

KENWOOD CORPORATION

©B64-0898-00 (KM) (MC)

Take the time to read through this instruction manual.

Familiarity with installation and operation procedures will help you obtain the best performance from your new power amplifier.

For your records

Record the serial number, found on the back of the unit, in the spaces designated on the warranty card, and in the space provided below. Refer to the model and serial numbers whenever you call upon your KENWOOD dealer for information or service on the product.

Model KAC-646X Serial number _____

Safety precautions

▲WARNING

Take the following precautions to prevent fire and avoid personal injury :

- When extending the battery cable, or ground cable, use 3mm² (AWG12) or larger automotive grade cable to avoid cable deterioration or damage to the covering.
- Check that no metal objects (coins, tools, etc.) are left inside the unit to avoid short circuits.
- If you smell or see smoke, turn the power off immediately and consult your Kenwood dealer.
- Do not touch the unit during use because the surface of the unit becomes hot and may cause burns if touched.

▲CAUTION

Take the following precautions to keep the unit in proper working order.

- Be sure the unit is connected to a 12V DC power supply with a negative ground connection.
- Do not open the top or bottom cover.
- Do not install the unit in places it is exposed to direct sunlight, high heat or humidity, water may splash over it, or dust exists.

NOTE

- If you have difficulty in installing this unit in your vehicle, contact your Kenwood dealer.



Cleaning the unit

- If the surface is dirty, wipe it clean with a silicon cloth or soft dry cloth with the power off.

▲CAUTION

Do not use hard cloths or paint thinner, alcohol, or other volatile solvents. These may damage external surfaces or remove indicator characters.

Accessories

Part name	External View	Number of Items
Self-tapping screws (ø4 × 16mm)		4
Terminal cover (Power terminal)		1

Troubleshooting guide

Often, what appears to be a malfunction is due to user error. Before calling for service, please consult the following table.

Symptom	Cause	Remedy
No sound. (No sound from one side.)	Input (or output) cables are disconnected.	Connect the input (or output) cables.
The output level is too small (or too large).	The input sensitivity adjusting control is not set to the correct position.	Adjust the control correctly referring to "Controls".
The sound quality is bad. (The sound is distorted.)	The speakers cable are connected with wrong \oplus/\ominus polarity.	Connect them properly checking the \oplus/\ominus of the terminals and cables well.
	A speaker cable is pinched by a screw in the car body.	Connect the speaker cable again so that it is not pinched by anything.

Specifications

Specifications subject to change without notice.

Audio Section

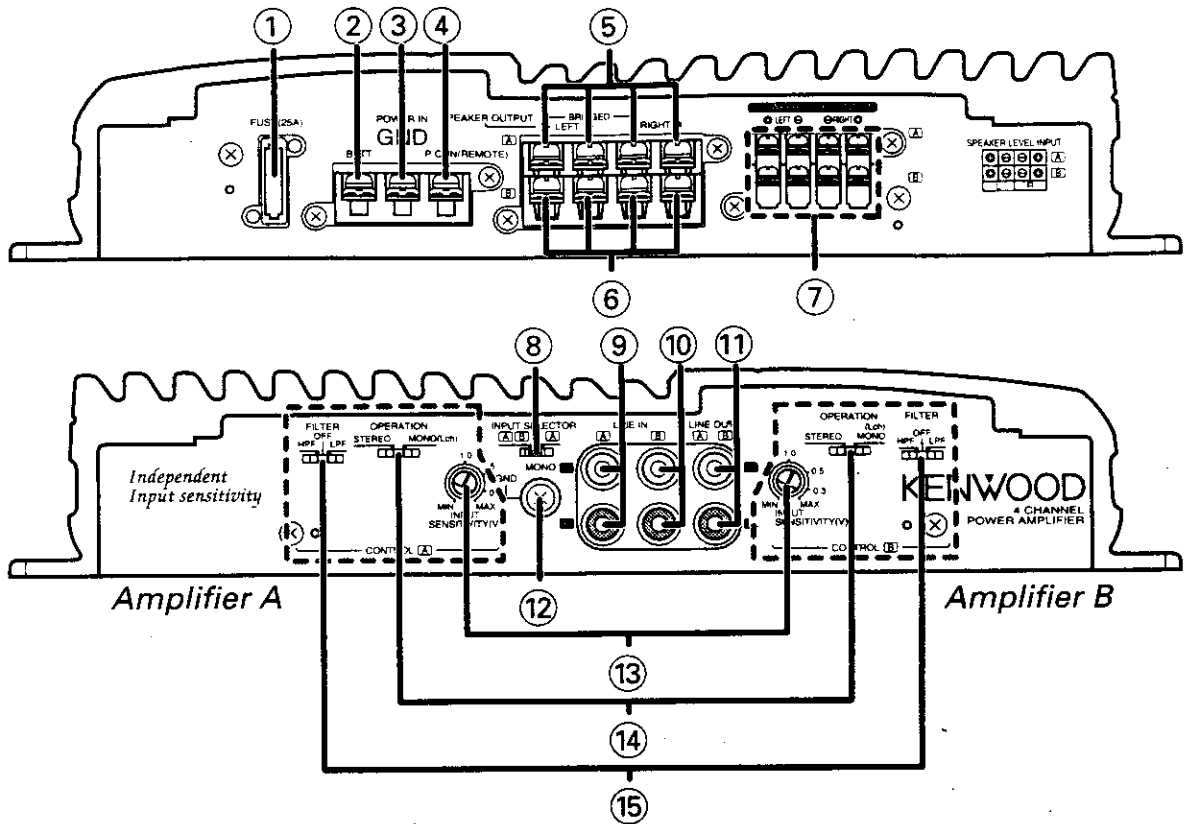
Max Power Output (4 Ω)	
4 Channel Mode	50 W \times 4
3 Channel Mode	50 W \times 2 + 140 W \times 1
2 Channel Mode	140 W \times 2
Rated Power Output (4 Ω)	
4 Channel Mode	25 W \times 4 (20 Hz ~ 20 kHz, less than 0.08 % THD)
3 Channel Mode	25 W \times 2 (1 kHz, 0.08 % THD) + 70 W \times 1 (1 kHz, 0.8 % THD)
2 Channel Mode	70 W \times 2 (1 kHz, 0.8 % THD)
Rated Power Output (2 Ω)	
4 Channel Mode	35 W \times 4 (1 kHz, 0.8 % THD)
Frequency Response	10 Hz ~ 45 kHz (+0, -1 dB)
Signal to Noise Ratio	100 dB
Sensitivity (MAX)	0.2 V (rated output)
Sensitivity (MIN)	4.0 V (rated output)
Input Impedance	10 k Ω
Low Pass Filter	80 Hz (12 dB/oct.)
High Pass Filter	150 Hz (12 dB/oct.)

General

Operating Voltage	14.4 V (11 ~ 16 V allowable)
Current Consumption (1 kHz, 10% THD)	22 A
Dimensions (W \times H \times D)	260 \times 52 \times 209 mm (10-1/4 \times 2-1/16 \times 8-1/4 in.)
Weight	2.5 kg (5.5 lb)

Controls

This is a 4 channel amplifier including 2 stereo amplifiers in a body. One amplifier is referred to as amplifier A and the other is amplifier B. This unit is compatible with a large variety of systems by combining the switches and functions described in the following.



- ① **FUSE (25 A)**
- ② **BATTERY terminal**
- ③ **GROUND terminal**
- ④ **POWER CONTROL (REMOTE) LEAD terminal**
- ⑤ **Amp A SPEAKER OUTPUT terminals**
- ⑥ **Amp B SPEAKER OUTPUT terminals**
- ⑦ **SPEAKER LEVEL INPUT terminals**
- ⑧ **INPUT SELECTOR switch**

This switch selects the input method of the signals to be amplified by amplifiers A and B.

- **[A] [B] position:**

Amplifies both of the signals input to amplifiers A and B.

- **[A] position:**

Amplifies only signal input amplifier A with both amplifiers A and B.

- ⑨ **Amp A LINE IN terminal**
- ⑩ **Amp B LINE IN terminal**
- ⑪ **LINE OUT terminal**

These jacks output the signals input to amplifiers A and B. They always output stereo signals regardless of the position of the OPERATION switch. (The output level is the sum of the levels of the amp A and amp B inputs.)

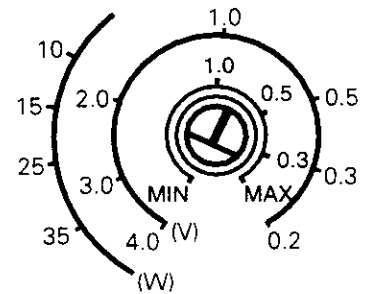
⑫ **RCA CABLE GROUND LEAD terminal**

⑬ **INPUT SENSITIVITY control**

Set this control according to the pre-output level of the center unit connected with this unit, or to the maximum power output of the genuine-accessory car stereo.

Use the diagram on the right as a guide.

The sensitivities of amplifiers A and B can be adjusted independently regardless of the position of the input selector switch.



NOTE

For the pre-output level or the maximum power output, refer to the "Specifications" in the instruction manual of the center unit.

⑭ **OPERATION switch**

The amplification methods of the signals input to amplifiers A and B can be selected independently according to the setting of this switch.

• **STEREO position:**

The amplifier can be used as a stereo amplifier.

• **MONO (Lch) position:**

Amplifies the signal input from the left side only. Set to this position and make bridged connections to use as a high-power monaural amplifier. (The input right signal is not output.)

⑮ **FILTER switch**

These switches allow filtering of the speaker output signals.

• **HPF(High Pass Filter) position:**

Only frequencies of 150Hz or higher are output. (Frequencies below 150Hz are cut.)

• **LPF(Low Pass Filter) position:**

Only frequencies of 80Hz or lower are output. (Frequencies above 80Hz are cut.)

The Lch and Rch will be mixed before output even if the operation switch is set to STEREO.

• **OFF position:**

The original sound without filtering is output.

Protection function

This unit is equipped with a protection function for protecting this unit and your speakers from various accidents or problems that can occur.

When the protection function is triggered, the Power indicator goes off and the amplifier stops operating.

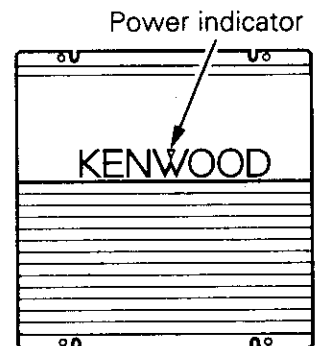
Power indicator

When the power is turned on, the Power indicator lights.

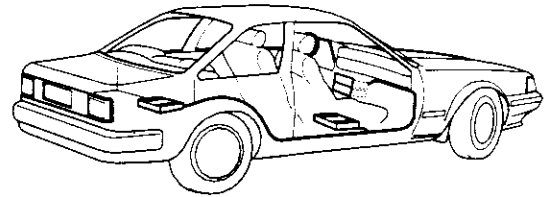
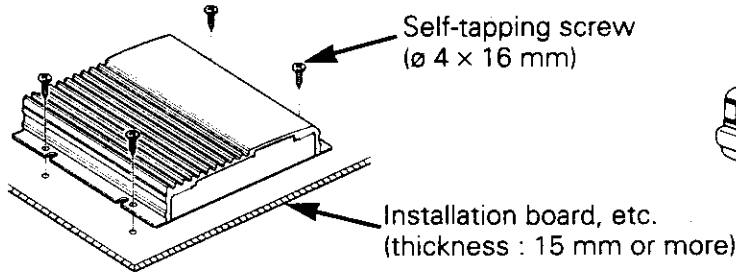
If the Power indicator does not light when the power is turned on, the protection function may be activated. Check whether there is any indication of trouble.

The protection function activates in the following situations:

- When a speaker output contacts ground.
- When the temperature of internal parts exceeds 120°C (248°F).
- When a ground cable of the center unit (cassette receiver, CD receiver, etc.) or this unit is not connected to a metal part serving as an electrical ground passing electricity to the battery's negative ⊖ terminal.



Installation



Since the power amplifier has no parts which require operation, it can be installed at a position away from the driver's seat without any hindrances.

As generally accepted positions for its installation, places such as inside the trunk, etc. can be considered.

▲CAUTION

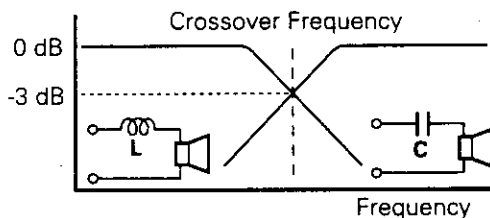
- Do not install the unit under the carpet. Otherwise heat build-up occurs and the unit may be damaged.
- Install this unit in a location which allows heat to easily dissipate. Once installed, do not place any object on top of the unit.
- After installing the unit, check to make sure that electrical equipment such as the brake lamps, turn signal lamps and windshield wipers operate normally.
- Install the unit securely in a location that does not interfere with driving.

Tri-mode

With the KAC-646X, a subwoofer can be added easily to the speaker system by marking use of the properties of coils and capacitors. This mode of operation is called Tri-mode.

■ Principle of Tri-mode

- Method of frequency band division using a coil and capacitor
 ***in case of 6dB/oct. slope



Coil (L): Passes low frequencies and blocks high frequencies. (Low pass)

Capacitor (C): Passes high frequencies and blocks low frequencies. (High pass)

$$C = \frac{159000}{f_c \times R} (\mu F)$$

$$L = \frac{159 \times R}{f_c} (mH)$$

f_c = Cut off Frequency (Hz)

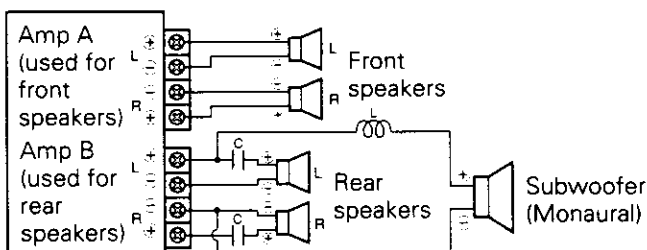
R = Speaker Impedance (Ω)

Example: When it is required to set a crossover frequency of 120 Hz using speakers with an impedance of 4 ohms.

Prepare commercially-available coil and capacitor with the closest ratings to the results calculated from the formula above. The capacitor rating should be as close as possible to 331.25 (μF) and the coil rating should be as close as possible to 5.3 (mH).

■ System example

To use the Tri-mode configuration, set the OPERATION switch to the STEREO position.



▲CAUTION

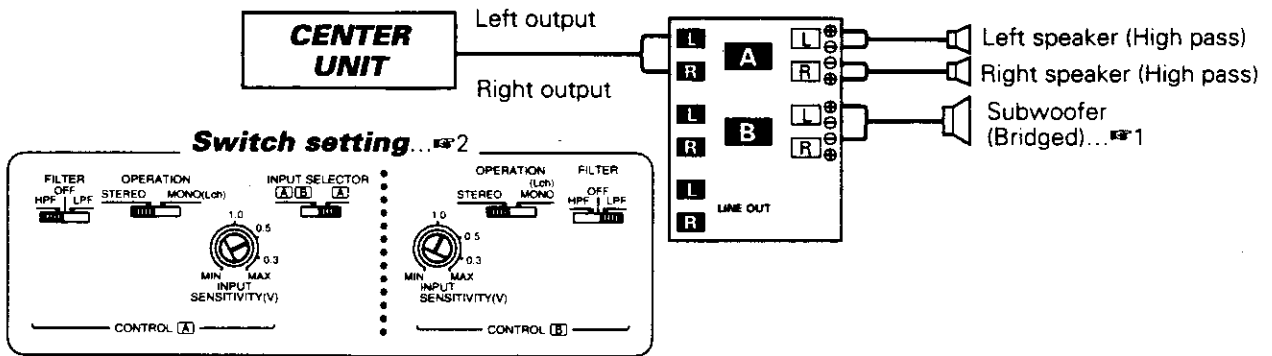
If you wish to bridge-connect a speaker, the speaker impedance must be no less than 4 ohms.

Connecting a speaker with an impedance lower than 4 ohms may damage the unit.

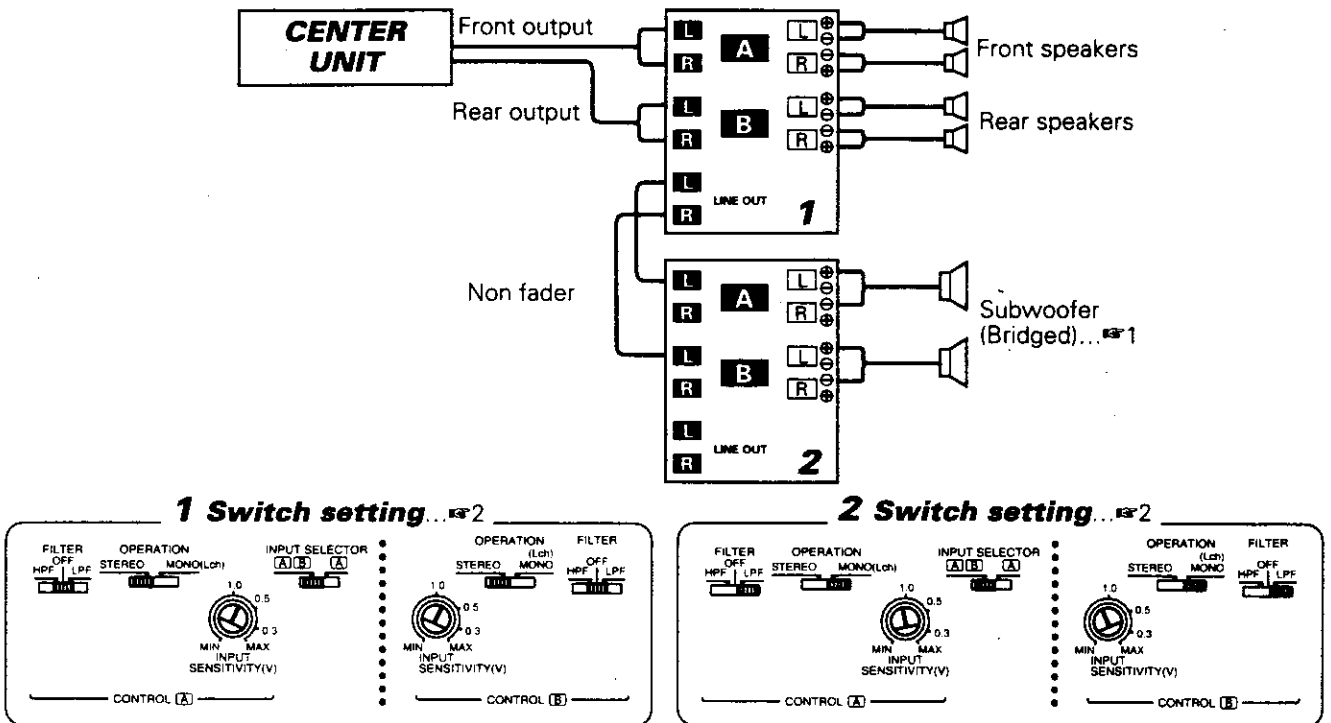
System examples

By combining the switches and functions of the KAC-646X, you can implement a wide range of audio system configurations.

High pass 2-channel + Subwoofer system



Full-range 4-channel + Subwoofer 2-channel system



¹

CAUTION

If you wish to bridge-connect a speaker, the speaker impedance must be no less than 4 ohms. Connecting a speaker with an impedance lower than 4 ohms may damage the unit.

²

NOTE

Amplifiers A and B can be adjusted independently regardless of the position of the input selector switch.

Installation procedure

1. Remove the ignition key and disconnect the negative \ominus terminal of the battery to prevent short circuits.
2. Connect the input and output cables of the units.
3. Connect the speaker cables.
4. Connect the ground cable and battery cable in the order listed.
5. Install the unit in the car.
6. Connect the negative \ominus terminal of the battery.

▲ CAUTION

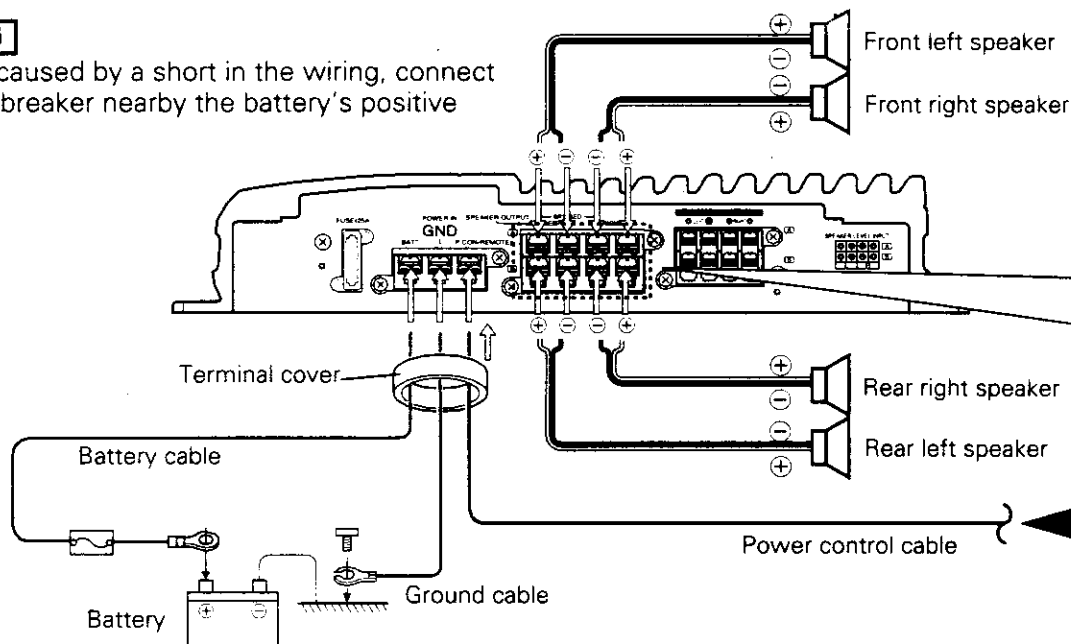
- If the fuse blows, check cables for shorts, then replace the fuse with one of the same rating.
- Check that no unconnected cables or connectors are touching the car body. Do not remove caps from unconnected cables or connectors to prevent short circuits.
- Connect the speaker cables to appropriate speaker connectors separately. Sharing the negative cable of the speaker or grounding speaker cables to the metal body of the car can cause this unit to fail.
- After installation, check that the brake lamps, wipers, and wipers work properly.

Connection

■ Power and Speakers cable connection

▲ WARNING

To prevent fire caused by a short in the wiring, connect a fusible link or breaker nearby the battery's positive terminal.



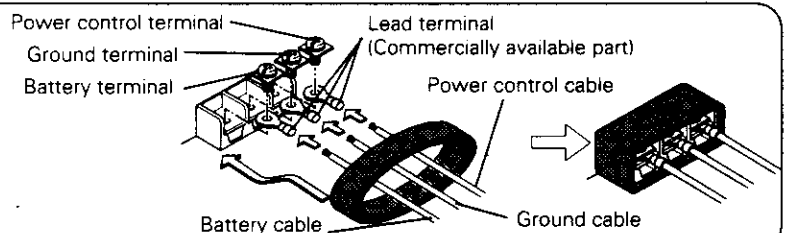
If a buzzing noise is heard from the speakers when the engine is running, connect a line noise filter (optional) to each of the battery cable.

NOTE

Connect the ground cable to a metal part of the car chassis that acts as an electrical ground passing electricity to the battery's negative \ominus terminal. Do not turn the power on if the ground cable is not connected.

Power terminal

Pass battery and ground cables through supplied terminal cover and connect to respective terminals. After completing connections, fasten terminal cover over terminal bracket.



Connection

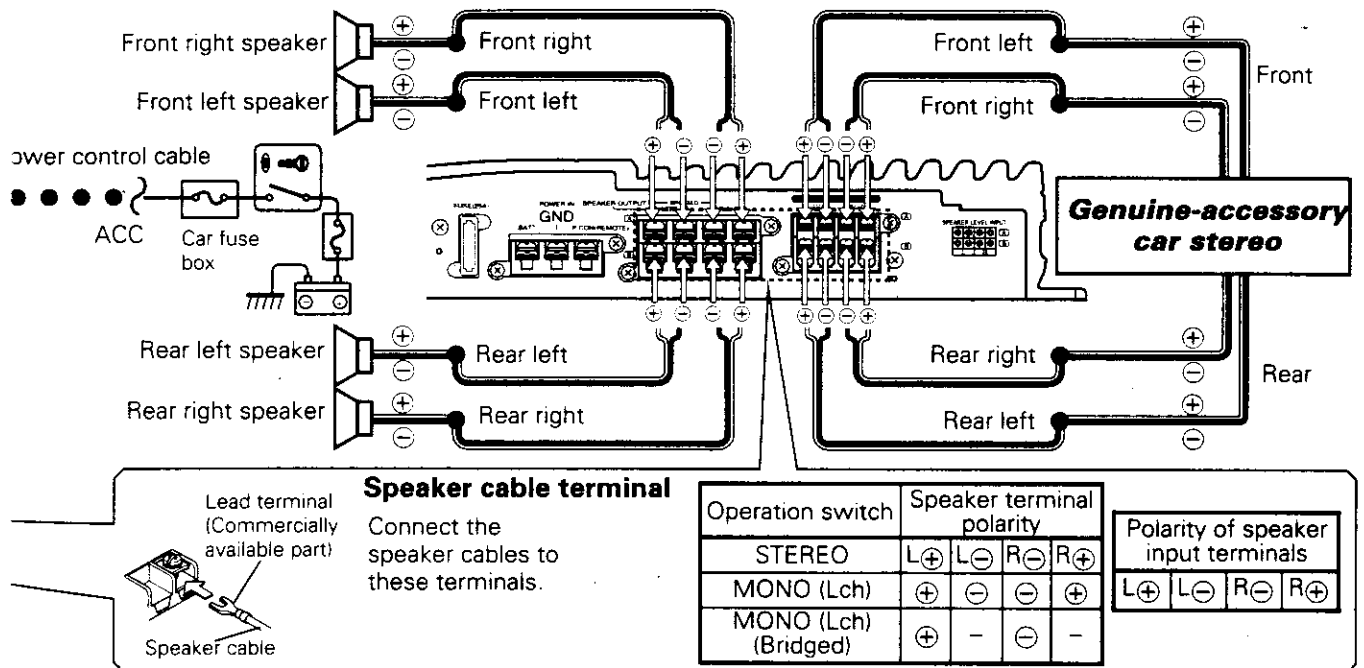
Speaker level input connection

Connect the unit by inserting it in the connection between the genuine-accessory car stereo and speakers.

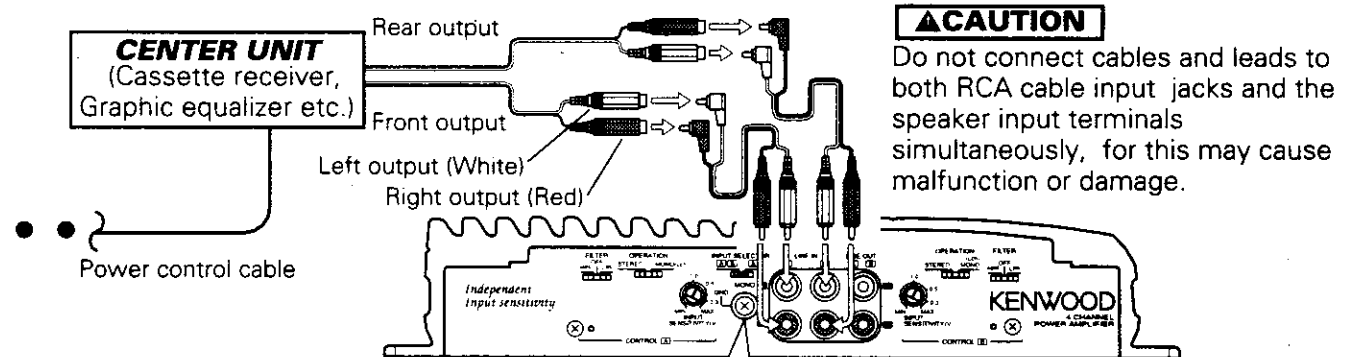
CAUTION

- The genuine-accessory car stereo shall have a maximum power output of no more than 25 W.
- Do not connect the speaker output leads from a power amplifier (Optional) to the speaker input terminals of this unit, for this may cause malfunction or damage.
- Do not connect cables and leads to both RCA cable input jacks and the speaker input terminals simultaneously, for this may cause malfunction or damage.
- Connect the power control lead to a power supply which can be turned ON/OFF by the ignition key switch (ACC line).

With this connection, shock noise may be generated when the power of the genuine-accessory car stereo is switched ON/OFF.



RCA cable connection



RCA cable ground lead terminal

When using an RCA cable with a ground lead attached, connect the ground lead to this terminal.

CAUTION

Do not use this terminal for power source grounding. This unit will be damaged if the power source grounding wire is connected to this terminal.