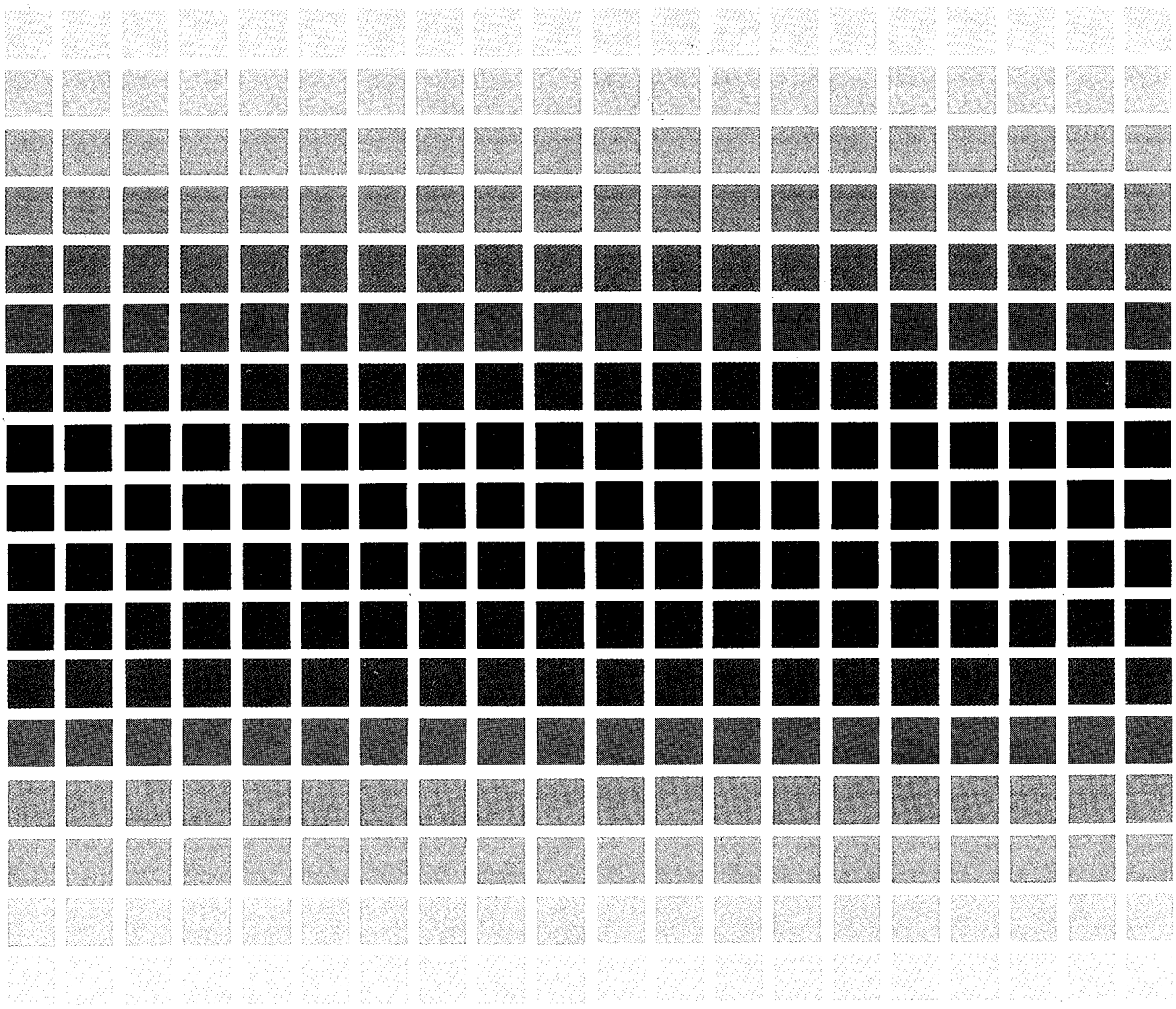
harman/kardon

Citation 16

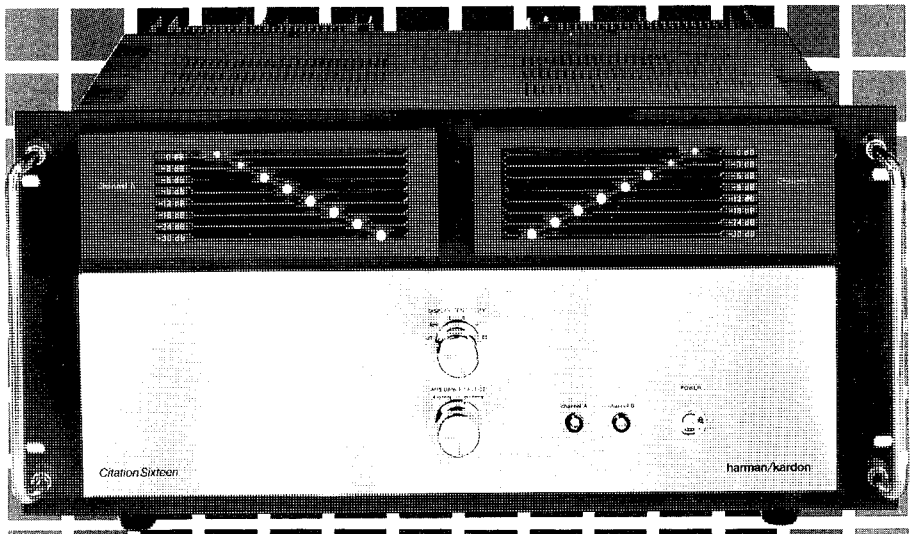
Owner's Manual



Citation 16

The Citation 16 is an expression
of our love for music, and our desire to
hear music reproduced as perfectly as possible.

We hope that you will find exploring the capabilities of the
Citation 16 amplifier as exciting and rewarding as
we found designing and building it.



Warning: To prevent fire or shock hazard, do not expose this amplifier to rain or moisture.

In every way, the Citation 16 is an instrument engineered to fulfill the audiophile's most exacting requirements.

Discrete components are used throughout. Their electrical and thermal isolation makes for sonic superiority over the more commonly used integrated circuits.

The Citation 16 slews quickly, a result of the superior high frequency response of the output stage. Excellent slew rate, coupled with low feedback voltages assure extremely low transient intermodulation distortion. The audible result is transparency of sound, even during the most demanding musical passages.

Class A operation has been extended beyond conventional limits, reducing audible crossover distortion. Crossover or "notch" distortion has been identified as a prime cause of the so-called "transistor" sound.

Completely separate power supplies for each channel ensure absolute stability under all speaker loads and provide transient handling ability.

The peak-reading light emitting diode display provides an instantaneous monitor of the power output. It is faster, easier to read, and more accurate than meters.

Ventilation

Effective ventilation of the Citation 16 requires provision for cool air to enter at the bottom and hot air to leave at the top. Isolate any accessories which might interfere with ventilation. Dress speaker wires and input cables so that they do not touch the fins of the heat sinks.

If you install the amplifier in a cabinet, leave the back of the cabinet open. Leave a minimum of two inches between each side of the chassis and the cabinet, and a minimum of six inches between the top of the heat sinks and the cabinet. If it is not possible to leave the back of the cabinet open, make sure that there are at least two inches of clearance in the rear and open large holes or slots in the bottom, top or sides of the cabinet to facilitate the flow of air from bottom to top.

Connections

Caution: Make all input and output connections and disconnections while the amplifier is turned off. In addition, once the preamplifier patch cords are connected, do not manipulate the plugs of the patch cords while the amplifier is on. The transient which may result could damage the speakers.

Power Connections

Connect the power line cord to any outlet furnishing 120 volts AC, 50 or 60 Hertz. Voltage can vary between 110 and 128 volts without damage to the amplifier.

Caution: If you plan to plug the power line cord of the Citation 16 into the switched power receptacle of the preamplifier, make sure that the preamplifier switch is rated at 1000 watts.

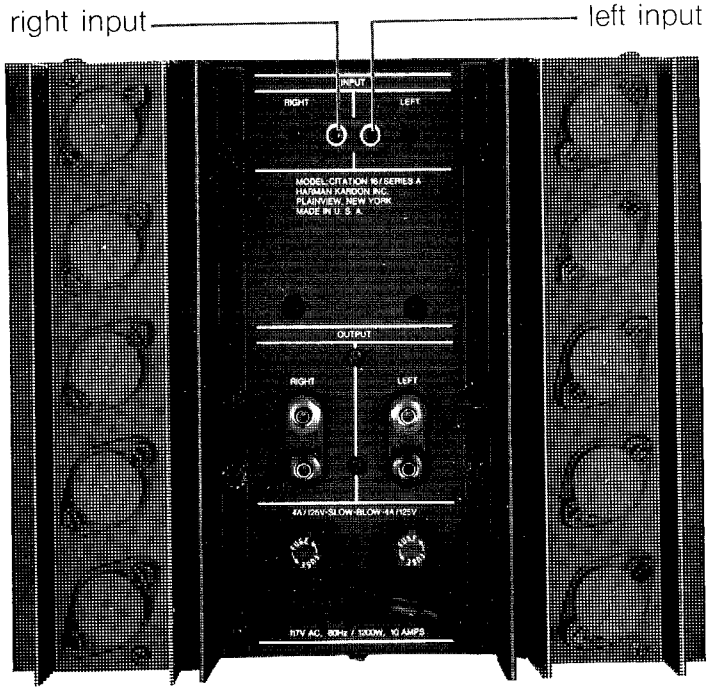
Grounding

Give careful attention to the grounding configuration of the components that feed the Citation 16. The chassis of the amplifier is grounded by means of a 3-prong power plug. If the preamplifier, turntable or other associated equipment also has a 3-prong plug, a ground loop may occur which would increase hum to undesirable levels. For this reason, the third wire of the associated component should be interrupted with isolating plugs.

The same problem develops in rack mounted applications if the various chassis are connected to each other via the rack. To keep hum levels within specification, the other chassis should be isolated from the rack.

Preamplifier Connections

Use standard shielded patch cords with RCA plugs to connect the outputs of your preamplifier to the inputs on the back of the Citation 16.



Speaker Compatibility and Protection

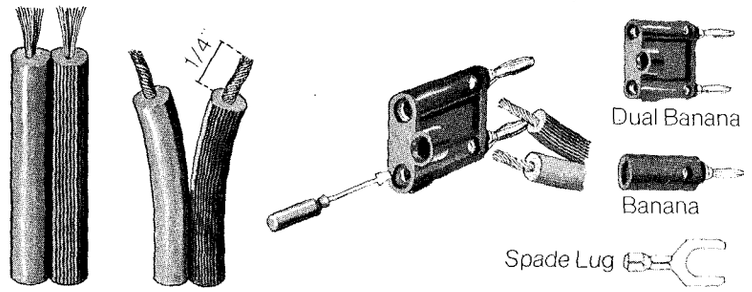
Since the Citation 16 does not contain audio output transformers, it is not necessary to match the impedance of your speakers to the amplifier. The amplifier will perform perfectly into any speaker with 4, 8 or 16 ohm impedance.

A relay circuit protects your speakers from switching transients by providing a one-second delay on turn-on, and instant turn-off.

Caution: There are no output fuses in the Citation 16 that will protect your speakers against inordinately large current surges or power output which could damage them. The amplifier can deliver 2.5 amperes into a 16 ohm speaker, 4.5 amperes into an 8 ohm speaker and 8 amperes into a 4 ohm speaker. Therefore, speakers that cannot operate safely with this level of current must be provided with fuses of the proper size in the speaker line. Check with the manufacturer of the speaker for the proper fuse rating.

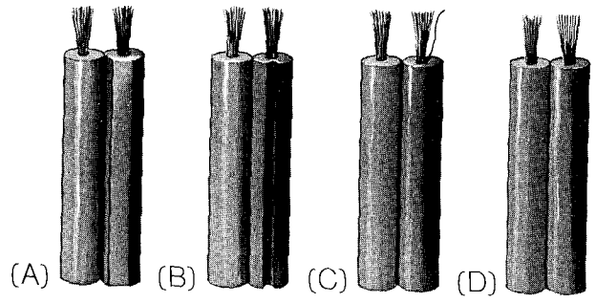
Preparing the Speaker Wires

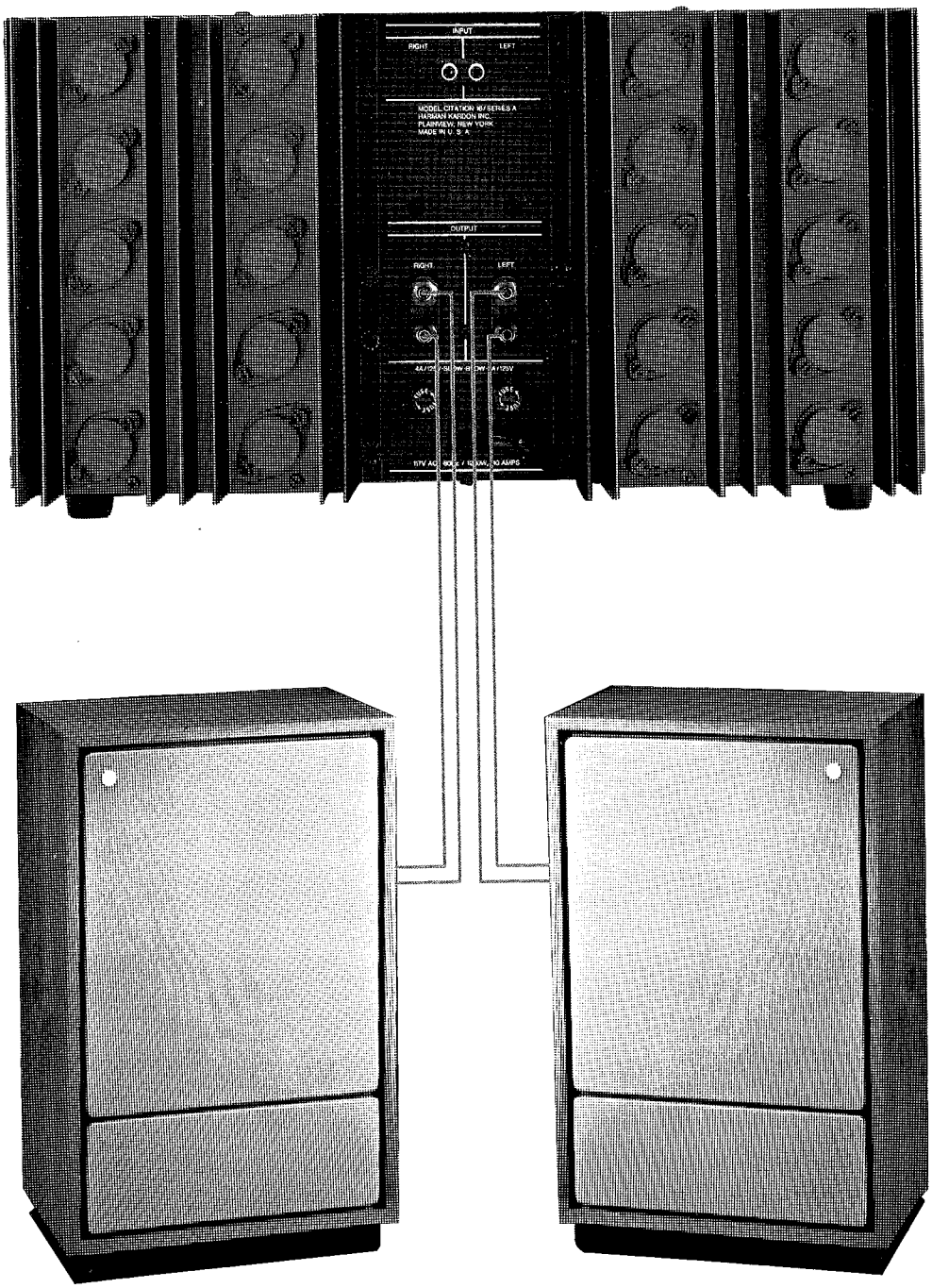
Use stranded wire to connect your speakers to the Citation 16. Lamp cord (zip cord) #18 gauge is acceptable, but a heavier gauge is desirable. Do not drive staples or tacks through the center of the wire, for this may short out the two conductors and consequently decrease the volume or short out the speakers entirely. It is possible to use 50 feet of connecting wire for each speaker without loss of volume. However, the damping factor is reduced and shorter leads are preferable. Cut two lengths of wire of approximately equal size. Both should be long enough to comfortably reach the farthest speaker. Separate the conductors at each end of the wire segments for a distance of two or three inches. Then carefully remove about 1/4 inch of insulation from each free end. Twist the strands of each conductor so they are smooth and tight, without any loose strands.



For your convenience, the output terminals of the Citation 16 accept spade lugs, banana plugs and dual banana plugs in addition to bare wire. Enclosed with your unit are two dual banana plugs – one for each channel.

Lamp cord usually provides a "code" which identifies one of the conductors. A conductor may be coded by a rib, sharp corner (A), or indentations (B) molded along the length of the insulation. In some cases, a thin colored thread is molded inside the insulation, along with the conductor (C). In others, the two conductors are different colors (D).




INPUT
RIGHT
LEFT
MODEL CITATION 18/SERIES A
HARMAN KARDON INC.
PLAINVIEW, NEW YORK
MADE IN U. S. A.
OUTPUT
RIGHT
LEFT

Speaker Connections

Connect one length of lamp cord to your left speaker system. If the cord is coded, connect the coded side to the plus (or "hot") terminal, and the uncoded side to minus (or "ground"). Connect the other end of the cord to the LEFT output on the rear panel of the amplifier. Connect the coded side to the red terminal post, and the uncoded side to the black.

Repeat the procedure for the right speaker system. The speakers should now be connected. If the code is followed as described, the speakers should also be in phase.

Phasing the Speakers

The object of speaker phasing is to have the diaphragms of the speakers move simultaneously in the same direction. Even though each of your speakers may be producing noticeable bass, they may be out of phase and the stereo image may actually be lacking accurate bass.

To check for proper phase by ear:

1. Put your stereo preamplifier in the A + B or monophonic mode.
2. Play a record, tape or FM broadcast which has a single speaking or singing voice, or a solo instrument.
3. Stand in a position equidistant between the two speakers. If the voice or instrument appears to be coming from an area directly between the two speakers, the speakers are in phase. If the sound appears to be coming from the two individual speakers, they have been incorrectly connected and are out of phase.

To correct the phasing, reverse the plus and minus leads at the terminals of only *one* speaker. The system will now be in phase.

Operation

The POWER switch is on the front panel, and is "on" in the depressed position. When the power is on, two neon indicator lamps – one for each channel – should glow. If a lamp does not light, the corresponding fuse is blown and that channel is not receiving power. The channel fuses are located on the back panel. They are slow-blow fuses rated at 4 amperes.

Bridge Mode Operation

The Citation 16 can be operated in a mode in which it delivers approximately 500 watts to a single 8 ohm speaker. While details of change to this mode of operation are included in the technical manual supplied with your unit, this procedure should be done only by a qualified technician.

LED Display

The output level of the Citation 16 may be monitored on the light emitting diode (LED) display. First set the IMPEDANCE SELECT switch to the nominal impedance of the speaker, 4 or 8 ohms. (For 16 ohm speakers, set the switch to the 8 ohm position.) This switch affects only the LED display and not the output itself.

	DISPLAY SENSITIVITY Setting			
	I	II	III	IIII
0dB	4W	16W	64W	160W
−3dB	2	8	32	80
−6dB	1	4	16	40
−9dB	.5	2	8	20
−12dB	.25	1	4	10
−18dB	.0625	.25	1	2.5
−24dB	.0156	.0625	.25	.625
−30dB	.0039	.0156	.0625	.1562

The ranges for the display are delineated by the sets of vertical bars which mark the DISPLAY SENSITIVITY switch positions. One bar (I) represents 4 watts full scale; 2 bars (II), 16 watts; 3 bars (III), 64 watts; and 4 bars (IIII), 160 watts. Once the range is set, the dB level of the signal below full scale is indicated by the dB calibration on either side of the lamps. For instance, if the switch is set to 4 bars (IIII), the first green lamp will illuminate at 30dB below 160 watts, the second green lamp at 24dB below 160 watts, etc. The top red lamp will glow at 160 watts output. The LED display matrix above shows the wattage value of each lamp at each DISPLAY SENSITIVITY setting. The values hold true for 4 and 8 ohm speakers only. For 16 ohm speakers, halve the matrix values.

To test that all the lamps function, turn the DISPLAY SENSITIVITY switch to the "test" position. Every lamp should glow. To defeat the display, turn the DISPLAY SENSITIVITY switch to "off."

Power Output:	**150 WATTS MIN. RMS PER CHANNEL, BOTH CHANNELS DRIVEN INTO 8 OHMS FROM 20Hz TO 20kHz, WITH LESS THAN 0.05% THD**
Power Bandwidth:	from 5Hz to 70kHz at less than 0.05% THD into 8 ohms, both channels driven simultaneously at 75 watts per channel
Frequency Response:	from less than 4Hz to greater than 40kHz, ± 0.5dB at less than 0.05% THD. From less than 4Hz to greater than 120kHz, +0, −3dB at less than 0.05% THD
Square Wave Rise Time:	better than 3 microseconds
Phase Shift:	less than 0.5 degrees at 20Hz, less than 12 degrees at 20kHz
Slew Rate:	greater than 30 volts per microsecond
Total Harmonic Distortion:	less than 0.05% from 250 milliwatts to 150 watts RMS, both channels driven simultaneously into 8 ohms from 20Hz to 20kHz
Intermodulation Distortion:	less than 0.05% from 0.015 watts to 150 watts
Hum and Noise:	better than 100dB below 150 watts
Damping Factor:	greater than 300:1
Input Impedance:	10k ohms
Input Sensitivity:	1.25 volts for 150 watts
Inputs:	one RCA type input terminal per channel
Outputs:	instrument type binding posts. Accepts speakers from 4 to 16 ohms
Dimensions:	19" W x 14" D x 9-1/4" H (complete with metal cage) (483 mm x 356 mm x 235 mm)
Weight:	55 lbs. (24.9kg)

This unit is internally bridgeable for monaural operation and provides 300 watts driven into 16 ohms from 20Hz to 20kHz with less than 0.05% THD.

Information is available upon request with regard to commercial and sound reinforcement applications.