

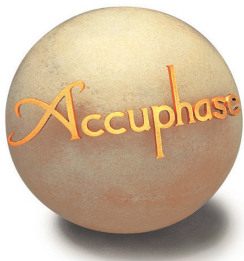
Accuphase

INTEGRATED STEREO AMPLIFIER

E-460

- Revolutionary AAVA volume control
- Output stage with triple parallel push-pull power MOS-FETs delivers high quality power: 180 watts x 2 into 8 ohms
- Instrumentation amplifier principle for power amplifier input stage allows fully balanced signal transmission, amplifier stage uses current feedback and MCS+ topology
- Logic-control relays for straight and short signal paths
- Robust power supply with large high-efficiency toroidal transformer and high filtering capacity





High End 180 W (8 Ohms) Integrated Amplifier – Innovative AAVA volume control and triple parallel push-pull power MOS-FET arrangement in output stage. Power supply featuring massive high-efficiency toroidal transformer and large filtering capacitors provides ample reserves for high output power. Instrumentation amplifier principle in power stage enables fully balanced signal transmission. Current feedback design combined with further improved MCS+ topology.

The successful and long-running E-400 series from Accuphase has garnered high praise both in Japan and abroad and is widely regarded as the pivotal line of high-end integrated amplifiers. The E-460 represents a model change from the popular E-450. It incorporates the sophisticated technological know-how gained by Accuphase over the years, and features a further refined AAVA volume control. It also marks a return to MOS-FET devices in class A/B integrated amplifier from Accuphase. Latest circuit topology and strictly selected parts bring out the hidden potential in each music source. Rediscover the joys of music with this high-class integrated amplifier.

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 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 power amplifier section is built as an advanced instrumentation amplifier, which enables fully balanced signal transmission throughout. Together with the further improved MCS+ circuit topology and the highly acclaimed current feedback principle, this makes for even better electrical characteristics. In the output stage, high-power MOS-FET devices renowned for their great sound and utter reliability are arranged in a triple parallel push-pull configuration per channel. MOS-FETs have excellent frequency response and high input impedance which reduces the load on the preceding driver stage. They also have perfect thermal stability. The power supply features a massive toroidal transformer and large filtering capacitors, sustaining the high-quality power output rated at 260 watts x 2 into 4 ohms or 180 watts x 2 into 8 ohms.

■ Power amplifier unit with power MOS FETs in triple parallel configuration delivers ample power: 180 watts/channel into 8 ohms or 260 watts/channel into 4 ohms.

■ Instrumentation amplifier principle in power amplifier section allows fully balanced signal paths. Current feedback design ensures outstanding high-range phase characteristics, together with further improved MCS+ topology.

■ Massive high-efficiency toroidal transformer and large filtering capacitors (33,000 μF x 2) provide ample reserves.

■ 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.

■ EXT PRE switch and power amplifier input connectors allow independent use of power amplifier section.

■ Two option board installation slots provide further versatility. With AD-20 board, MC/MM switching on E-460 front panel is possible.

■ Dedicated headphone amplifier optimized for sound quality.

■ Analog peak power meters for monitoring output levels.

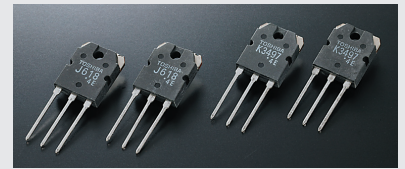
■ Loudness compensator for enhanced bass at low listening levels.

■ Tone controls using active filters for optimum sound quality.

■ Two sets of large-size speaker terminals accept also Y lugs.

■ 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.



Power MOS-FETs



Toroidal power transformer



"EXT PRE" selector

"PHASE" selector



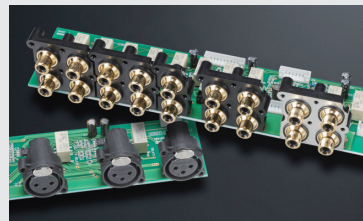
Filtering capacitors



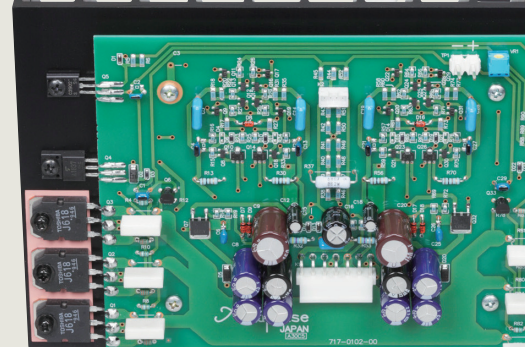
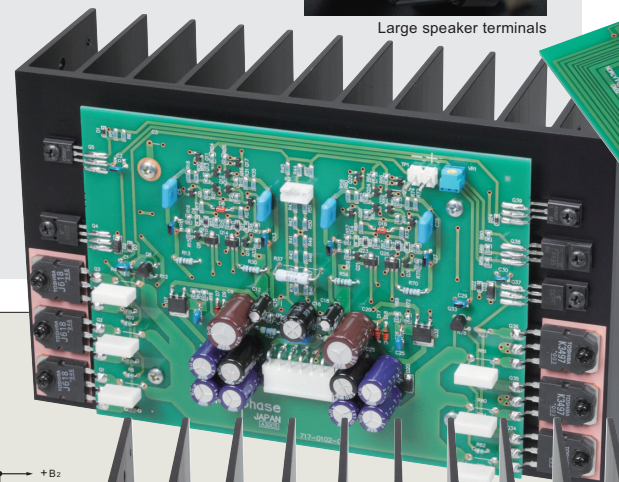
MC/MM selector



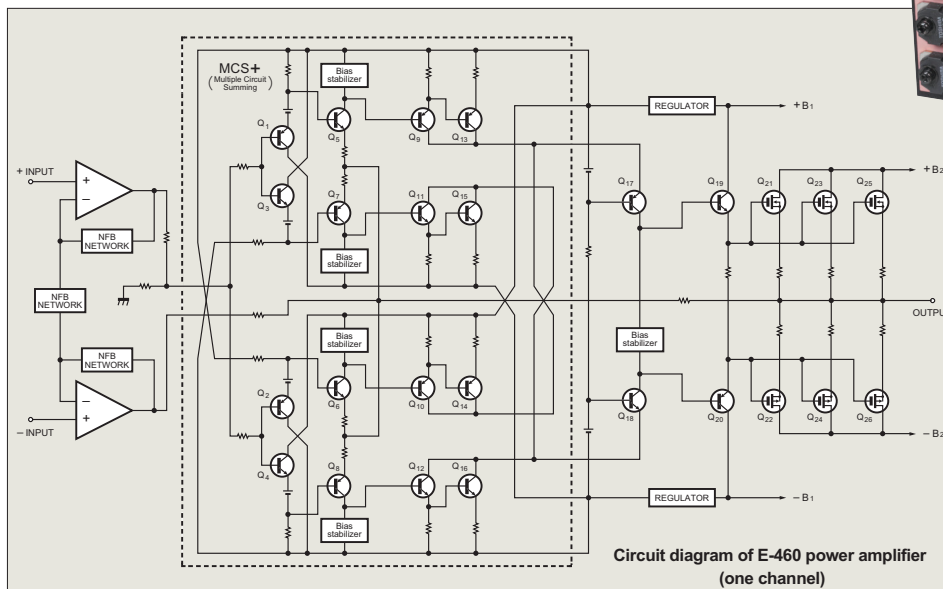
Large speaker terminals



Line input and output connectors and balanced input connectors



■ Power amplifier assembly and output stage with triple parallel push-pull power MOS-FETs directly mounted to large heat sink



Circuit diagram of E-460 power amplifier (one channel)

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

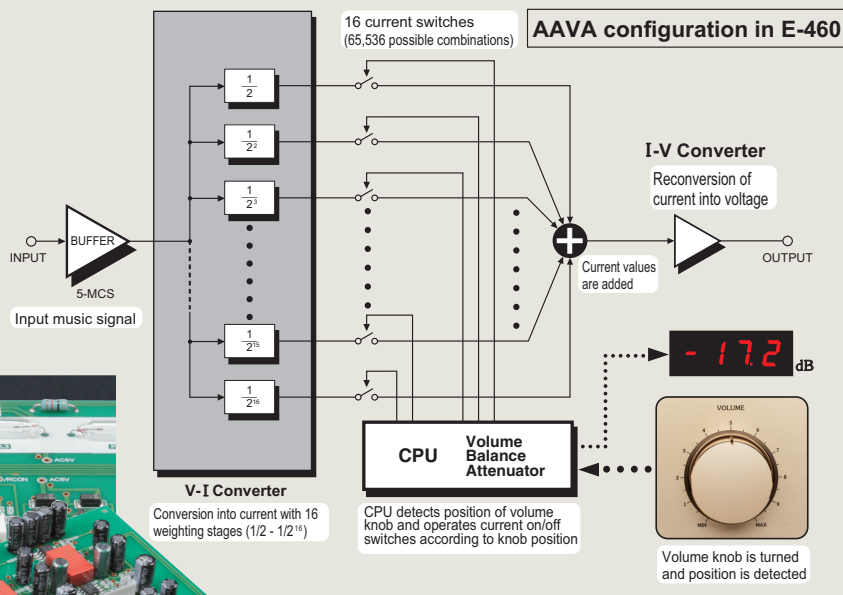
The functions of the attenuator and the left/right balance control are covered by the AAVA circuit as well, eliminating the need for additional circuit stages. Keeping the configuration simple helps to maintain high performance and sonic purity.

■ Display shows volume level as numeric value

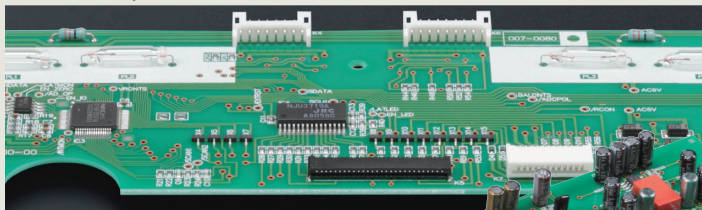
The volume level (degree of attenuation) as set with AAVA is shown as a numeric indication in the center of the front panel. The indication ranges from MAX (0 dB) to MIN (lowest setting).

AAVA operation principle

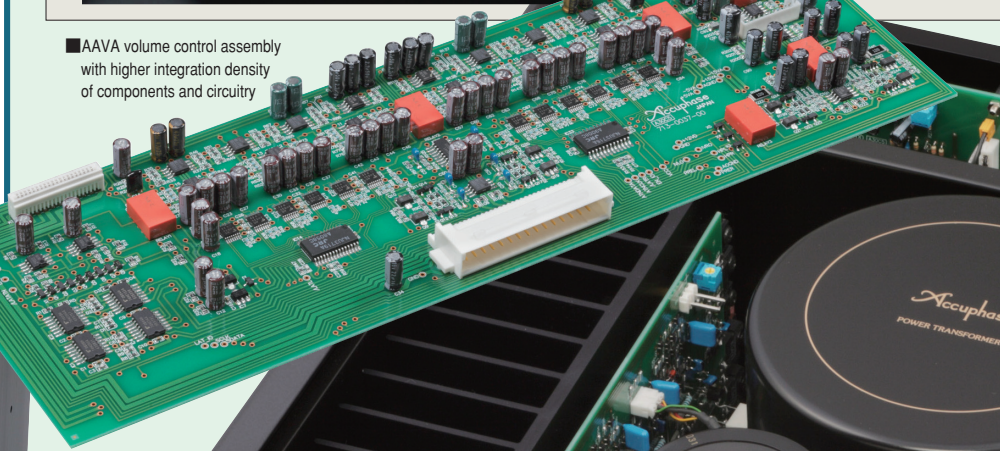
The music signal is converted into 16 types of weighted current by V-I (voltage - current) converting amplifiers [$1/2, 1/2^2, \dots, 1/2^{15}, 1/2^{16}$]. The 16 currents are turned on or off by 16 current switches, and the combination of switch settings determines the overall volume. The switching 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



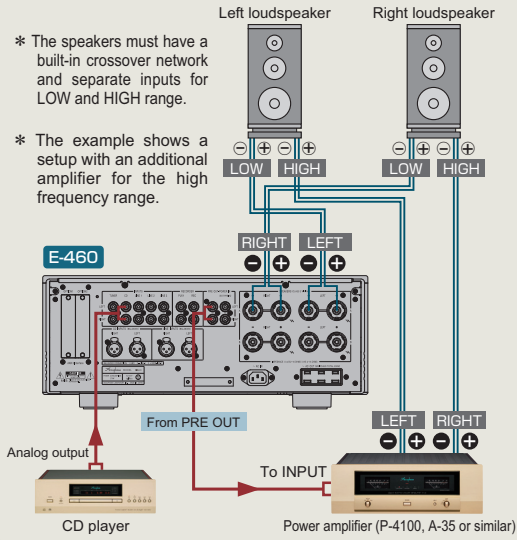
■ Supplied remote commander RC-200 Allows volume adjustment and input source switching.



Connection example for bi-amping setup

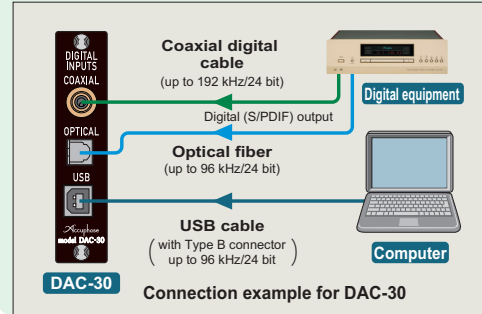
In a bi-amped setup, the speaker units for the LOW frequency range and HIGH frequency range are driven by separate amplifiers, for even better sound quality.

- * 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 amplifier for the high frequency range.



Option Boards

- The E-460 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/DAC-20

These boards feature a high-performance MDS (Multiple Delta Sigma) ++ type D/A converter. The USB port of the DAC-30 allows connection to a computer with a downloaded music library, for playback of high-resolution data with optimum sound quality.

DAC-20

- Inputs for coaxial and optical fiber connections, with support for up to 96 kHz sampling frequency/24 bit resolution.

DAC-30

- Inputs for coaxial fiber connections with support for up to 192 kHz sampling frequency/24 bit resolution, and optical fiber and USB (Type B) connections, with support for up to 96 kHz sampling frequency/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-460.
- Internal DIP switches control MC input impedance and subsonic filter on/off.

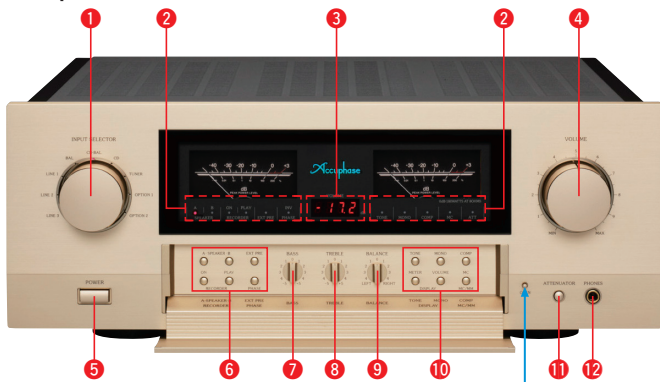
MC Gain: 62 dB
Input impedance: 10/30/100 ohms (selectable)

MM Gain: 36 dB
Input impedance: 47 kilohms

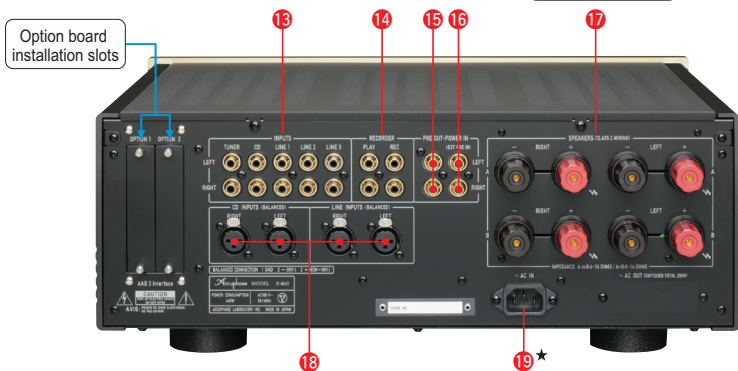
Line Input Board LINE-10

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

Front panel



Rear panel



- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Input selector 2 Function indicator LEDs 3 Volume level indication 4 Volume control 5 Power switch 6 Function buttons Speaker selectors (A: ON/OFF, B: ON/OFF) Recording selector (ON/PLAY) Preamplifier/power amplifier separator (EXT PRE), Phase selector 7 Bass control 8 Treble control 9 Balance control 10 Function buttons Tone control (ON/OFF), Meter operation (ON/OFF), MONO/STEREO selector, Volume level display (ON/OFF), Loudnesscompensator, MC/MM selector | <ul style="list-style-type: none"> 11 Attenuator button 12 Headphone jack 13 Line inputs (unbalanced) TUNER CD LINE 1, 2, 3 14 Recorder inputs and outputs 15 Preamplifier outputs 16 Power amplifier inputs 17 Left/right speaker output terminals A/B 18 CD/LINE input (balanced) Pin ② : -, Pin ③ : +
(Can be switched with phase selector button 6) 19 AC power connector ★ |
|---|--|

Pressing this button opens the sub panel.

E-460 Guaranteed Characteristics

[based on the EIA RS-490 test standard]

- **Rated Continuous Average Output Power**
(both channels operating simultaneously at 20 - 20,000 Hz)
260 W/ch 4-ohm load
220 W/ch 6-ohm load
180 W/ch 8-ohm load
- **Total Harmonic Distortion**
(both channels operating simultaneously at 20 - 20,000 Hz)
0.05% 4 to 16 ohm load
- **IM Distortion** 0.01% or less
- **Frequency Characteristics** LINE 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)
- **Damping Factor** 200 (with 8-ohm load, 50 Hz)
- **Input Sensitivity, Input Impedance**

Input	Sensitivity		Input impedance
	For rated output	For 1 W output (EIA)	
LINE INPUT	190 mV	14.2 mV	20 k Ω
BALANCED INPUT	190 mV	14.2 mV	40 k Ω
POWER INPUT	1.51 V	113 mV	20 k Ω

- **Output Voltage, Output Impedance**
PRE OUTPUT: 1.51 V, 50-ohm (at rated continuous average output)
- **Gain**
LINE 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)	EIA S/N
	S/N ratio at rated output	
LINE INPUT	107 dB	93 dB
BALANCED INPUT	100 dB	93 dB
POWER INPUT	123 dB	100 dB

- **Power Level Meters** Logarithmic compression, peak reading meter (Output dB/% scale)
- **Load Impedance** 4 - 16 ohms
- **Stereo Headphones** Suitable impedance : 8 ohms or above
- **Power Source** AC 120 V/230 V 50/60 Hz
(Voltage as indicated on rear panel)
- **Power Consumption** 92 watts idle
440 watts in accordance with IEC 60065
- **Maximum Dimensions** Width 465 mm (18-5/16")
Height 181 mm (7-1/8")
Depth 428 mm (16-7/8")
- **Mass** 24.4 kg (53.8 lbs) net
30.0 kg (66.1 lbs) in shipping carton

Remarks

- ★ This product is available in versions for 120/230 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.

Supplied accessories:

- AC power cord
- Remote commander RC-200

