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The Citation Twelve

Professional 120 Watt Stereophonic
Basic Power Amplifier

harman/kardon
THE MUSIC COMPANY

Installation and
Operation Manual

harman/kardon

55 AMES COURT, PLAINVIEW, N. Y. 11803

IMPORTANT NOTICE TO USER

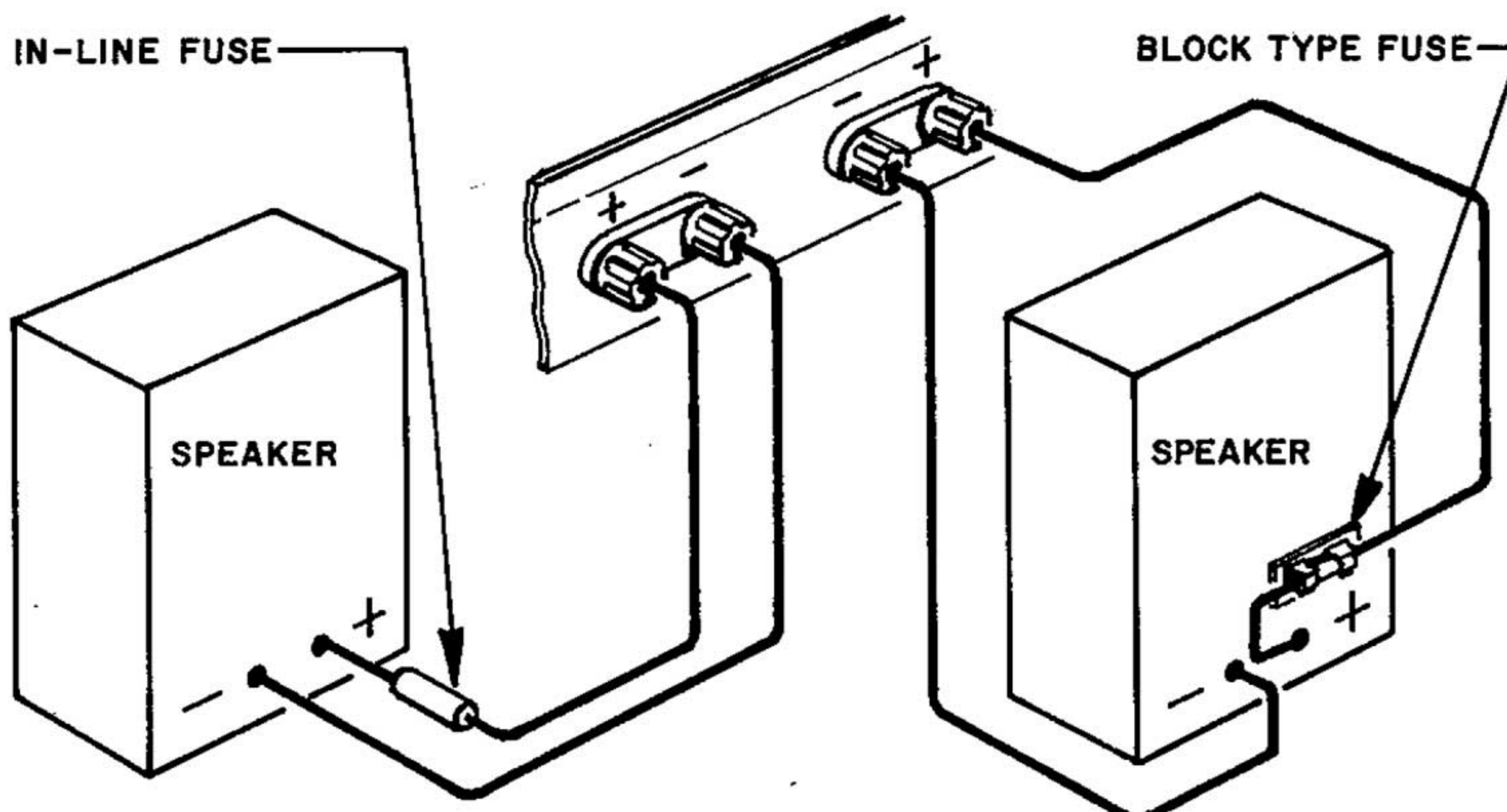
In certain circumstances it may be required to protect your speakers from overload and possible damage as the Citation Twelve produces in excess of 60 watts, RMS, per channel, both channels driven simultaneously. Although there are many high quality speakers which can handle this power, it is still recommended, as a safety factor, that your speakers be fused for their protection.

The chart below indicates the appropriate size fuse to use with speakers that are conservatively rated with music power specifications. It has been our experience that very few speakers are rated in terms of sine wave (RMS) power. However, in the event your speaker is rated according to this rigid specification, contact the speaker manufacturer for the comparable music power rating.

<u>Speaker Rating Average Program Material</u>	<u>Fast Acting Fuse For 8 Ohm Speaker</u>	<u>Fast Acting Fuse For 4 Ohm Speaker</u>
40 Watts	1.0 AMP	1.5 AMP
50 Watts	1.0 AMP	1.5 AMP
60 Watts	1.0 AMP	1.5 AMP
80 Watts	1.5 AMP	2.0 AMP
100 Watts	1.5 AMP	2.0 AMP
150 Watts	1.5 AMP	2.0 AMP
200 Watts	1.5 AMP	2.0 AMP

The speaker fuse should be in the positive speaker line and located at or near the speaker input terminals. It should NOT be located at the amplifier speaker terminals.

The fuse and fuse holder can be obtained at any electronic supply store. You may use either an in-line or block type fuse, as shown in the drawing below.



INTRODUCTION

“... for the sake of music and our demanding love of it.”

The name Citation has always meant something special to music lovers. When Citation was first introduced a decade ago, it represented a major breakthrough in high fidelity design. “Citation Sound” became the industry’s new standard of excellence and captured the imagination of audiophiles throughout the world. Hans Fantel, noted audio authority, stated in a glowing report that “the Citation group bore eloquent witness to the one vital aspect of audio that for so many of us has elevated high fidelity from a casual hobby to a lifelong interest; the earnest attempt to reach an ideal — not for the sake of technical showmanship — but for the sake of music and our demanding love of it.”

Harman-Kardon’s new Citation products reflect years of research and leadership in the application of transistors to high fidelity design. These superb products are an expression of advanced design concepts which adhere to the same basic philosophy of earlier Citation products. These advanced engineering techniques can be found only in ultra-sophisticated professional solid state equipment where absolute performance regardless of cost is the only requirement.

OUTSTANDING FEATURES OF THE CITATION TWELVE

- Two individual power supplies deliver superb regulation for absolute stability and extended low frequency response. Handling of transients is effortless at any power level.
- Hermetically sealed heavy duty silicon output devices deliver exceptionally wide frequency response at full power output with low distortion.
- Fail-safe operation with all types of speakers including electrostatics. Amplifier can handle high power transients, short circuits or unloaded condition without damage to the output stage.
- Amplifier designed with all connectors and power indicator on front panel to facilitate installation and operation.
- Phenomenal square wave response throughout the entire audio spectrum. Phase shift at 20 Hertz is less than five degrees. Amplifier extends to below one hertz with less than fifteen degrees phase shift. Rise time faster than two micro-seconds at 20K Hertz.
- Instrument-type speaker binding posts assure positive connections without possibility of short circuits.
- Computer grade components guarantee long, trouble-free life.
- Heavy duty heat sinks keep amplifier cool even under stress operating conditions.
- Two thermal cutouts, one per channel, remove power from the output stage when heat build-up exceeds 80 degrees C. Two series-type limiting relays protect amplifier from short circuits. Reset automatically once short is removed.
- Two year service warranty on parts and labor.

ENGINEERING DESCRIPTION

The basic design philosophy of the Citation engineering team was to create high fidelity products which offer no sound of their own and come as close to the design philosophy of a straight wire gain as possible. Conventional solid state designs were therefore dismissed in favor of new and more advanced techniques.

The most important characteristic of a basic power amplifier with inordinately high power capabilities is its ability to perform flawlessly at low power levels. It is for this reason that the Citation Twelve features a newly developed differential comparator input circuit which balances automatically for zero D.C. offset voltage at the speaker terminals. Differential balancing permits the application of negative feedback across the entire frequency spectrum to insure perfectly linear operation for even the most minute signal levels.

Crossover axis (class AB transition axis) is kept completely symmetrical. This eliminates notch or crossover distortion which contributes towards sharp, raucous sound at low listening levels.

The Citation Twelve has smooth transference of the sine wave power curve which results in extremely clean, articulate sound without a trace of stridency.

Years ago, when Harman-Kardon engineers first began to design Citation they discovered that the characteristics of an amplifier in the non-audible range strongly influenced the quality of sound in the audible range. This was proven countless times in carefully controlled laboratory listening tests. Wideband designs exhibited greater spaciousness and clarity than amplifiers whose frequency response was restricted to the narrow range of 20-20,000 Hz.

The Citation Twelve basic amplifier will reproduce frequencies as low as one Hertz with virtually no phase shift. The twenty Hertz square wave is the same as the generator. This results in exceptionally dry, tight bass response.

High frequency response of the Citation amplifier extends beyond 100,000 Hertz without evidence of ringing or instability. Sound quality is totally transparent without harshness or poor instrument differentiation in the higher overtones.

Feedback is an important factor in amplifier design. The higher degree of feedback, the more apparent the improvement in sound quality and the greater the reduction of listener fatigue. An extremely high degree of feedback has been designed into the Citation amplifier for lowering distortion without sacrificing stability. Feedback, however, cannot be regarded as a panacea. Distortion products must be exceedingly low to begin with. Then when feedback is applied, distortion is reduced to almost the vanishing point.

The Citation Twelve is "rock" stable with all types of speakers. To maintain this tight form of stability, especially in an amplifier which carries a low frequency cutoff of one Hertz, the power supply must meet very special requirements in terms of regulation and low source impedance. A dual supply, each with its own power transformer and electrolytics, assures proper operating voltages even under severe stress conditions. The amplifier, therefore, is literally two separate power stages on one chassis. Power measurements can be made with both channels driven simultaneously without deterioration of the power ratings or an increase in distortion.

The power output stage of the Citation amplifier utilizes a quasi-complimentary configuration to insure absolute balance and symmetry at the clipping points. Amplifiers which use output coupling capacitors often clip non-symmetrically which produces raucous breakup in the sound. Elimination of the output coupling capacitors also permits extended low frequency response without phase distortion.

Two thermal cutout circuits, one for each channel, automatically removes power from the output transistors when heat build-up exceeds 80 degrees C. Short circuit protection includes a series-type limiting relay which resets automatically after the short is removed.

UNPACKING

After unpacking the Citation Twelve, inspect it carefully for signs of transit damage. The amplifier was subjected to numerous quality control tests and inspections prior to packing and should therefore be in perfect operating condition. If damage is visible, notify your dealer at once. If the amplifier was shipped to you, notify the transportation company without delay. HARMAN-KARDON will cooperate with you in such instances, but only YOU can recover from the carrier for damage incurred during shipment.

SERVICE

HARMAN-KARDON has a special customer service division to answer all questions pertinent to the installation and operation of your unit. Please feel free to write us at any time and we shall endeavor to offer prompt and complete advice.

CITATION WARRANTY

We warrant each factory wired amplifier to be free from defects in material and workmanship under normal use and service, and in accordance with the conditions set forth below. Should a defect occur within the period specified, and providing the unit is returned to either HARMAN-KARDON or an authorized HARMAN-KARDON warranty station, transportation prepaid, and which our examination shall disclose to our satisfaction to be defective we will for a period of two (2) years from date of original purchase either replace or repair and install any defective parts free of charge.

The Citation warranty does not include packaging or transportation charges to and from the factory or authorized warranty repair station.

This warranty is not applicable to any unit which shall have been repaired or altered in any way so as, in our judgment, to affect its reliability or stability or general performance or has been subject to neglect, misuse, abuse, negligence or accident; or which has had the serial number altered, ef-

If your problem cannot be resolved through our combined efforts, we may wish to refer you to a local authorized repair agency or we may prefer to authorize the return of your unit to the factory. To aid us in selecting a service station convenient to you, it would be helpful if you would indicate which major city is closest to your home. Please address your inquiry to Customer Service Department, HARMAN-KARDON, INC., Plainview, New York 11803. Be sure to include the model and serial number of your unit.

In the event it must be returned, an authorization form and proper packing instructions will be forwarded to you. This authorization form, together with the warranty registration number, **MUST BE RETURNED** with your unit.

UNDER NO CIRCUMSTANCES SHOULD YOUR UNIT BE SHIPPED TO THE FACTORY WITHOUT PRIOR AUTHORIZATION.

faced or removed. Neither shall this warranty apply to any instrument which has been connected other than in accordance with instructions furnished by us.

This warranty is in lieu of all other warranties, expressed or implied, and of all other obligations or liabilities on our part, and we neither assume nor authorize any representative or other person to assume for us any other liability in connection with the sale of this instrument.

REGISTRATION

To obtain service under the terms of this policy, it is necessary for you to retain your **ORIGINAL BILL of SALE**. The enclosed registration card will not be considered proof of purchase.

In the event your equipment requires service during the warranty period, only presentation of your original bill of sale to either a factory-authorized repair agency or the factory, itself, will insure your rights under the policy, as outlined in this manual.

POWER REQUIREMENTS

Connect the line cord into any outlet furnishing 117 volts, 50-60 Hertz A.C. current. The voltage may vary between 110-125 volts without affecting the performance of the amplifier. It would be advantageous to connect the Citation Twelve directly to the switched A.C. receptacle on the rear of your Citation Eleven preamplifier (or any preamplifier which offers a switched A.C. outlet) to permit you to turn the amplifier on and off with the preamplifier's on/off switch.

A neon indicator light located on the front escutcheon will glow when the amplifier is receiving A.C. power from the line.

For use in areas which require 50 Hertz, 220 volt current, the amplifier must be modified in the following manner. It is advisable to have this modification made by a competent service technician.

1. 220 volt, 50 Hertz conversion involves the re-wiring of two wires per channel.
2. Remove bottom plate of amplifier.
3. Locate black and brown wires attached to fuse post. Unsolder brown wire only. Black wire remains on fuse post.
4. Locate black/white wire on the lug strip directly behind the fuse post and unsolder from lug strip.
5. Join the black/white wire you have just removed with the brown wire previously removed from the fuse post and solder together to the vacant lug provided on the lug strip.
6. Repeat exact procedure for other channel.
7. Replace 3A-3AG fuse supplied with Citation Twelve for 117 volt, 50-60 Hertz operation with 1.5A-3AG fuse for 220 volt, 50-60 Hertz operation.
8. Replace bottom plate.

VENTILATION

Although your new Citation Amplifier rarely develops high heat, it is still recommended that you leave the back of the cabinet open. If this is not possible, provide several large holes or slots as low down and as high up in the cabinet back as possible. As an alternate, holes may be provided in the sides, bottom or top of the cabinet. Remember that really effective ventilation requires provision for cool air to enter at the bottom and hot air to leave at the top. A minimum clearance of two

(2) inches should be allowed on each side and in the rear, between the chassis and the cabinet, and six (6) inches is required above it.

Isolate any accessories which might interfere with ventilation. For example, do not drape plastic or rubber covered interconnecting cable over the finned heat dissipating devices on the front panel.

WIRE DRESSING

Speaker wiring and input cables connected to the front panel of the Citation Twelve should be routed underneath the unit in order to prevent interference with the cooling fins of the power transistor heat sinks.

CONNECTING THE SPEAKERS FOR STEREO OPERATION

Your two speakers should be identical to obtain optimum results. Experts agree that a perfectly matched system offers the best stereophonic reproduction. The speakers should be placed along the same wall approximately 8 to 10 feet apart depending upon room size and furniture placement. It may be necessary to experiment with speaker placement until best results are obtained.

Use any type of stranded wire to connect your speakers to the Citation Amplifier. Lamp cord (zip cord) #18 gauge is excellent and may be dressed easily around the molding for an inconspicuous and neat installation. Do not drive staples or tacks through the center of the wire for this may short out the two sections which will decrease volume or short out the speakers entirely. It is permissible to use approximately 50 feet of speaker connecting wire for each speaker without loss of volume.

1. Connect one length of lamp cord to your left speaker system. If the cord has color-coded insulation, connect red to plus (+) and black to minus (-), or ground.
2. Connect the other end of the lamp cord to the LEFT SPEAKER terminals located on the front apron of the amplifier. The speaker output terminals are of a special industrial grade found in laboratories on professional test equipment. They can accept any type of wire termination such as bare tinned wire, spade lug, banana plug, etc. If the wire is color-coded, connect red to plus (+) and black to minus (-), or ground.

3. Now connect another length of lamp cord to your right speaker. Observe polarity.

4. Connect the other end of the lamp cord to the RIGHT SPEAKER terminals. Observe polarity.

Dress the bare wires carefully so they do not touch the chassis or each other to cause a short circuit. Observe the same precaution when connecting the lamp cord to the speaker. If a short circuit does occur, the amplifier will turn itself off automatically, and will continue to cycle until the short is removed.

SPEAKER PHASING

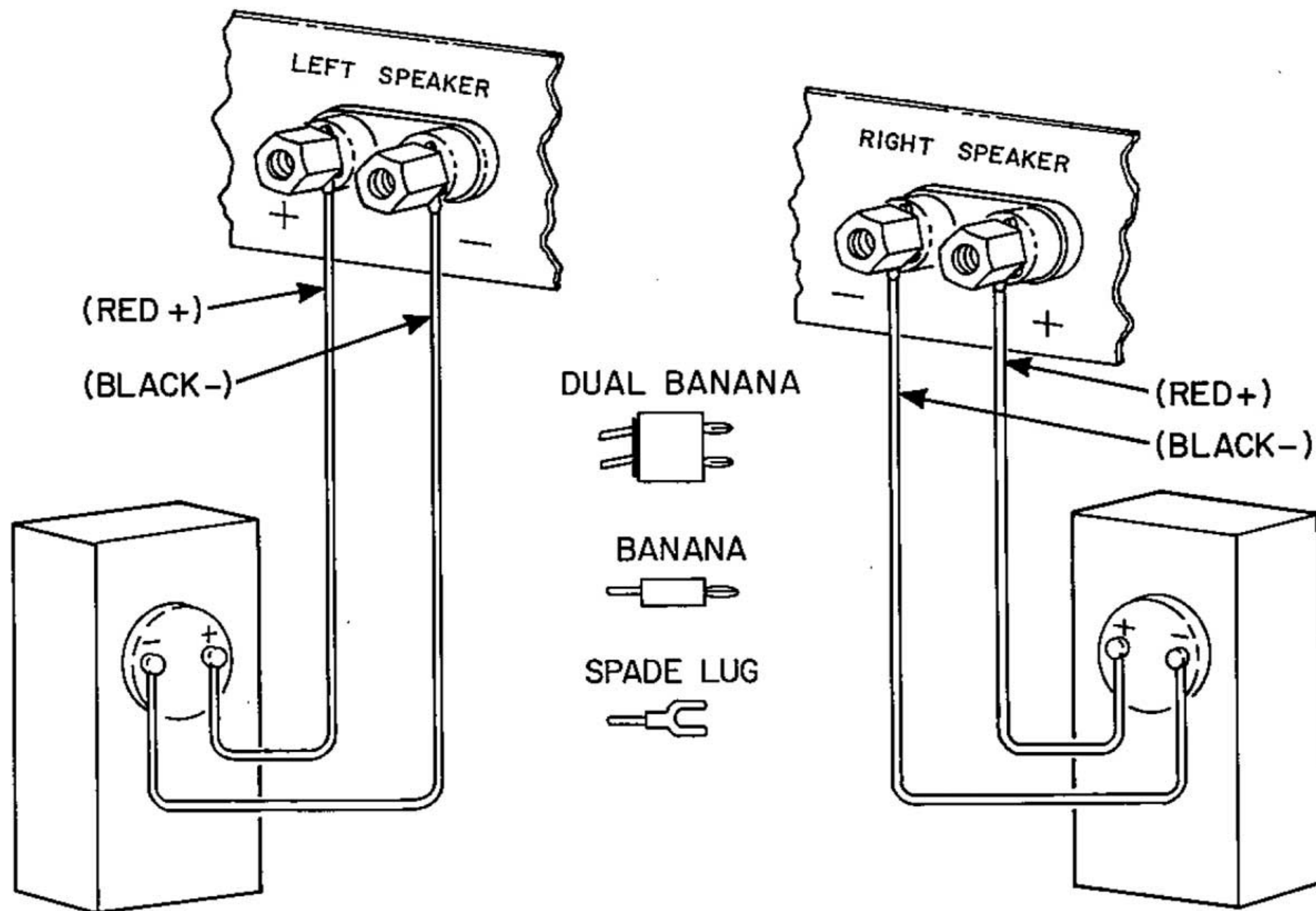
When more than one speaker is used in a music reproducing system, the speakers must be connected in a manner which will allow them to work together. Both left and right speakers must operate in perfect unison, moving back and forth together. If the speakers are moving in opposite directions, the result will be diminished bass response and decreased realism of sound. When this occurs, the speakers are said to be out of phase.

Checking for proper phase and correcting, if required, is quite simple.

1. Place your stereo preamplifier in the A + B or monophonic mode of operation.
2. Play a record, tape, or FM broadcast which has a single speaking or singing voice, or a solo instrument.
3. The voice or instrument should appear to be coming from an area directly between the two speakers. If the speakers are out of phase, the sound will appear to be coming from the two individual speakers.
4. If you determine that the speakers are out of phase, simply disconnect the leads from only one of the speakers and reverse them. The system will then be in phase.

This completes your speaker connections. Since the Citation Twelve does not contain audio output transformers, it is not necessary to match the impedance of your speakers to the amplifier. The amplifier will perform perfectly with any speaker which has an impedance of 4, 8 or 16 ohms.

DIAGRAM A
CONNECTING STEREO SPEAKERS



CONNECTING SPEAKERS FOR MONOPHONIC OPERATION

If the Citation Twelve is to be used monophonically and stereo is to be added at a later date, it is important that both speaker output terminals be terminated into a proper load. Refer to Diagram B for complete details.

UNDER NO CIRCUMSTANCES SHOULD BOTH CHANNELS BE TIED TOGETHER IN PARALLEL FOR MONOPHONIC OPERATION.

UNDER NO CIRCUMSTANCES SHOULD AN INPUT CABLE BE ATTACHED TO THE UNUSED CHANNEL.

TECHNICAL INFORMATION

BIAS ADJUSTMENT: This adjustment has been made at the factory and it should not be necessary to touch the bias potentiometer for the life of the amplifier. The only time that readjusting bias will be required is when output transistors are changed. This adjustment should be made only by a competent service technician.

FUSES: There are two fuses protecting the Citation Twelve. Both are 3A-3AG types. If replacement is required use only this size. A larger fuse will not protect the amplifier and damage may result.

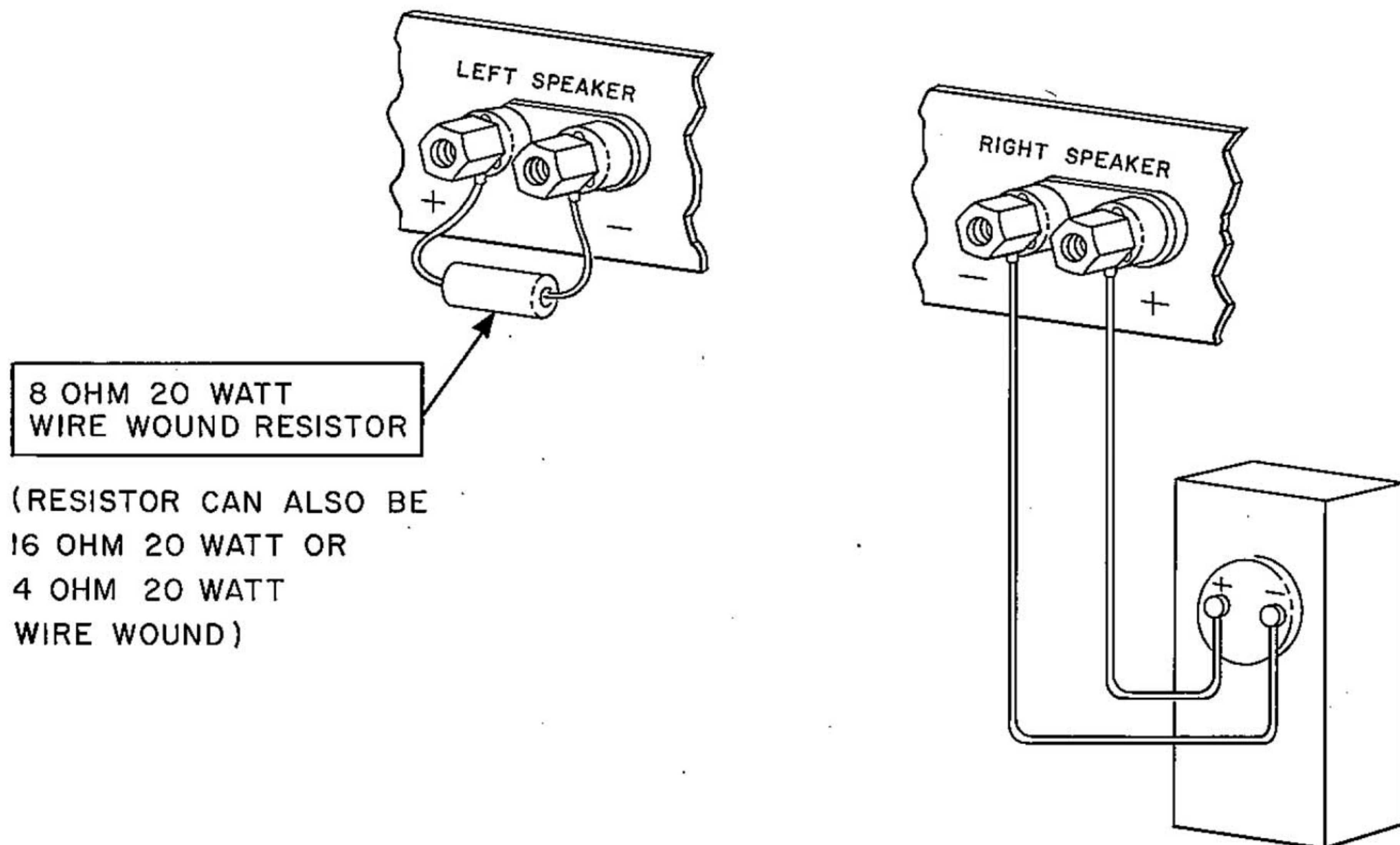
CONNECTING THE PREAMPLIFIER

Use standard shielded patch cords with RCA plugs to connect your preamplifier to the Citation Twelve.

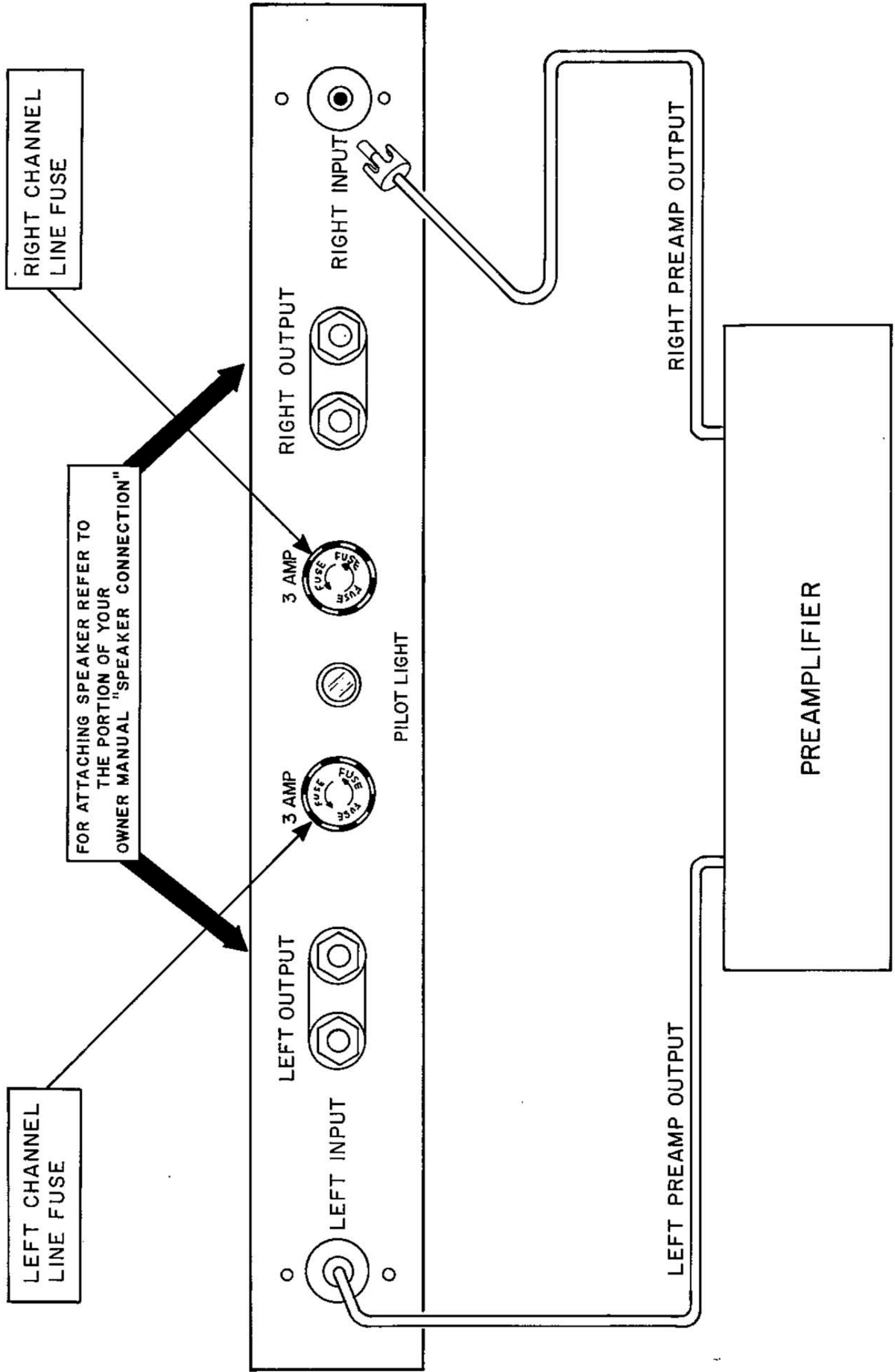
Connect one patch cord from the Left Channel Output of your preamplifier to the Left Channel Input on the front apron of the Citation Twelve and an additional patch cord from the Right Channel Output of your preamplifier to the Right Channel Input of the Citation Twelve.

WARNING: DO NOT REMOVE OR MANIPULATE THE PLUGS OF THESE PATCH CORDS WHILE THE CITATION IS ON. THE TRANSIENT WHICH MAY BE CAUSED BY AN OPEN GROUND OR OPEN SIGNAL LEAD COULD DAMAGE YOUR SPEAKERS. ALWAYS TURN THE SYSTEM OFF BEFORE UNPLUGGING CONNECTIONS.

DIAGRAM B
CONNECTING MONOPHONIC SPEAKER



FRONT PANEL



LEFT CHANNEL
LINE FUSE

RIGHT CHANNEL
LINE FUSE

FOR ATTACHING SPEAKER REFER TO
THE PORTION OF YOUR
OWNER MANUAL "SPEAKER CONNECTION"

LEFT OUTPUT

RIGHT OUTPUT

3 AMP

3 AMP

LEFT INPUT

RIGHT INPUT

PILOT LIGHT

LEFT PREAMP OUTPUT

RIGHT PREAMP OUTPUT

PREAMPLIFIER

CITATION[®] TWELVE

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