

Accuphase

PRECISION STEREO PREAMPLIFIER

C-2400

- Revolutionary AAVA volume control for top performance and superb sound quality
- Fully modular construction with individual left/right amplifier units arranged on motherboard
- Separate power transformers and filtering capacitors for left and right channels
- Logic-controlled relays for shortest signal paths
- High quality tone controls
- Optional analog record playback capability





Innovative AAVA type volume control guarantees great sound and top performance – Experience volume adjustment without deterioration in S/N ratio or distortion. AAVA and other circuit modules are arranged on motherboard separately for left and right channels. Fully dual monaural construction features two separate power transformers. Dedicated phono equalizer unit allows analog record reproduction with superb fidelity.

The C-2400 inherits the design technology of the outstanding Accuphase C-2800, featuring the same AAVA type volume control. One of the most important aspects of a preamplifier is how it handles volume adjustment. AAVA (Accuphase Analog Vari-gain Amplifier) is an innovative concept that differs radically from conventional variable-resistor type volume controls. Amplification and volume control are fully unified, eliminating all mechanical contact points. Pure analog processing ensures optimum performance and superb sound. Doing away with the variable resistor in the signal path has numerous advantages and brings the amplifier

a significant step closer to absolute purity in signal transmission. Another benefit of AAVA is that it is configured only with highly reliable semiconductor components. This assures that performance and sound quality will remain undiminished for many years to come. The large volume knob on the front panel employs a position detection method that combines superb precision with a smooth conventional feel.

The power transformer, filtering capacitors and all other parts of the power supply are duplicated for the left and right channel. What's more, all unit amplifiers such as for line input, balanced output, and AAVA are also entirely separate for

the two channels, arranged on a high-quality motherboard. This fully monaural construction prevents unwanted interaction both on the electrical and the physical plane.

The line amplifier with integrated volume control is a major aspect of the C-2400, but there are also a host of other attractive features in this superb analog preamplifier. Tone controls and loudness compensator allow fine tuning of the sound. Tape recorder and copying facilities as well as an EXT PRE function provide connection flexibility. A phono equalizer unit (AD-2800) for faithful playback of analog records is also available.

AAVA (Accuphase Analog Vari-gain Amplifier) volume control

The newly developed volume control called AAVA (Accuphase Analog Vari-gain Amplifier) is totally different from conventional controls using resistors. Because the music signal does not pass through variable resistors, it is not affected by changes in impedance. This means that high signal-to-noise ratio and low distortion of the signal are maintained. The volume can be adjusted without any deterioration in sound quality.

■ AAVA resolution

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

■ AAVA maintains high S/N ratio

With conventional volume controls, the impedance increases significantly at settings that correspond to normal listening levels, thereby leading to increased noise. Because AAVA performs adjustment by selective use of V-I converter amplifiers (changing the actual gain), there is no change in impedance and thus no deterioration of S/N ratio. Changing the volume with AAVA does not mean introducing noise or detracting from the high performance of the amplifier.

■ No more left/right tracking differences or crosstalk

Because AAVA is an electronic circuit employing highly precise metal film 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.

■ Simple circuit configuration

AAVA unifies the amplifier and volume control functions, resulting in a circuit that is electrically very simple. Long-term reliability is excellent, with performance and sound quality that will remain unchanged also after prolonged use.

■ AAVA means analog processing

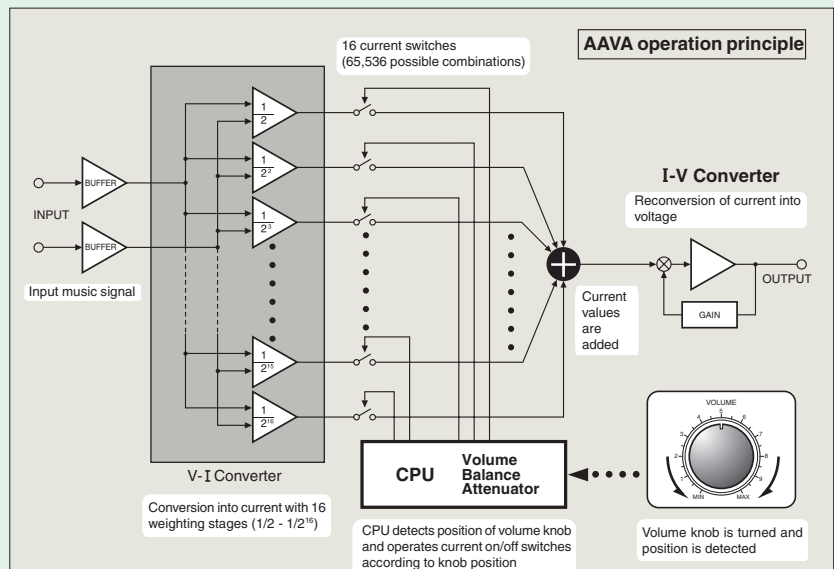
The AAVA circuit converts the music signal from a voltage into a current, switches gain by means of current switches, and then reconverts the current into a voltage. The entire process is carried out in the analog domain.

■ 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.

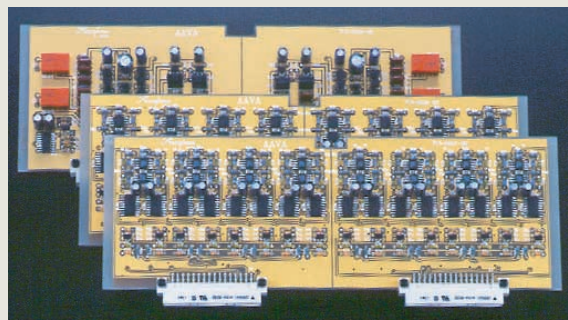
■ Attenuator and balance control also implemented by AAVA

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.



AAVA operation principle

AAVA operates by feeding the music signal to a V-I (voltage - current) converting amplifier where it is weighted in 16 steps [$1/2, 1/2^2, \dots, 1/2^{15}, 1/2^{16}$]. The 16 current steps 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 volume. Finally, the combined current is converted back into a voltage by an I-V (current - voltage) converter.



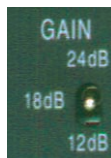
Input buffer, 16 V-I converter amps and current switches, current adder, I-V converter amp, and other circuitry on modular AAVA unit, installed separately for left/right channel on motherboard



■ **Supplied remote commander RC-32**
Allows volume control and input source selection.

Selectable preamplifier gain

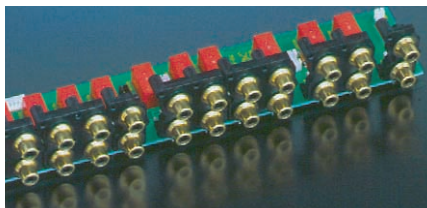
The overall gain of the preamplifier can be set to 12, 18, or 24 dB with a rear-panel switch. This allows the C-2400 to operate at optimum gain in any kind of system.



Factory default: 18 dB

Logic-controlled relays assure high sound quality and long-term reliability

The C-2400 offers a host of input and output connectors and functions. Strategically placed relays prevent any signal degradation that could occur if the signal has to travel through long paths for connection and function switching.



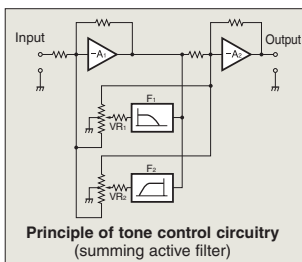
Fully dual monaural construction with separate power transformers and separate board-mounted unit amplifiers for left/right

The input buffer, AAVA circuit, balanced output and other amplifier circuitry are configured as five separate units for each channel, arranged neatly on a motherboard. Power transformers and

smoothing capacitors are also separate for the two stereo channels. This dual monaural approach assures total freedom from unwanted mutual interaction.

Tone controls use summing active filters for highest sound quality

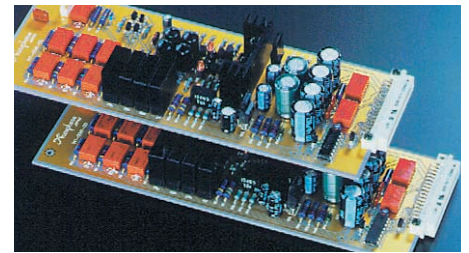
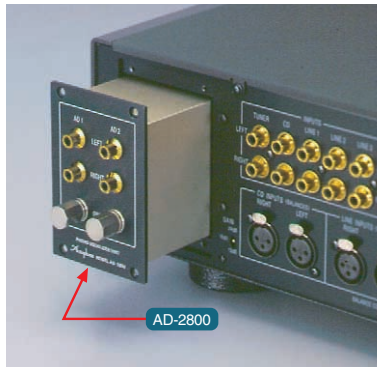
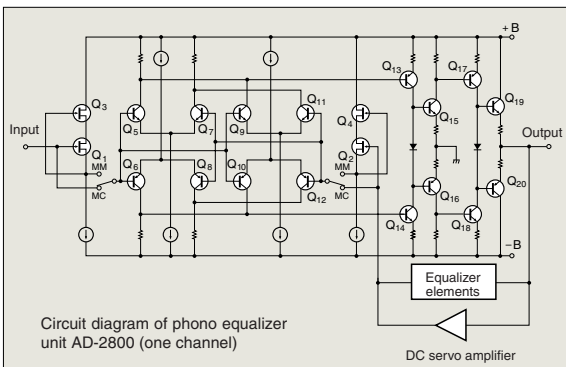
The tone control circuitry in the C-2400 uses summing active filters. The illustration below shows the operation principle of this circuit. The flat signal is passed straight through, and only when an adjustment is required, the characteristics are created at F_1 and F_2 and added to the signal, thereby producing the desired change. This design provides efficient control without degrading signal purity.



- **Flexible input/output configuration**
- **Dedicated headphone amplifier optimized for sound quality**
- **EXT PRE function allows use of external preamplifier**
- **Optional phono equalizer allows playback of analog records**
- **Supplied remote commander with volume control function**
- **Versatile features:**
 - Recording/playback/monitoring facilities for 2 recorders
 - Copy function
 - Loudness compensator for fuller bass at low levels
 - Subsonic filter removes ultra low frequency noise
 - Phase selector
 - Attenuator

Dedicated Phono Equalizer Unit AD-2800

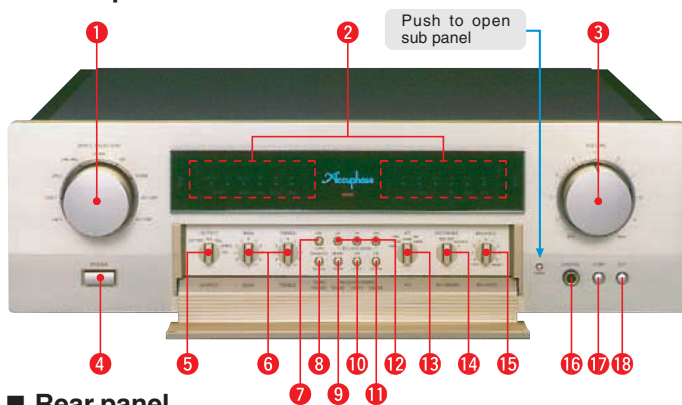
Analog records can be reproduced by installing the dedicated phono equalizer unit AD-2800 in a rear-panel slot. The AD-2800 uses printed circuit boards made from Teflon material (glass fluorocarbon resin) and is housed in a sturdy aluminum case for complete protection against any external interference. Shortest possible connection between inputs and amplifier circuitry assures outstanding S/N ratio. Highly reliable DIN connectors are used for connection to main unit.



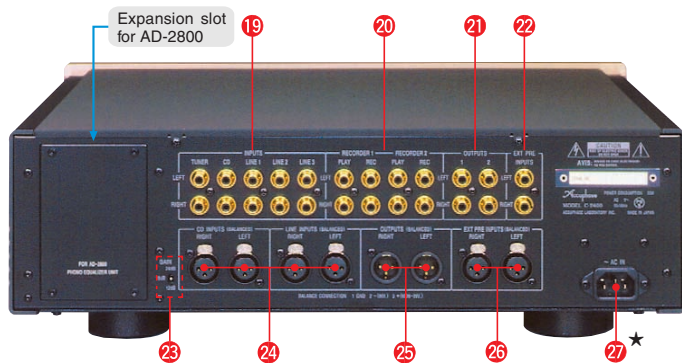
MM	Gain: 30/36 dB, switchable Input impedance: 47 kilohms
MC	Gain: 62/68 dB, switchable Input impedance: 10/30/100 ohms, switchable

* The phono equalizer units AD-290 and AD-290V designed for the Accuphase models C-290 and C-290V can also be used in the C-2400.
* The AD-2800 can also be used in the Accuphase models C-2800, C-290 and C-290V.

Front panel



Rear panel



- | | |
|---|--|
| 1 Input selector | 14 Recorder switch |
| 2 Function LED indicator | 15 Balance control |
| 3 Volume control | 16 Headphone jack |
| 4 Power switch | 17 Loudness compensator |
| 5 Output selector | 18 Attenuator |
| EXT PRE ALL BAL UNBAL OFF | 19 Line input connectors TUNER CD LINE 1, 2, 3 |
| 6 Bass/Treble controls | 20 Recorder output/input connectors |
| 7 Tone control on/off button | 21 Unbalanced output connectors |
| 8 Phase selector button | 22 External preamplifier input connectors (unbalanced) |
| 9 Stereo/mono selector | 23 Gain selector 24 dB 18 dB 12 dB |
| 10 Copy button | 24 CD/LINE balanced input connectors |
| 11 Subsonic filter | ① Ground ② Inverted (-) ③ Non-inverted (+) |
| 12 MC cartridge load impedance selector | 25 Balanced output connectors |
| 13 Equalizer gain selector | 26 External preamplifier input connectors (balanced) |
| MM: 30 dB/36 dB MC: 62 dB/68 dB | 27 AC inlet* |

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
 - Audio cable with plugs (1 m)
 - Remote commander RC-32

C-2400 Guaranteed Specifications

[Guaranteed specifications are measured according to EIA standard RS-490. AD stands for "Analog Disc".] [Specifications are shown for phono equalizer unit AD-2800 installed.]

- **Frequency Response** BALANCED/UNBALANCED INPUT: 3 - 200,000 Hz +0 -3.0 dB
20 - 20,000 Hz +0, -0.2 dB
AD INPUT [MM/36 dB, MC]: 20 - 20,000 Hz ±0.2 dB
AD INPUT [MM/30 dB]: 20 - 20,000 Hz ±0.3 dB

- **Total Harmonic Distortion** (for all inputs) 0.005%

Input Sensitivity, Input Impedance

Input	Sensitivity		Input impedance
	For rated output	For 0.5 V output	
AD:MM/30 dB INPUT	8.0 mV	2.0 mV	47 kΩ
AD:MM/36 dB INPUT	4.0 mV	1.0 mV	47 kΩ
AD:MC/62 dB INPUT	0.2 mV	0.05 mV	10/30/100 Ω, switchable
AD:MC/68 dB INPUT	0.1 mV	0.025 mV	10/30/100 Ω, switchable
BALANCED/UNBALANCED	252 mV	63 mV	40 kΩ/20 kΩ

- **Rated Output Voltage, Output Impedance** BALANCED/UNBALANCED OUTPUT: 2 V 50 ohms
REC (with AD input): 252 mV 200 ohms

S/N Ratio

Input terminal	Input shorted, IHF-A weighting		S/N ratio (EIA)
	S/N ratio at rated output		
AD:MM/30 dB INPUT	95 dB		91 dB
AD:MM/36 dB INPUT	89 dB		92 dB
AD:MC/62 dB INPUT	80 dB		87.5 dB
AD:MC/68 dB INPUT	75 dB		88.5 dB
BALANCED/UNBALANCED	111 dB		108 dB

- **Maximum Output Level** BALANCED/UNBALANCED OUTPUT: 7.0 V
REC (with AD input): 6.0 V

- **LINE Maximum Input Level** BALANCED/UNBALANCED INPUT: 6.0 V

- **Maximum AD Input Level** MM [30/36dB] INPUT: 300/150 mV
(1 kHz, 0.005% THD) MC [62/68dB] INPUT: 7.5/3.75 mV

- **Minimum Load Impedance** BALANCED/UNBALANCED OUTPUT: 600 ohms
REC: 10 kilohms

- **Gain** (gain selector: 18 dB)

* Gain can be set to 12/18/24 dB
BALANCED/UNBALANCED INPUT → BALANCED/UNBALANCED OUTPUT: 18 dB
UNBALANCED INPUT → REC OUTPUT: 0 dB
AD (MM 30/36dB) INPUT → BALANCED/UNBALANCED OUTPUT: 48.54 dB
AD (MM 30/36dB) INPUT → REC OUTPUT: 30/36 dB
AD (MC 62/68dB) INPUT → BALANCED/UNBALANCED OUTPUT: 80.86 dB
AD (MC 62/68dB) INPUT → REC OUTPUT: 62/68 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)

- **Subsonic Filter** 10 Hz: -18 dB/octave

- **Attenuator** -20 dB

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

- **Power Consumption** 33 watts

- **Maximum Dimensions** Width 465 mm (18-3/8")
Height 150 mm (5-7/8")
Depth 403 mm (15-7/8")
(Depth with AD-2800 installed: 412 mm)

- **Weight** 17.6 kg (38.8 lbs) net (18.5 kg with AD installed)
23.0 kg (50.7 lbs) in shipping carton



ACCUPHASE LABORATORY INC.

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