

Accuphase

PRECISION STEREO CONTROL CENTER

C-2410

- Revolutionary AAVA volume control
- Separate power transformers for left and right channels
- Selectable preamp gain
- Fully modular construction with individual left/right amplifier units on motherboard
- Logic-controlled relays for shortest signal paths
- Independent phase selection for each input position
- Optional phono equalizer unit allows analog record playback
- Side panels with elegant persimmons wood finish





A stereo control center of the next generation – Further evolved AAVA type volume control. Complete dual mono construction with separate AAVA and other amplification modules and separate power supplies. Overall preamp gain selection and independent phase selection for each input position. Optional phono equalizer unit allows high-quality playback of analog records.

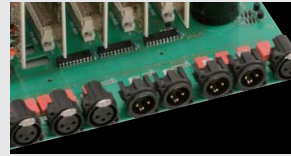
The C-2410 inherits the superb design technology of the C-2810, including the improved AAVA (Accuphase Analog Vari-gain Amplifier) volume control with similar specs and configuration. AAVA is a revolutionary concept that takes a radically different approach from conventional volume controls. The result is high performance and sound quality far exceeding conventional designs.

AAVA does not use variable resistors, which brings a number of distinct advantages: ① Frequency response does not change, regardless of the volume setting. ② S/N ratio is outstanding. ③ Distortion is reduced to an absolute minimum. ④ There are no left/right level differences (tracking error). ⑤ Left/right channel crosstalk is minimized. Another benefit of AAVA is the fact that only highly reliable electronic components are used. Mechanical wear ceases to be a problem, ensuring that the outstanding performance and sound quality of the amplifier will remain undiminished for many years to come. Unlike conventional digital volume controls, AAVA operates through purely analog processing. The operating feel using a volume knob on the front panel also is exactly the same as with other high-end stereo components. The power supply section of the C-2410 employs two separate transformers, one for each channel. Filtering capacitors and all other parts of the power supply are duplicated for left and right. What's more, the AAVA circuitry, balanced output circuits, and other unit amplifiers are also entirely separate for the two channels, arranged on a high-quality motherboard. This fully monaural construction prevents unwanted crosstalk and interaction both on the electrical and the physical plane.

As can be expected of a control center, the C-2410 offers a full complement of balanced and unbalanced input and output connectors. Flexibility is further enhanced by features such as tone controls, loudness compensation, recorder functions, subsonic filter, overall gain selection, EXT PRE connectors for combination with another preamplifier, and independent phase selection for each input position. An optional phono equalizer unit is available for playback of analog records with ultimate sound quality.

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

The strategically placed relays of the C-2410 prevent any signal degradation that could occur if the signal has to travel a long way for input and output connection and function switching. Optimum signal flow is maintained at all times.



Balanced input and output connectors

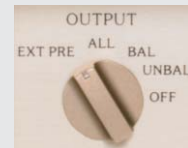


Unbalanced input and output connectors

■ **EXT PRE function allows use of external preamplifier.**

■ **Selectable preamp gain.**

The overall gain of the preamplifier can be set to 12 dB, 18 dB, or 24 dB.



■ **Independent phase selection for each input position.**

The selected phase setting is memorized for each input position separately. The on/off status of a LED indicator shows the respective setting.

■ **Dedicated headphone amplifier optimized for sound quality.**

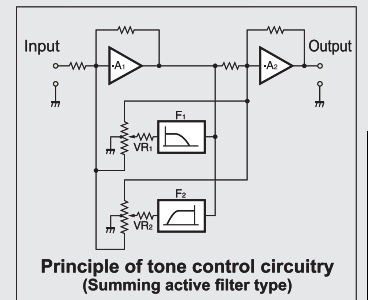
■ **Versatile array of balanced and unbalanced input and output connectors.**

■ **Aluminum-base side panels with persimmons wood finish provide a striking visual appeal.**

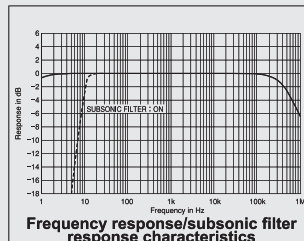
■ **Tone controls using summing active filters for highest sound quality.**

■ **More versatile features:**

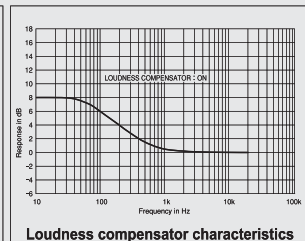
- Provisions for recording and playback with two recorders
- Subsonic filter removes ultra low frequency noise
- Loudness compensator augments bass impact at low listening volume
- Attenuator (-20 dB)



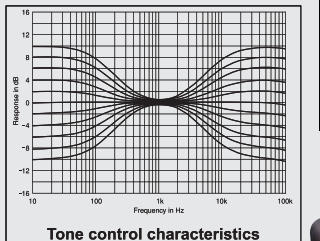
Principle of tone control circuitry (Summing active filter type)



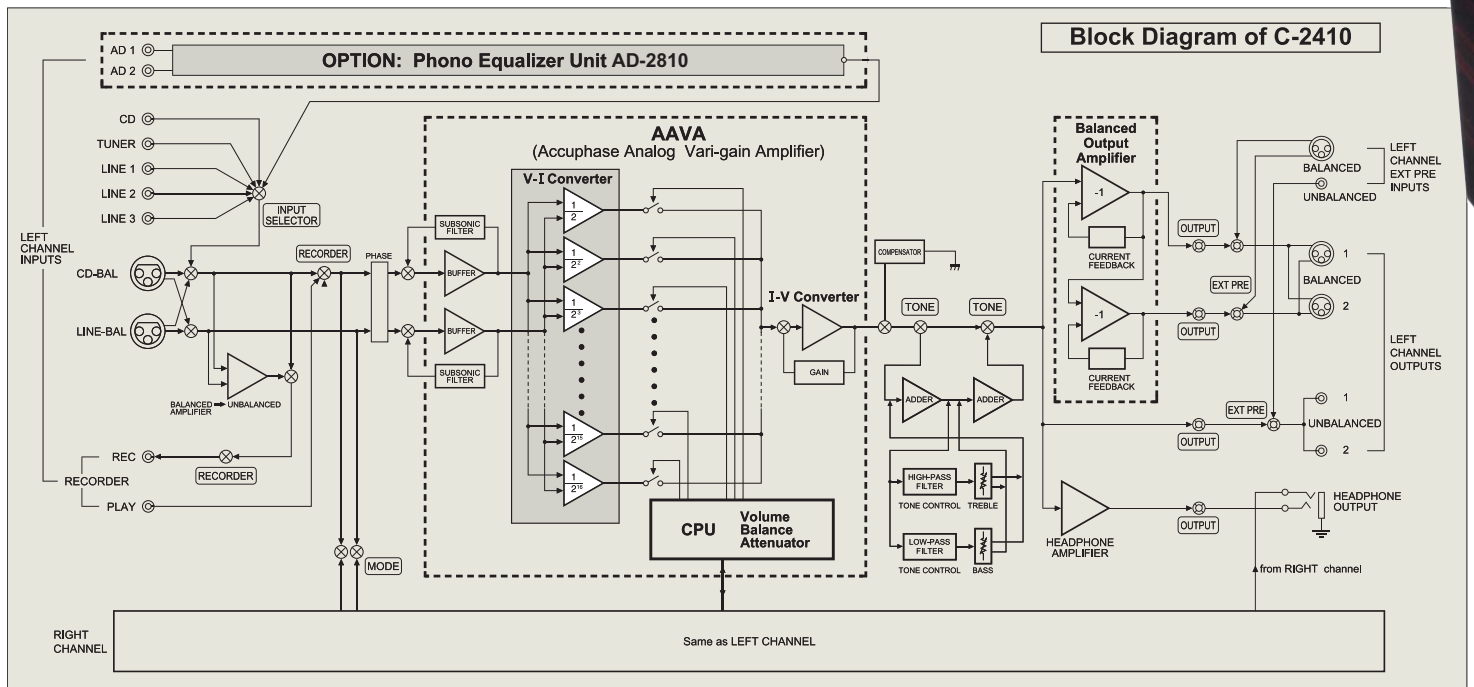
Frequency response/subsonic filter response characteristics



Loudness compensator characteristics



Tone control characteristics



AAVA (Accuphase Analog Vari-gain Amplifier) volume control

AAVA is a radically different volume control principle that does not use variable resistors and provides top-notch performance and sound quality. 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 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.

AAVA ensures high S/N ratio and uniform frequency response.

With conventional volume controls, the impedance increases significantly at settings that correspond to normal listening levels, thereby leading to increased noise. With AAVA, there is no change in impedance and consequently no deterioration of S/N ratio. Frequency response also remains totally uniform. 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 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.

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

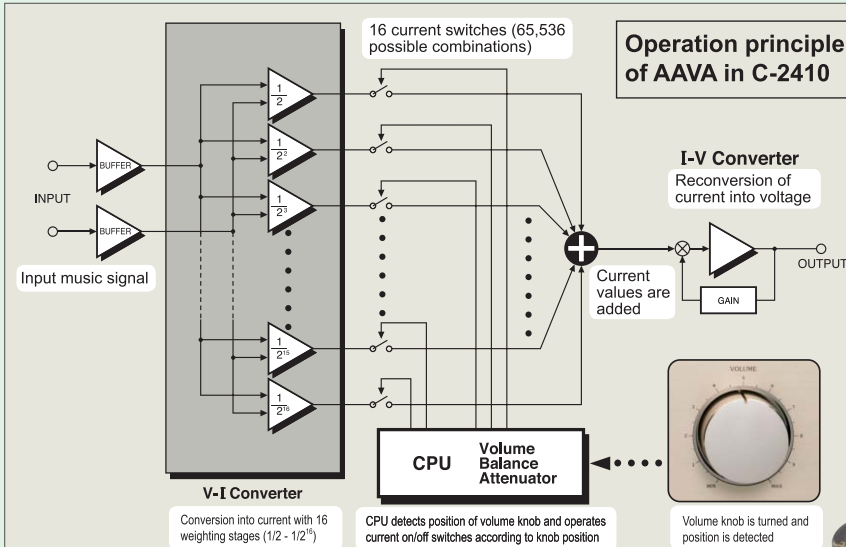
out in the analog domain.

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.

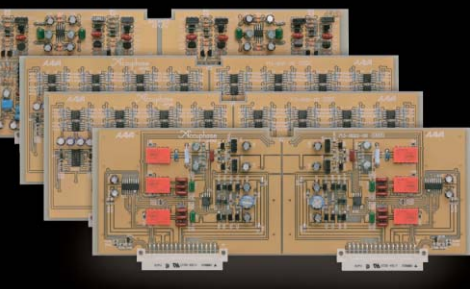
Attenuator and balance control also implemented by AAVA.

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.

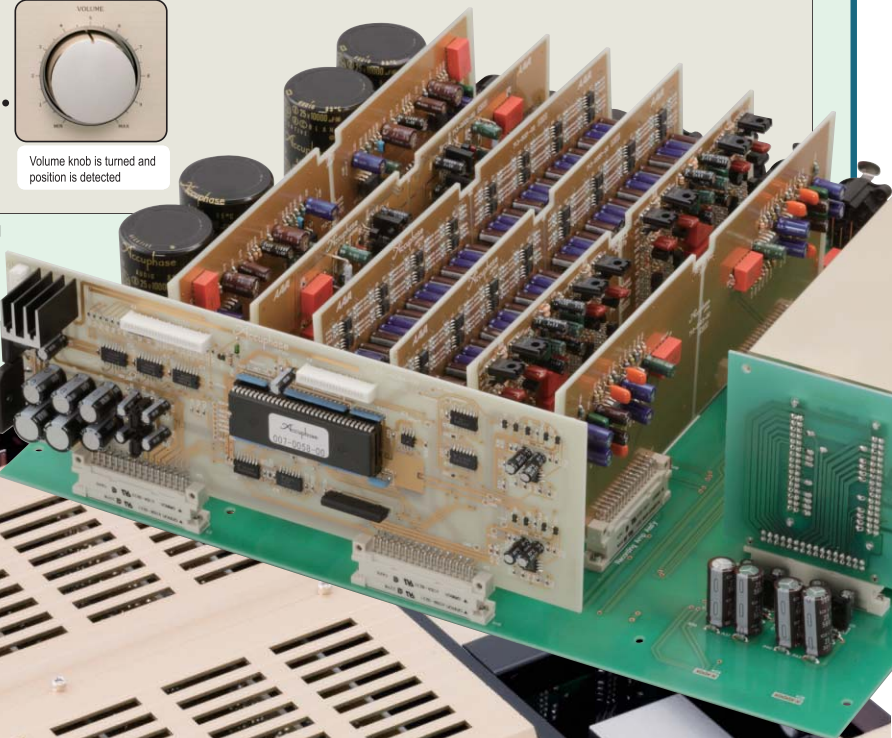


AAVA operation principle

The music signal is converted into 16 types of weighted current by V-I (voltage - current) converting amplifiers [$1/2$, $1/2^2$, ... $1/2^{15}$, $1/2^{16}$]. 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.



AAVA circuitry is implemented in the form of unit amplifiers arranged on a motherboard and kept separate for left and right channels. Modules include input buffers, 16 V-I converters + current switches + current adding circuitry, and I-V converters.

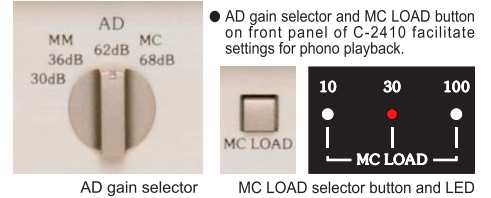
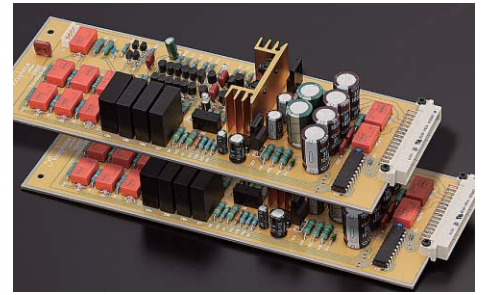
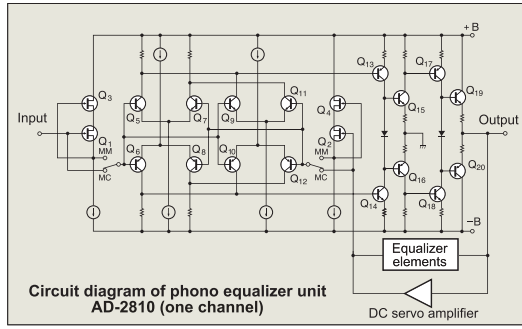


Supplied remote commander RC-200 provides access to volume control, input source selection, and other functions.

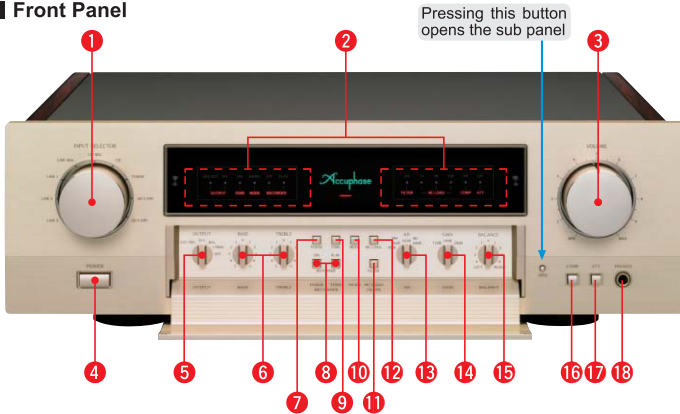
Dedicated Phono Equalizer Unit AD-2810

Analog records can be reproduced by installing the dedicated phono equalizer unit AD-2810 in a rear-panel slot. The AD-2810 uses printed circuit boards made from Teflon material (glass fluorocarbon resin substrate) and is housed in a sturdy aluminum case for complete protection against any external interference. The shortest possible connection between input and amplification circuits ensures outstanding S/N ratio, and highly reliable DIN connectors are used for the link to the main unit.

- * The AD-2810 can also be used in the Accuphase models C-2810, C-2800, C-2400, C-290 and C-290V.
- * The AD-290/AD-290V and AD-2800 are also compatible and can be used in place of the AD-2810.



Front Panel



Rear Panel



- | | |
|--|--|
| 1 Input selector | 16 Loudness compensator button |
| 2 Function indicator LEDs | 17 Attenuator button |
| 3 Volume controls | 18 Headphone jack |
| 4 Power switch | 19 Line input connectors |
| 5 Output selector | TUNER CD LINE 1,2,3 |
| 6 Bass/treble controls | 20 Recorder playback/recording connectors |
| 7 Phase selector button | 21 Unbalanced output connectors (2 sets) |
| 8 Recorder buttons ON, PLAY | 22 External preamplifier input connectors (unbalanced) |
| 9 Tone control on/off button | 23 CD/LINE balanced input connectors |
| 10 Stereo/mono selector button | 1 Ground 2 Inverted (-) |
| 11 Subsonic filter | 3 Non-inverted (+) |
| 12 MC cartridge load impedance selector button | 24 Balanced output connectors (2 sets) |
| 13 AD gain selector | 25 External preamplifier input connectors (balanced) |
| 14 Gain selector 12dB 18dB 24dB | 26 AC power supply connector* |
| 15 Balance control | |

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-200
 - Cleaning cloth

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-2810 installed.

- **Frequency Response** BALANCED/UNBALANCED INPUT: 3 - 20,000 Hz +0, -3.0 dB
 20 - 20,000 Hz +0, -0.2 dB
 AD INPUT [MM/36dB, MC]: 20 - 20,000 Hz ±0.2 dB
 AD INPUT [MM/30dB]: 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	8.0 mV	2.0 mV	47 kΩ
AD:MM/36 dB	4.0 mV	1.0 mV	47 kΩ
AD:MC/62 dB	0.2 mV	0.05 mV	10/30/100 Ω, switchable
AD:MC/68 dB	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
 RECORDER REC (with AD input): 252 mV, 200 ohms

- **S/N Ratio** (gain selector: 18 dB)

Input	Input shorted, IHF-A weighting	S/N ratio (EIA)
	S/N ratio at rated output	
AD:MM/30 dB	95 dB	91 dB
AD:MM/36 dB	89 dB	92 dB
AD:MC/62 dB	80 dB	87.5 dB
AD:MC/68 dB	75 dB	88.5 dB
BALANCED/UNBALANCED	109 dB	107 dB

- **Maximum Output Level** BALANCED/UNBALANCED OUTPUT: 7.0 V
 (0.005% THD, 20 - 20,000 Hz) RECORDER REC (with AD input): 6.0 V

- **LINE maximum input level** BALANCED/ UNBALANCED INPUT: 6.0 V

- **Maximum AD Input Level** MM [30/36 dB] INPUT: 300/150 mV
 MC [62/68 dB] INPUT: 7.5/3.75 mV

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

- **Gain** (gain selector: 18 dB)
 BALANCED/ UNBALANCED INPUT → BALANCED/ UNBALANCED OUTPUT: 18 dB
 UNBALANCED INPUT → REC OUTPUT: 0 dB
 AD (MM: 30/36 dB) INPUT → BALANCED UNBALANCED OUTPUT: 48/54 dB
 AD (MM: 30/36 dB) INPUT → REC OUTPUT: 30/36 dB
 AD (MC: 62/68 dB) INPUT → BALANCED/ UNBALANCED OUTPUT: 80/86 dB
 AD (MC: 62/68 dB) INPUT → REC OUTPUT: 62/68 dB
 * Gain can be set to 12/18/24 dB

- **Loudness Compensation** +6 dB (100 Hz)

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

- **Attenuator** -20 dB

- **Headphone Jack** Suitable impedance: 8-100 ohms

- **Power Requirements** AC120 V/230 V, 50/60 Hz (Voltage as indicated on rear panel)

- **Power Consumption** 33 watts

- **Maximum Dimensions** Width: 465 mm (18-5/16")
 Height: 150 mm (5-7/8")
 Depth: 409 mm (16-1/8")
 (Depth with AD-2810 installed: 414 mm)

- **Mass** 18.9 kg (41.7 lbs) net (19.8 kg with AD-2810 installed)
 24.0 kg (52.9 lbs) in shipping carton



ACCUPHASE LABORATORY, INC.