

# Accuphase

*Class-A*  
PRECISION INTEGRATED STEREO AMPLIFIER

## E-650

- First integrated amplifier featuring Balanced AAVA volume control
- Pure Class A operation (30 watts into 8 ohms)
- Guaranteed linear power: 120 watts into 2 ohms, 60 watts into 4 ohms, 30 watts into 8 ohms
- Output stage with power MOS-FETs in triple parallel push-pull configuration
- Instrumentation amplifier principle in power amplifier for fully balanced signal transmission, complemented by MCS+ topology and current feedback amplification circuitry
- Strong power supply with massive high-efficiency transformer and large filtering capacitors
- Preamplifier and power amplifier sections can be used separately
- Numeric indication of volume level





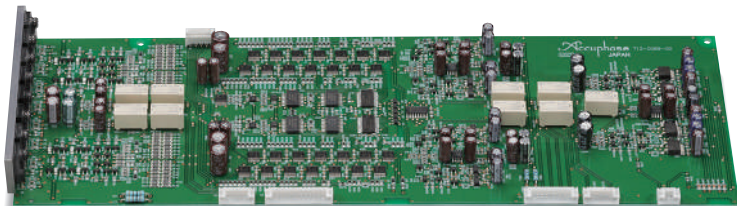
# The Reference Model of a New Integrated Amplifier Generation Aiming for Ultimate Sound With Exquisite Sensibility and a Rich Array of Further Refined Technology

Innovative engineering and top-grade parts and materials come together in this product featuring the superb Balanced AAVA type volume control and a triple parallel arrangement of power MOS-FETs in the output stage. The power amplifier section employs the latest instrumentation amplifier configuration for balanced signal transmission, resulting in an integrated amplifier with fully balanced configuration from the inputs right through to the output. The massive power supply and low-impedance output circuitry deliver 150 watts per channel (into 1 ohm, with music signal) and a damping factor of 800.

## Innovation – At the leading edge of technology

### Balanced AAVA volume control

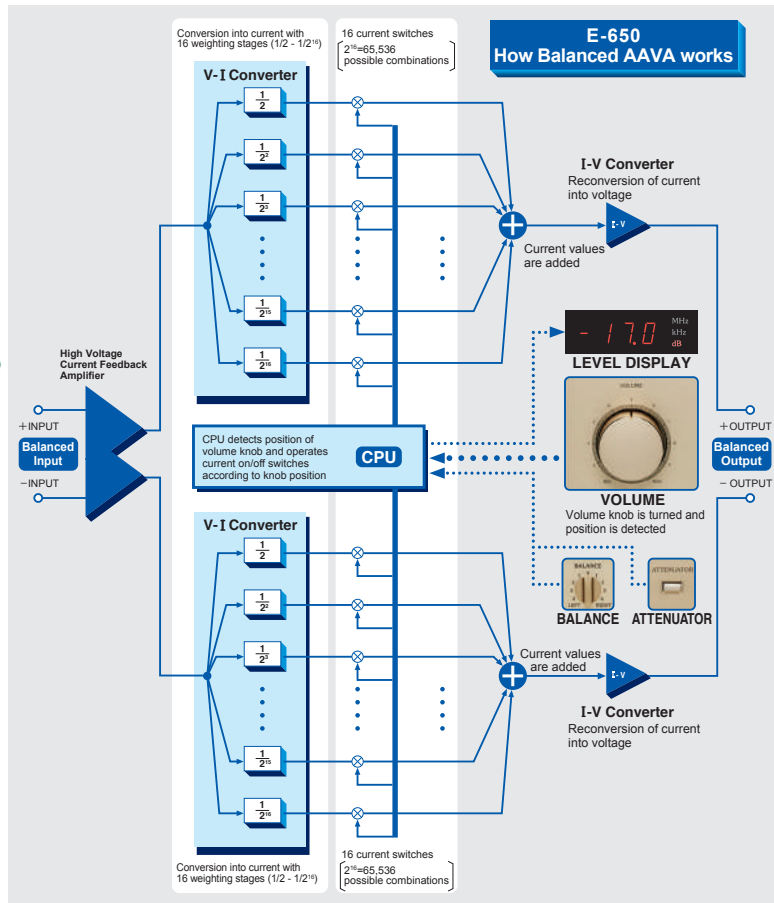
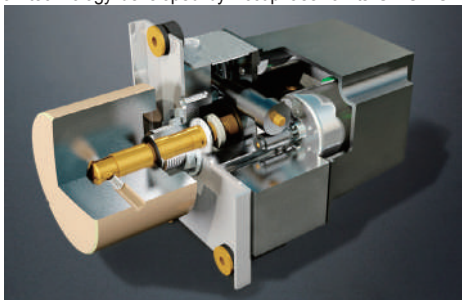
As a first in an integrated amplifier, the E-650 features the sophisticated Balanced AAVA type volume control incorporated in Accuphase's top-of-the-line preamplifier model C-3850. Balanced AAVA uses two AAVA circuits driven in a fully balanced configuration. This completely cancels out any external noise and results in unsurpassed S/N ratio.



■ Balanced AAVA volume control assembly

### High-accuracy, high-rigidity volume sensor construction with massive yet responsive feel

AAVA uses a volume control knob that looks similar to conventional controls. However, Accuphase also paid careful attention to volume sensor construction. The rotary mechanism is assembled with high accuracy and mounted to a highly rigid frame extruded from a single aluminum block. The solid brass shaft has a diameter of 8 mm and gives a pleasingly massive yet responsive operation feel to the volume knob. Floating suspension technology developed by Accuphase for its SA-CD/CD players is used to mount the volume sensor mechanism to the main chassis. Furthermore, utterly smooth and quiet operation is assured also when adjusting the volume with the remote commander, thanks to insulators that dampen any vibrations of the drive motor.



## Sound quality – Simply aiming for the best

■ Triple parallel push-pull output stage with power MOS-FETs and power amplifier stage mounted on a large heat sink. Two identical units are arranged on the left and right sides of the chassis.

■ Class A operation (30 watts into 8 ohms). Guaranteed linear power of 120 watts into 2 ohms, 60 watts into 4 ohms, 30 watts into 8 ohms per channel.

■ Strong power supply with massive high-efficiency toroidal transformer and large filtering capacitors.

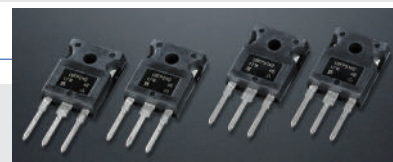
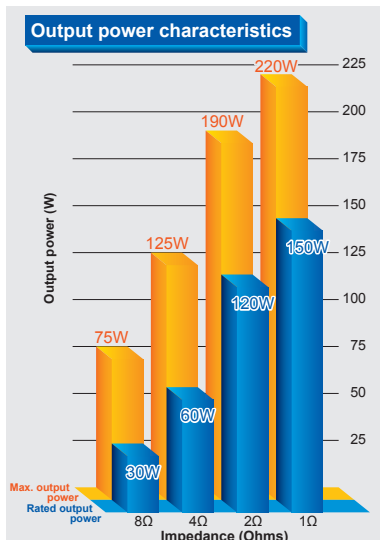
The E-650 uses a massive power transformer with high output capability. Highly effective filtering is realized with two custom-made aluminum electrolytic capacitors, each with a large 50,000 µF rating.



Toroidal power transformer



Filtering capacitors



Power MOS-FETs



Power amplifier assembly

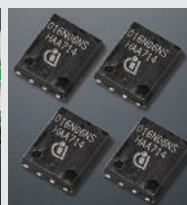


## Advanced Features

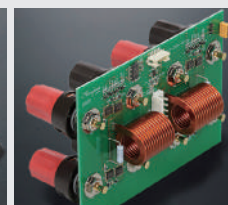
- Power amplifier stage features instrumentation amplifier configuration for balanced signal transmission. MCS+ topology and current feedback principle in amplification circuitry assure excellent phase characteristics in high range.
- Semiconductor (MOS-FET) switches used for protection circuitry prevent contact problems and ensure long-term reliability. Eliminating mechanical contacts from the path of the music signal also further enhances sound quality.
- Logic-controlled relays for signal switching assure high sound quality and long-term reliability.
- MAIN IN switch and preamplifier output and power amplifier input connectors allow independent use of both sections. Both line level and balanced connectors are provided.
- Tone controls with balanced circuit configuration and summing active filters for optimum sound quality.
- Versatile array of inputs with two balanced inputs to shut out external noise interference.
- Individual phase setting supported for each input position.
- Dedicated headphone amplifier constructed with discrete components.
- Two option board installation slots on the rear panel provide further versatility. With the AD-50, AD-30, or AD-20 board, MC/MM switching is performed on the front panel.
- The DAC input selector button allows the user to select the desired input when using the Digital Input Board DAC-50 or DAC-40 With USB Port. Display of the sampling frequency of the locked digital signal is also possible. (This is not supported with the DAC-30, DAC-20, or DAC-10.)
- LED-based bar graph power meters with improved sensitivity and readability.
- Two sets of large speaker terminals that also accept spade connectors or banana plugs.



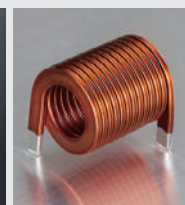
Line and balanced input/output connectors



MOS-FET switches



Protection circuitry

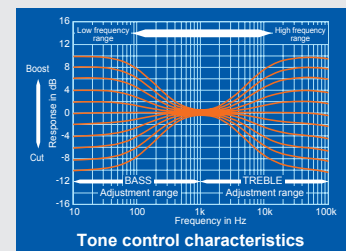
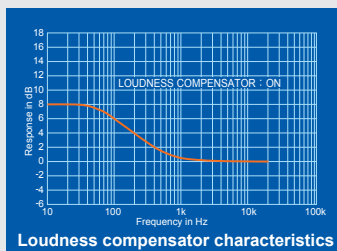


Ultra-heavy-gauge edgewise coil



[Sub panel]

- 1 Speaker output selector
- 2 Button for activating bass/treble tone controls
- 3 Phase selector button for output signal
- 4 Mono/stereo selector button
- 5 Loudness compensator button for enhanced volume impression of bass sounds
- 6 DAC input selector button for use when DAC-50 or DAC-40 is installed
- 7 MC/MM selector button for selecting phono cartridge type when AD-50 or AD-30 is installed
- 8 Display mode selector button for switching between volume level and sampling frequency indication
- 9 MAIN IN selector for separate use of preamplifier and power amplifier sections
- 10 Recorder selector for recording or playback



- Supplied Remote Commander RC-220  
Allows volume adjustment and input source switching.



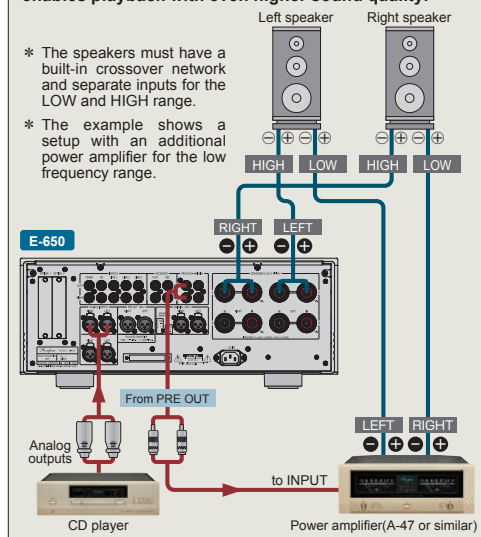


## Bi-amping for further enhanced sound

In a bi-amped setup, the speaker units for the LOW frequency range and the HIGH frequency range are driven by separate amplifiers with equal gain, which enables playback with even higher sound quality.

\* The speakers must have a built-in crossover network and separate inputs for the LOW and HIGH range.

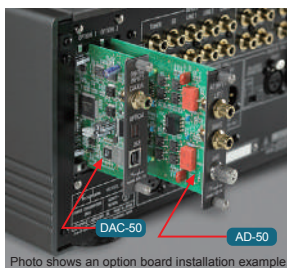
\* The example shows a setup with an additional power amplifier for the low frequency range.



## Dedicated Option Boards

The E-650 has two option board installation slots on the rear panel. These are designed for use with three types of options boards, depending on requirements: DAC-50, AD-50, and LINE-10.

• The following option boards can also be used: DAC-40, DAC-30, DAC-20, DAC-10, AD-30, AD-20, AD-10, AD-9, LINE-9.



### Line Input Board

Provides an additional set of unbalanced line level inputs.

### Analog Disc Input Board

Features a high-performance phono equalizer for playback of analog records.

- MC/MM switching can be performed on the front panel of the E-650.
- On-board switches for input impedance switching and subsonic filter

**MC:** For MC type cartridges with low output voltage  
Gain: 66 dB  
Input impedance: 30/100/300 ohms (selectable)

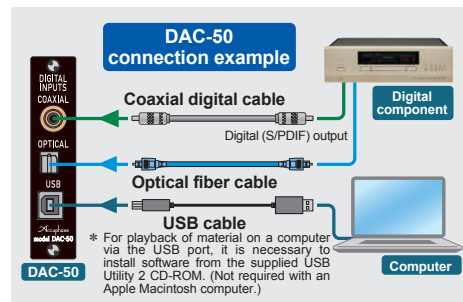
**MM:** For MM type cartridges with high output voltage  
Gain: 40 dB  
Input impedance: 47 kilohms

### Digital Input Board

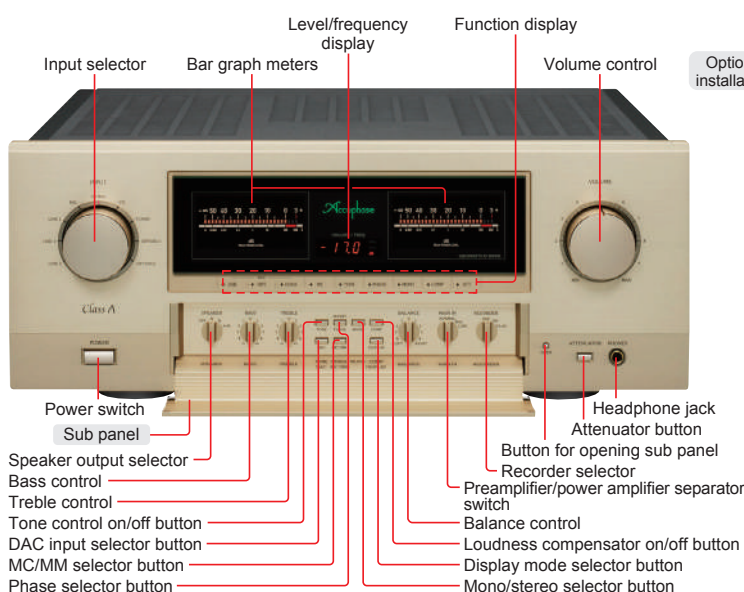
### DAC-50

Provides inputs for reproducing digital music signals from digital components.

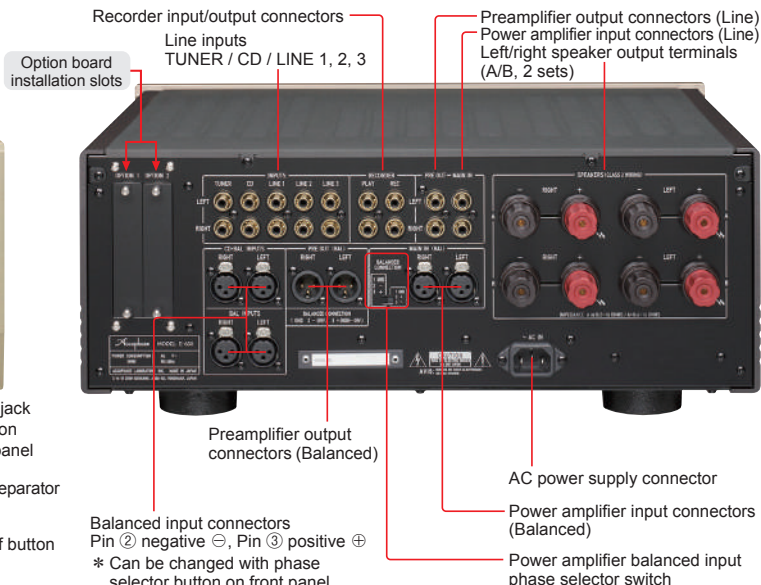
- The front panel display of the E-650 can be used to show the USB/OPTICAL/COAXIAL selection and the sampling frequency.
- **USB:** USB 2.0 cable with Type B connector (max. 2 m)  
USB 2.0 High Speed (480 Mbps) compliant  
Sampling frequency 2.8224 MHz, 5.6448 MHz, 11.2896 MHz/1-bit (11.2896 MHz: ASIO only) 32 kHz to 384 kHz, 32-bit
- **OPTICAL:** Optical fiber, JEITA CP-1212 compliant  
Sampling frequency 32 kHz to 96 kHz, 24-bit
- **COAXIAL:** 75-ohm coaxial cable, IEC 60958/AES-3 compliant  
Sampling frequency 32 kHz to 192 kHz, 24-bit



## Front Panel



## Rear Panel



## E-650 Guaranteed Specifications

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

**Rated Continuous Average Output Power (both channels operating simultaneously, 20 - 20,000 Hz)**

150 W/ch	1-ohm load (*)
120 W/ch	2-ohm load
60 W/ch	4-ohm load
30 W/ch	8-ohm load

Note: \* 1-ohm operation possible with music signals only.

**Total Harmonic Distortion (both channels operating simultaneously, 20 - 20,000 Hz)**

0.05%	2-ohm load
0.03%	4 to 16 ohm load

**Intermodulation Distortion** 0.01%

**Frequency Response** HIGH LEVEL INPUT

At rated continuous average output: 20 - 20,000 Hz +0, -0.5 dB

MAIN IN

At rated continuous average output: 20 - 20,000 Hz +0, -0.2 dB

At 1 watt output: 3 - 150,000 Hz +0, -3.0 dB

**Damping Factor** 800 (with 8-ohm load, 50 Hz)

**Input sensitivity and impedance**

Input	Input sensitivity		Input impedance
	For rated output	For 1 W output (EIA)	
HIGH LEVEL INPUT	77.7 mV	14.2 mV	20 kilohms
BALANCED INPUT	77.7 mV	14.2 mV	40 kilohms
MAIN IN LINE	0.617 V	113 mV	20 kilohms
MAIN IN BAL	0.617 V	113 mV	40 kilohms

**Output Voltage and Impedance**

PRE OUTPUT 0.617 V 50 ohms  
(at rated continuous average output)

**Gain** HIGH LEVEL INPUT → PRE OUTPUT: 18 dB  
MAIN IN → 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 compensator** +6 dB (100 Hz)

**Attenuator** -20 dB

**S/N Ratio, Input-converted Noise**

Input	S/N ratio at rated output (A-weighted, with input shorted)	S/N ratio (EIA)
HIGH LEVEL INPUT	102 dB	97 dB
BALANCED INPUT	102 dB	97 dB
MAIN IN	117 dB	101 dB

**Bar graph meter** Represents output voltage value (dB) using 26 points  
With meter on/off switching function

**Output Load Impedance** 2 to 16 ohms

**Stereo Headphones** Suitable impedance: 8 ohms or higher

**Power Requirements** 120 V/220 V/230 V AC, 50/60 Hz  
(Voltage as indicated on rear panel)

**Power Consumption** 168 W idle  
290 W in accordance with IEC 60065

**Maximum Dimensions** Width 465 mm (18.31")  
Height 191 mm (7.52")  
Depth 428 mm (16.85")

**Mass** 25.3 kg (55.8 lbs) net  
32.0 kg (70.6 lbs) in shipping carton

### 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 230 V version has an Eco Mode that switches power off after 120 minutes of inactivity.
- ★ 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-220



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