x 2 into 8 ohms.

- Power amplifier unit with high-power transistors in parallel configuration delivers ample power: 140 watts/channel into 4 ohms or 100 watts/channel into 8 ohms.
- Instrumentation amplifier principle in power amplifier section allows fully balanced signal paths. Current feedback circuit topology ensures outstanding high-range phase characteristics.
- Hefty high-efficiency transformer and large filtering capacitors (22,000  $\mu\text{F}$  x 2) provide ample reserves.
- Redesigned NFB path results in minimized output impedance, improved damping factor, and even better sound quality.
- Analog peak power meters for monitoring output levels.
- Tone controls using active filters for optimum sound quality.
- Loudness compensator for enhanced sonic impact at low listening levels.
- Two option board installation slots on rear panel.
- Digital input and analog record playback can be realized via option boards. With AD-20 board, MC/MM switching on E-360 front panel is possible.
- EXT PRE button and preamplifier output/power amplifier input connectors allow independent use of pre and power amplifier sections.
- Output phase selectable individually for each input, with visual indication. When INV LED is lit, output phase is inverted. When LED is out, phase is normal.
- Dedicated headphone amplifier optimized for sound quality.
- Logic-controlled relays assure high sound quality and long-term reliability.
- Versatile array of inputs with two balanced inputs to shut out external noise interference.
- "High Carbon" cast iron insulator feet with superior damping characteristics further enhance sound quality.
- Two sets of large-size speaker terminals accept Y lugs and enable speaker bi-wiring.



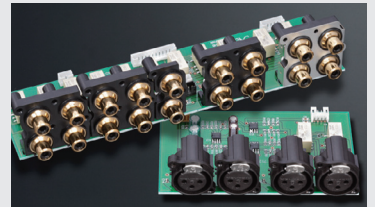
Large power transformer



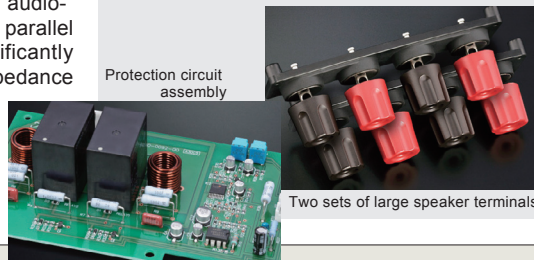
Filtering capacitors



MC/MM selector EXT PRE button PHASE selector

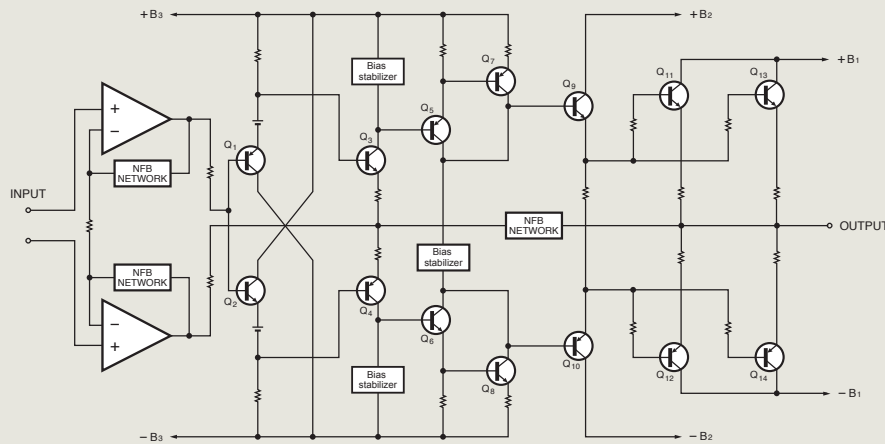


Line input and output connectors and balanced input connectors

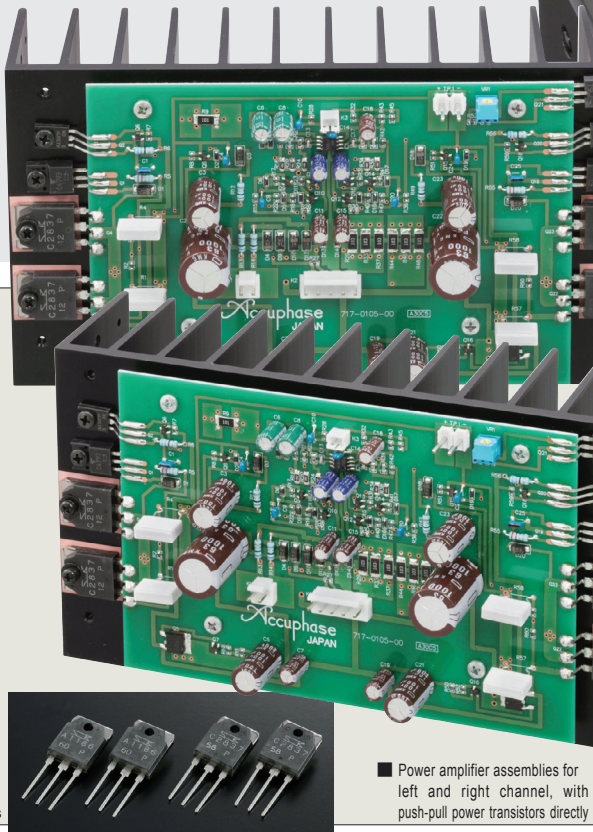


Protection circuit assembly

Two sets of large speaker terminals



Circuit diagram of E-360 power amplifier (one channel)



High power transistors

Power amplifier assemblies for left and right channel, with push-pull power transistors directly



# AAVA (Accuphase Analog Vari-gain Amplifier) Volume Control

AAVA is a radically different volume control principle that eliminates all variable resistors from the signal path and provides top-notch performance and sound quality. Because the music signal is not affected by changes in impedance, high signal-to-noise ratio and low distortion are maintained at any volume control setting.

## Volume control resolution

AAVA adjusts the listening volume by means of 16 weighted V-I converter amplifiers which are controlled by current switches. The number of possible volume steps set by the combination of these converter amplifiers is 2 to the power of 16 = 65,536.

## Input buffer amps use 5-MCS topology

One of the factors that have a bearing on possible noise in an AAVA arrangement is the input buffer design. By connecting five high-performance amps in parallel, excellent S/N ratio is assured.

## AAVA maintains high S/N ratio and uniform frequency response

Unlike with conventional volume controls, AAVA does not introduce a change in impedance at any volume setting. Consequently, there is no deterioration of S/N ratio, and frequency response remains totally uniform. The benefits are especially apparent at settings that correspond to normal listening levels, because the tonal quality is not altered in any way.

## No more left/right tracking differences or crosstalk

Because AAVA is an electronic circuit employing fixed-value resistors, there is virtually no left/right tracking error also at low volume levels. Since channels can be kept separate, crosstalk also does not present a problem.

## AAVA means analog processing

The AAVA circuit converts the music signal from a voltage into a current, switches gain by means of current switches, and then reconverts the current into a voltage. The entire process is carried out in the analog domain.

## Same operation feel as a conventional high-quality volume control

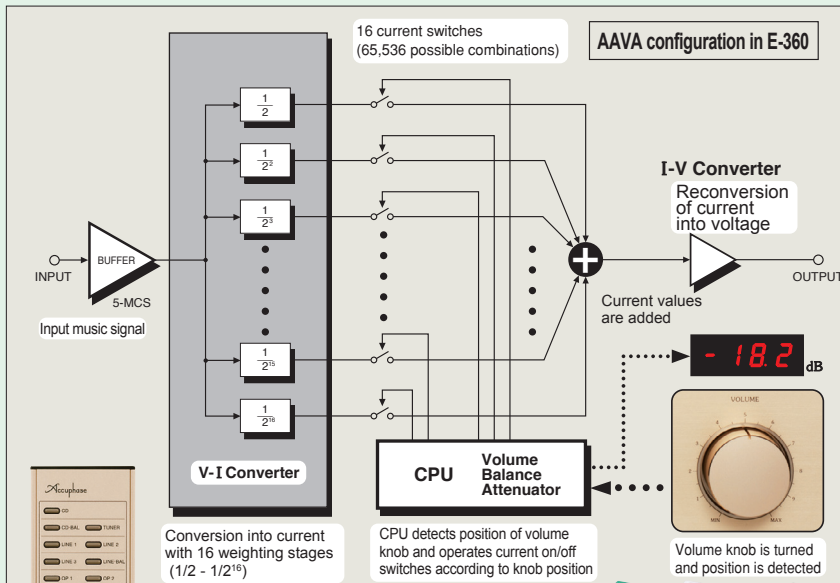
The volume control knob position is detected by a dedicated CPU which in turn selects the current switches for AAVA operation. Operating the knob therefore feels exactly the same as with a conventional control, and as before, operation via the remote commander is also possible.

## Attenuator and balance control also implemented by AAVA

The functions of the attenuator and the left/right balance control are covered by the AAVA circuit as well, eliminating the need for additional circuit stages. Keeping the configuration simple helps to maintain high performance and sonic purity.

## Display shows volume level as numeric value

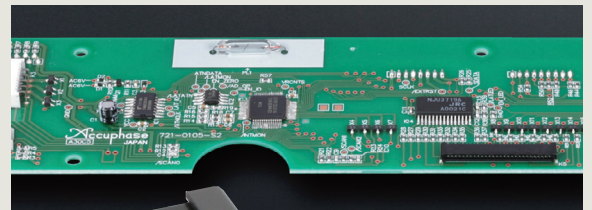
The volume level (degree of attenuation) as set with AAVA is shown as a numeric indication in the center of the front panel. The indication ranges from MAX (0 dB) to MIN (lowest setting).



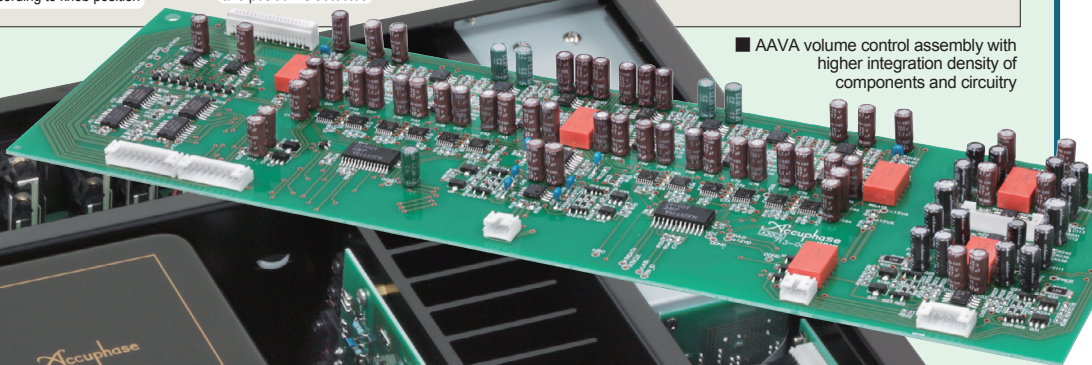
## AAVA operation principle

The music signal is converted into 16 types of weighted current by V-I (voltage - current) converting amplifiers [1/2, 1/2<sup>2</sup>, ... 1/2<sup>15</sup>, 1/2<sup>16</sup>]. The 16 currents are turned on or off by 16 current switches, and the combination of switch settings determines the overall volume. The switching operation is controlled by a CPU according to the position of the volume control knob. The combined signal current forms a variable gain circuit that adjusts the volume. Finally, the combined current is converted back into a voltage by an I-V (current - voltage) converter.

## CPU assembly which controls AAVA and various other functions



## AAVA volume control assembly with higher integration density of components and circuitry



Supplied remote commander RC-200 Allows volume adjustment and input source switching.



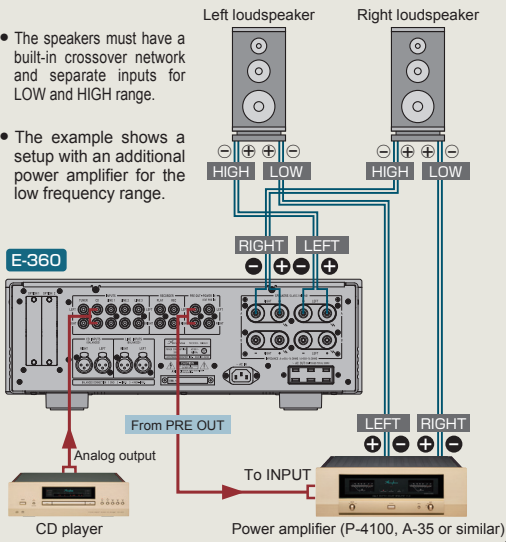
output stage and parallel mounted to large heat sink



## Connection example for bi-amping setup

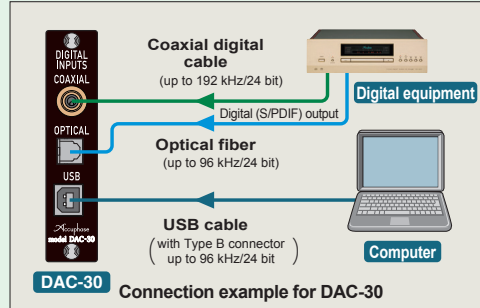
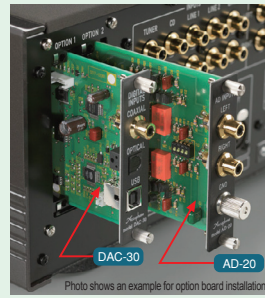
In a bi-amped setup, the speaker units for the LOW frequency range and HIGH frequency range are driven by separate amplifiers, for even better sound quality.

- The speakers must have a built-in crossover network and separate inputs for LOW and HIGH range.
- The example shows a setup with an additional power amplifier for the low frequency range.



## Option Boards

- The E-360 provides two slots for option boards on the rear panel.
- Option boards can be used to implement direct connection of digital signals for high-quality music playback, or to implement high-quality playback of analog records.
- It is possible to install two identical boards in the slots.



## Digital Input Board

DAC-30

Features an MDS (Multiple Delta Sigma) ++ type D/A converter. The USB port allows connection to a computer with a downloaded music library for playback of high-resolution data with optimum sound quality.

- COAXIAL: 75-ohm coaxial cable  
Sampling frequency 32 kHz - 192 kHz, 24 bit resolution
- OPTICAL: Optical fiber cable  
Sampling frequency 32 kHz - 96 kHz, 24 bit resolution
- USB: USB cable (with Type B connector)  
Sampling frequency 32 kHz - 96 kHz, 24 bit resolution

## Analog Disc Input Board

AD-20

This board serves for playback of analog records. It contains a high-performance, high-gain phono equalizer.

- MC/MM switching is possible on the front panel of the E-360.
- Internal DIP switches control MC input impedance and subsonic filter on/off.

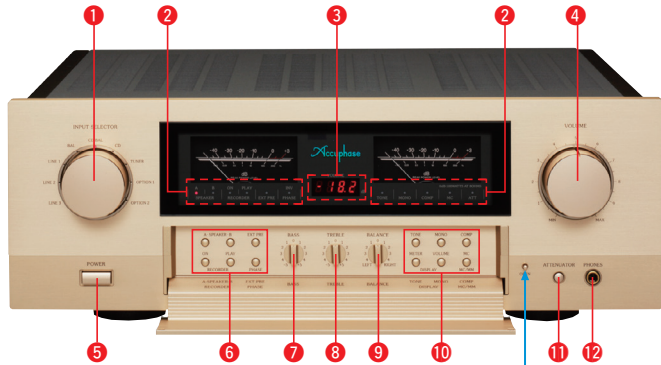
|    |   |
|----|---|
| MC | Gain: 62 dB<br>Input impedance: 10/30/100 ohms (selectable) |
| MM | Gain: 36 dB<br>Input impedance: 47 kilohms                  |

## Line Input Board

LINE-10

This option board provides an additional set of unbalanced line inputs.

## Front panel



## Rear panel



- |  |  |
|--|--|
| 1 Input selector   | 11 Attenuator button   |
| 2 Function indicator LEDs  | 12 Headphone jack  |
| 3 Volume level indication  | 13 Line inputs   |
| 4 Volume control   | 14 TUNER CD LINE 1, 2, 3   |
| 5 Power switch   | 15 Recorder inputs and outputs   |
| 6 Function buttons   | 16 Preamplifier outputs  |
| Speaker selectors (A: ON/OFF, B: ON/OFF)   | 17 Power amplifier inputs  |
| Recording selector (ON/PLAY)   | 18 Left/right speaker output terminals (2 sets, A/B)                   |
| Preamplifier/power amplifier separator (EXT PRE)Phase selector   | 19 CD/LINE inputs (balanced)   |
| 7 Bass control   | Pin ② : -, Pin ③ : +<br>(Can be switched with phase selector button ⑥) |
| 8 Treble control   | 19* AC power connector*  |
| 9 Balance control  |  |
| 10 Function buttons  |  |
| Tone control (ON/OFF), MONO/STEREO selector,<br>Meter operation (ON/OFF), Volume level display (ON/OFF),<br>Loudness compensator, MC/MM selector |  |

## 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.

## E-360 Guaranteed Specifications

[Guaranteed specifications are measured according to EIA standard RS-490.]

- Continuous Average Output Power (both channels driven, 20-20,000 Hz)  
140 watts per channel into 4 ohms  
120 watts per channel into 6 ohms  
100 watts per channel into 8 ohms

- Total Harmonic Distortion (both channels driven, 20-20,000 Hz)  
0.05% with 4 to 16-ohm load

- Intermodulation Distortion 0.01%

- Frequency Response HIGH LEVEL INPUT/POWER INPUT  
20 - 20,000 Hz +0, -0.2 dB (for rated continuous average output)  
3 - 150,000 Hz +0, -3.0 dB (for 1 watt output)  
200 (with 8-ohm load, 50 Hz)

- Damping Factor
- Input Sensitivity, Input Impedance

| Input            | Input sensitivity |                     | Input impedance |
|------------------|-------------------|---------------------|-----------------|
|                  | For rated output  | For 1W output (EIA) |                 |
| HIGH LEVEL INPUT | 142 mV            | 14.2 mV             | 20 kilohms      |
| BALANCED INPUT   | 142 mV            | 14.2 mV             | 40 kilohms      |
| POWER INPUT      | 1.13 V            | 113 mV              | 20 kilohms      |

- Output Voltage, Output Impedance PRE OUTPUT: 1.13 V, 50 ohms (at rated continuous average output)

- Gain HIGH LEVEL INPUT → PRE OUTPUT: 18 dB  
POWER INPUT → OUTPUT: 28 dB

- Tone Controls Turnover frequency and adjustment range  
BASS: 300 Hz ±10 dB (50 Hz)  
TREBLE: 3 kHz ±10 dB (20 kHz)

- Loudness Compensation +6 dB (100 Hz)
- Attenuator -20 dB

- Signal-to-Noise Ratio
- | Input          | Input shorted (A weighting)<br>S/N ratio at rated output |        | EIA S/N |
|----------------|--|--------|---------|
|                | HIGH LEVEL INPUT   | 105 dB |         |
| BALANCED INPUT | 97 dB  | 95 dB  |         |
| POWER INPUT    | 122 dB   | 101 dB |         |

- Power Level Meters Logarithmic compression, peak reading meters, output dB/% scale
- Load Impedance 4 - 16 ohms

- Stereo Headphones Suitable impedance: 8 - 100 ohms
- Power Requirements AC 120 V/220 V/230 V 50/60 Hz (Voltage as indicated on rear panel)
- Power Consumption 49 watts idle  
280 watts in accordance with IEC 60065

- Maximum Dimensions Width 465 mm (18-5/16") Height 171 mm (6-3/4")  
Depth 422 mm (16-5/8")
- Mass 21.7 kg (47.8 lbs) net  
28.0 kg (61.7 lbs) in shipping carton

## Supplied accessories:

- AC power cord
- Remote commander RC-200