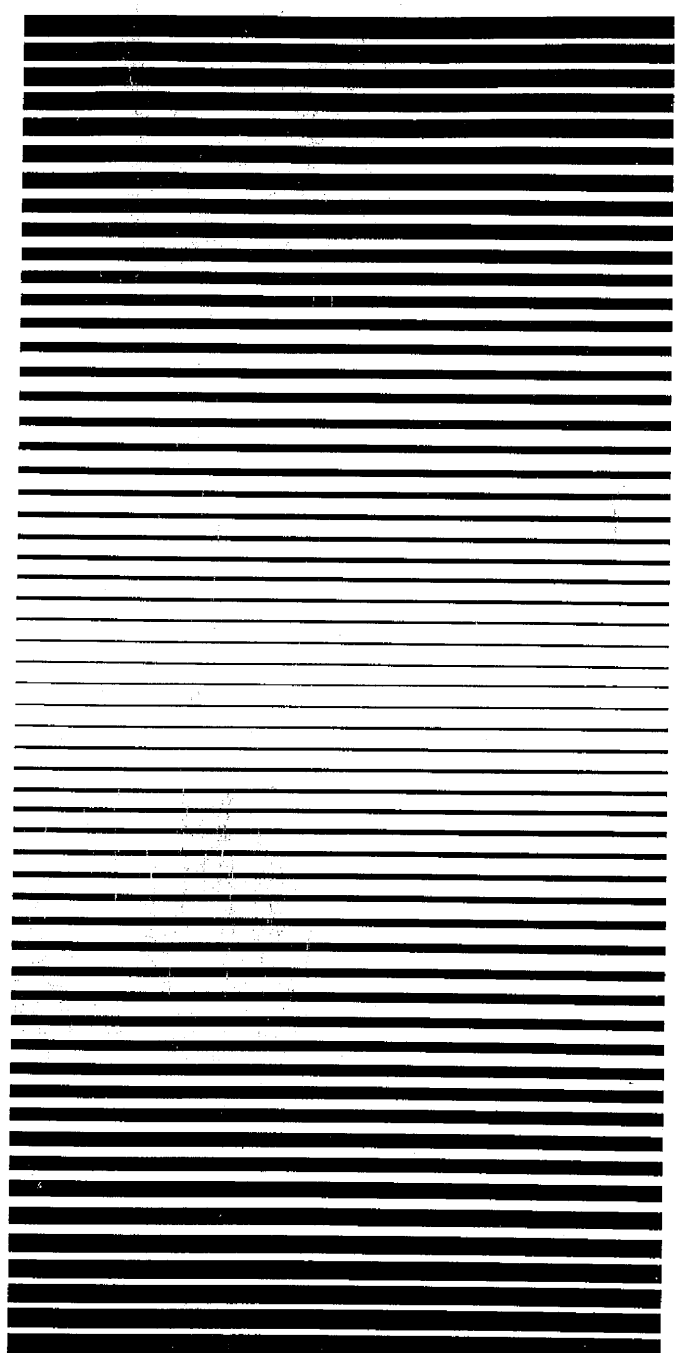
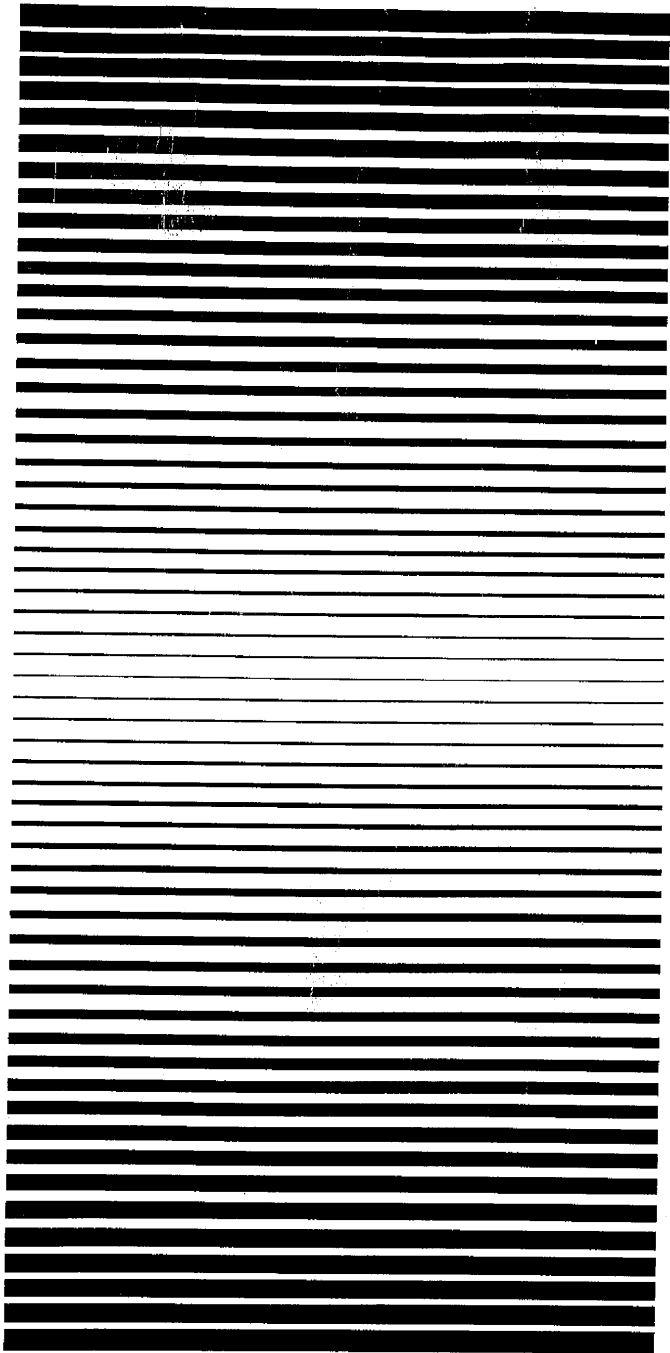


harman/kardon

A-401

stereophonic control amplifier
owner's manual

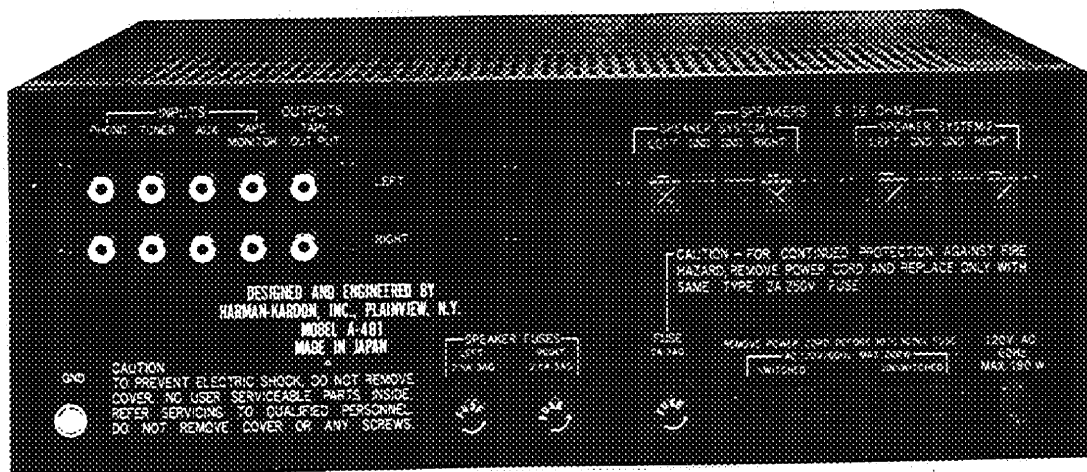


Introduction

The fact that you've invested in a component high fidelity system indicates you to have a more than average interest in music. The fact that your investment includes a Harman/Kardon amplifier shows us your appreciation of uncompromised reproduction of the music you enjoy. Throughout the design and manufacture of this amplifier, we have made every effort to assure it will meet all of your expectations. We are confident the A-401 will do this if it is properly connected and its controls and features are clearly understood.

This manual will serve as a guide to the connection of the A-401 and the expert use of all its controls. We understand your desire to have the A-401 operating in the shortest possible time, so this manual has been organized to make the installation procedure rapid, simple, and accurate. We feel a comprehensive understanding of the various controls and features the A-401 offers can best be obtained when you can hear their effects as we describe them, so this manual is organized to allow that.

Read each section of this manual completely before you begin to make the connections or control adjustments that section describes. You will make the right connections or adjustments the first time you attempt them and thus shorten the process of installation.



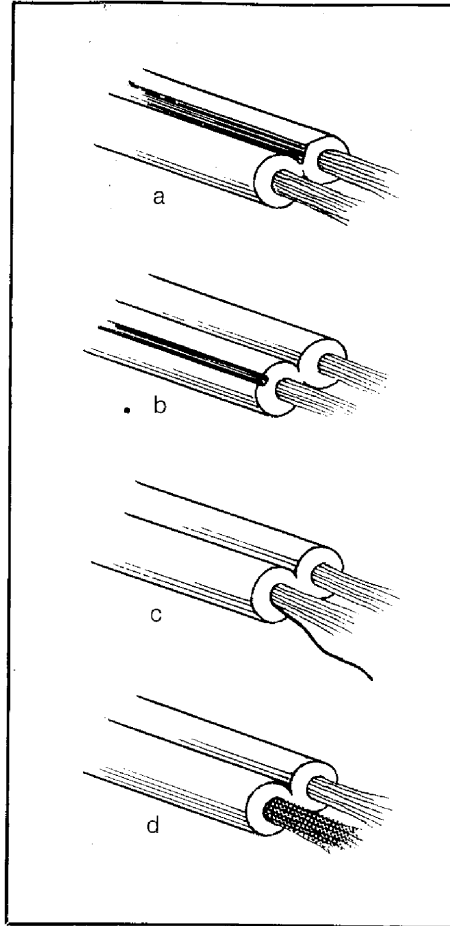
Warning: To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

Connecting the A-401

Before proceeding with the connection of the A-401, there is one other item that you should take care of. Since you have just purchased the unit, you should still have the **bill of sale**. Make sure it is clearly marked showing the date of purchase. Now look on the rear panel of the A-401 and locate the serial number. Record this number on the bill of sale and then put it away in a safe place for future reference. This number will be important if your unit requires warranty service. It may also prove a useful identification if your unit becomes subject to theft. Also remember to fill out and mail in your registration card.

On the rear panel of the A-401 you will find numerous receptacles, all clearly and specifically marked with identifying legends. Each of these will be dealt with in turn. For the moment, leave the power cord of the A-401 **unconnected**. Place the A-401 on a shelf or table, or on the floor near where it will finally be placed when you've completed the connections. You should leave enough working space around it so you can make your connections easily and comfortably.

Although the A-401 is a solid state device, its powerful amplifiers will generate heat. The A-401 is designed to operate efficiently over a wide range of ambient temperatures, but the heat it generates must be allowed to escape to prevent internal temperatures from rising too high. Adequate ventilation must be provided. If the A-401 will operate on an open shelf, no special precautions need be taken. If a shelf will exist above the A-401, allow at least 1" to 2" of free space above the amplifier. If the A-401 will operate in a 3 or 5-sided (bottom, back, top and sides) closed space, at least 2" to 4" of free space should be allowed above it and to either side. In custom-mounted cabinet installations, adequate air flow can be obtained by drilling a large cutout, or several small holes, in the surrounding cabinetry, both above and below the amplifier (not in the A-401 housing!!!). Open back custom installations require no special attention. Finally, free air flow through the bottom of the amplifier must be allowed. **Never operate the A-401 on a rug or cushion that could prevent air from entering the bottom of the amplifier.**

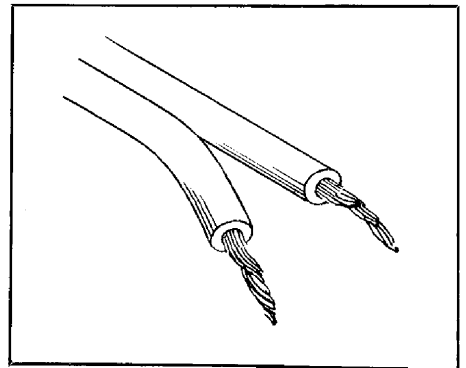


Lamp cord usually provides a "code" which is a means of identifying the conductors. On some brands the insulation surrounding one of the conductors has a rib, sharp corner (see "a"), or indentations molded along its length (see "b"); on others a thin, colored thread is molded inside the insulator along with one conductor (see "c"). In still other brands, the two conductors are different colors (see "d"). Such wire will be very useful in "phasing" your speaker systems.

Preparing for Connections:

Choosing the right wire for connecting your speakers to the amplifier will assure the best performance. We recommend use of 18 gauge, stranded, two-conductor wire. This type of wire is often called lamp, or "zip" cord and is available at most high fidelity stores or any electrical supply store. 18 gauge wire is thick enough to allow lengths of up to 50 feet to be used without affecting the low frequency performance of your system. For longer runs, we suggest thicker 16 gauge wire. If the length of wire you need is relatively short, you may use thinner 20 gauge wire for your installation, although 18 gauge wire is preferred.

Cut two lengths of wire of approximately equal size. Both should be long enough to comfortably reach the speaker that will be at the greatest distance from the A-401 in order to prevent imbalance in the system. Later, when the components are put into final position, coil the excess length and place it inconspicuously.



Separate the conductors at each end of the wire segments a distance of about 2-3 inches, then carefully remove about 1/2 inch of insulation from each free end. Twist the strands of each conductor so that they are smooth and tight without any loose strands.

Speaker Systems

Connecting Speakers to the A-401:

Find the row of four connectors on the back panel of the A-401 marked SPEAKER SYSTEM 1. Starting with either Left or Right pair of connectors, push firmly in on the plastic head of each connector, revealing an opening. Insert each of the bare conductors at the end of one of the lengths of wire you've prepared into the opening. Release the connector. Each of the two conductors should be locked firmly in place in its own connector. Take the other end of this wire and connect the bare conductors to the two terminals on one of your speakers. Now (*this is important*) note to which connector (red or black) on the A-401, and to which speaker terminal, the coded side of the wire is connected. Connect the other speaker to the other two connectors under SPEAKER SYSTEM 1, being sure the coded side of this wire is connected to both the A-401 and the speaker in the same way as the first wire. The left channel connection should be made to the speaker placed at the left side of your listening area. The right channel connection should be made to the speaker placed at the right side of

your listening area. Be certain (*this is very important*) all these connections are tight and that *all* the strands of the wires are firmly seated in the connectors of the A-401 and under the terminals of your speaker systems. Any loose strands of wire could touch other terminals and cause short circuits, which might cause the speaker fuse to blow.

If you have been careful to follow these directions, your speakers will be properly "phased." We will describe how to check this by ear when the other connections are completed and your system is operating.

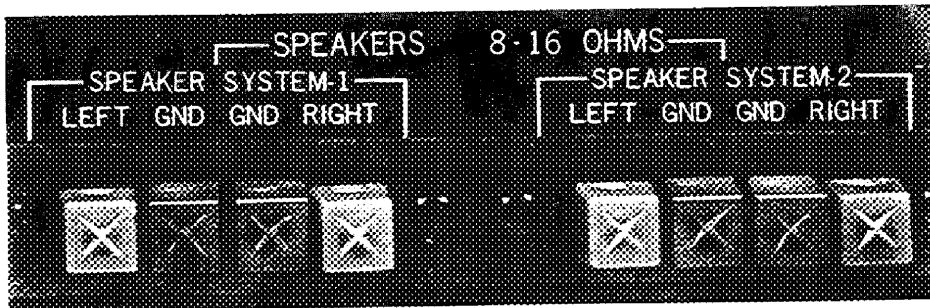
If, now or later, you wish to connect a second pair of speakers, you can use the **SPEAKER SYSTEM 2** connectors of the A-401, following the procedure outlined previously. The speakers in your system should **ALL** have a rated impedance of 8 ohms or higher.*

Turntables or Automatic Changers

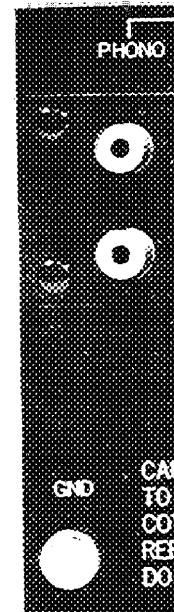
All record playing units provide two or three cables (aside from the power cord) for connection to the A-401. These are the left and right channel signal cables and the ground connection (some turntables combine the ground connection with one of the signal cables). The two signal cables are usually identified as "left channel" and "right channel" by the use of a color code or tabs, or the channel identifications are molded into the insulators around the pin-type RCA connectors. Determine which of the cables is left and which right and insert them into the two corresponding receptacles on the rear panel of the A-401 marked PHONO. Press them in as far as they will go so they are seated snugly.

If a separate ground wire is provided, connect its lug or stripped end under the knurled nut marked GND on the rear panel of the A-401. The phonograph signal connections are now complete.

Insert the AC power cord of your turntable into the AC receptacle marked UNSWITCHED on the rear of the A-401. This receptacle is "live" so long as the A-401 itself is connected to a live AC outlet, *regardless* of whether the A-401 is itself operating. Your turntable or automatic changer should be connected to this receptacle.



Although your A-401 has been designed for use with speakers with rated impedances of 8 or 16 ohms, the A-401 can accommodate **ONE** pair of 4-ohm speakers adequately. You should not, however, use more than **ONE** pair of 4-ohm speakers. Damage to the A-401 could result from such use.



Note: The A-401 is designed to operate with a high quality **MAGNETIC** cartridge. If you purchased your A-401 and turntable separately, be sure the turntable is equipped with a cartridge of this type.

Tuners

Most tuners utilize pin type RCA receptacles as output connectors. Your tuner may also have a chassis ground terminal. These connectors are generally placed on the rear panel of tuners. Locate them on your unit. If the output connectors are other than pin type RCA receptacles, it will be necessary for you to obtain a mating adapter from your dealer.

Connect a cable having pin type RCA male plugs between the LEFT channel OUTPUT receptacle of your tuner and the LEFT TUNER INPUT receptacle of the A-401. Similarly connect a cable between the RIGHT channel OUTPUT receptacle of your tuner and the RIGHT TUNER INPUT receptacle of the A-401. Push the plugs in all the way so they are firmly seated, making good electrical contact. Connect an insulated wire between ground (GND) terminal on the A-401 and the similar connection on your tuner. If your tuner lacks a terminal, connection may be made to an unpainted screw head.

Many dealers stock cables which contain the two shielded signal cables and ground lead in a single molded assembly. A cable of this type makes for a very neat, convenient installation.

The AC power cable of your tuner may be plugged into the switched 120 VAC receptacle on the A-401. In this case the tuner will be activated by the front panel power switch of the A-401.

Connecting Tape Equipment

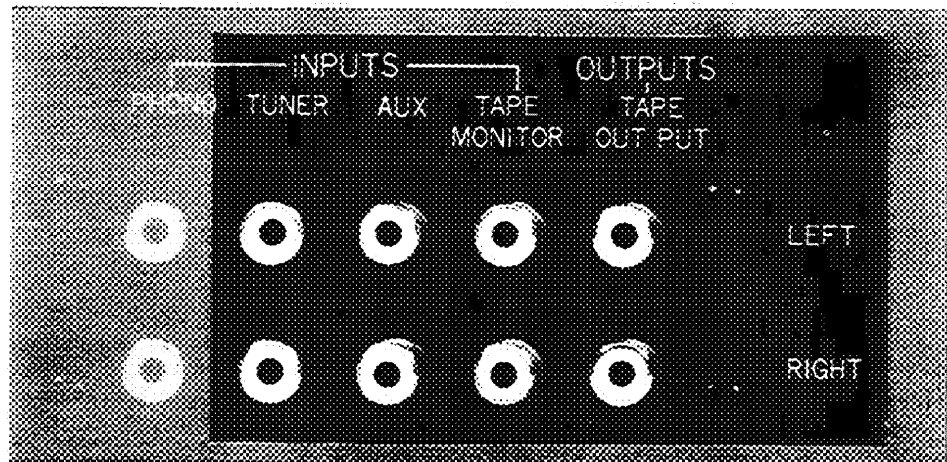
The A-401 provides facilities for both the recording and playback of tape programs to and from open-reel, cassette, or eight-track cartridge equipment. Using the signal cables provided with your tape deck or recorder, recordings can be made by connecting the left and right channel TAPE receptacles (under the bracket labeled OUTPUTS) on the rear panel of the A-401 to the corresponding *input* receptacles of your tape equipment.

If your open-reel or cassette equipment offers true off-tape monitoring facilities, the left and right channel *output* receptacles of your tape equipment should be connected to the corresponding TAPE MONITOR receptacles under the bracket labeled INPUTS. Most cassette recorders and many open-reel units do not offer true tape monitor capability. However, the outputs of these machines may still be connected to the TAPE MONITOR receptacles of the A-401. Tape equipment capable of playback *only*, can be connected to either the TAPE MONITOR or AUX receptacles of the A-401. The choice here will be affected by your desire or need to reserve the AUX inputs of the A-401 for use as explained below.

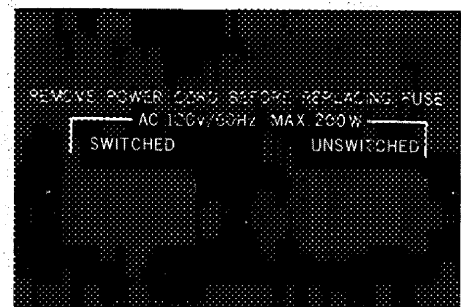
Other Equipment

A pair of auxiliary inputs is available at the rear of the A-401 for the connection of any "high level" output equipment. A special tuner for long wave, marine, aircraft, or citizen's bands, etc. may be connected — or you may choose to connect a second tape recorder or the output of the audio section of a television receiver. Any number of choices is available. Consult your dealer for information as to what equipment is compatible with the parameters of the AUX inputs of the A-401. If you have not used the SWITCHED AC OUTLET for a tape recorder, you can use it for accessory equipment.

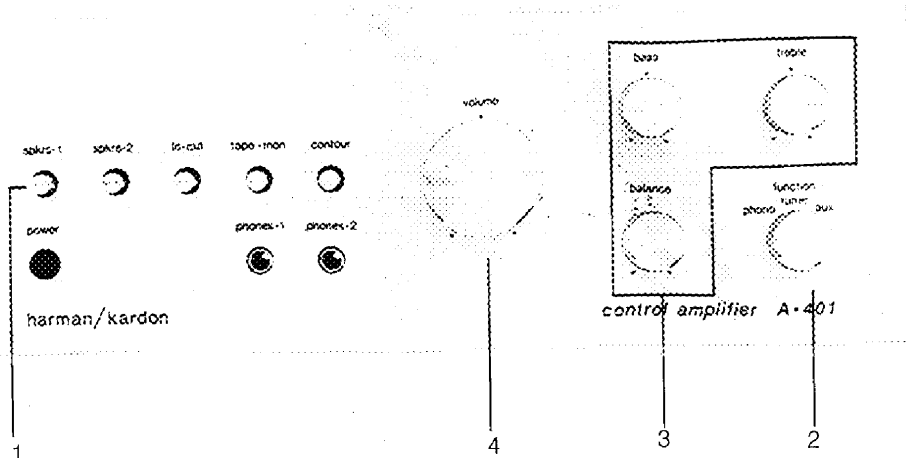
The connections to the rear panel of the A-401 are now complete. Insert its AC power cord into a convenient wall outlet and place the A-401 in its final position in your listening room.



The remaining SWITCHED AC OUTLET on the rear of the A-401 may be used to provide power for your tape deck or recorder. This outlet is "live" only when the A-401 is itself operating. If you wish, the power switch of your tape equipment may be left in the "on" position — power to it would then be controlled by the POWER SWITCH of the A-401. If you use this outlet, be sure the recorder's drive system is disengaged before you switch the A-401 off.



Operating the A-401



Familiarize yourself with the front panel controls. There are five knobs and six pushbuttons controlling all the features of the amplifier. Each of the controls performs a different function, but instead of discussing each control separately, we will illustrate how they work together to control the reproduction of sound through the A-401. Find the VOLUME control and turn it down (counterclockwise). Push the POWER switch to turn the A-401 on.

Playing Records with the A-401

Five basic controls are used to play back disc recordings through the A-401. FUNCTION, VOLUME, BALANCE, TREBLE and BASS. Make the following adjustments to these controls and the SPEAKERS switch after activating your turntable or record changer:

- (1) SPEAKERS 1 — On (Push "in")
- (2) FUNCTION — "Phono" position
- (3) BALANCE, BASS, TREBLE — Neutral position (12 o'clock)
- (4) VOLUME — Advance (clockwise) to comfortable loudness level.

You should now hear sound from the disc through your system. To increase or decrease the loudness of the playback, the VOLUME control may be advanced (clockwise) or turned down (counterclockwise). The BALANCE control if turned counterclockwise will shift the loudness to the left speaker by attenuating (reducing the loudness of) the right speaker. When turned in the other direction, it has the opposite effect. The SPEAKER 1 pushbutton connects or defeats the loudspeakers connected to SPEAKER SYSTEM 1. (If you have speakers connected to SPEAKER SYSTEM 2, they are controlled by the SPEAKERS 2 pushbutton on the front panel).

Play a stereo disc with strong bass passages. Listen carefully to the bass. If you don't think it is as full as it should be reverse the speaker connections for one speaker. If the bass response improves your speakers were out of phase. If the bass response is poorer re-connect the speaker as it originally was.

Push the POWER switch off. Recheck your connections both at the rear of the A-401 and at the terminals of both loudspeakers. If you are using two dissimilar loudspeakers, it is possible that their internal connections have reverse polarity, causing them to be out of phase. Reverse the connections made at the speaker or the amplifier (NOT BOTH) for one channel ONLY. The system should now be in phase.

The phasing test can be done with any program material, but disc recordings are the recommended method. Stereo material is suggested to make the effect more obvious.

If you do not get sound at this point, check the control positions given above. Also, be sure the TAPE MONITOR switch is in the "out" position. Leave the volume control at the 9 o'clock position while you are adjusting the other controls. If you still get no sound, check the back panel connections for PHONO, then check the turntable itself.

NOTE: Whenever you check connections at the back panel, always push the POWER switch off.

If, at average listening levels, you hear an objectionable (i.e. easily audible) amount of hum or buzz coming from the ground wire connected to the A-401. Some turntable/record combinations actually produce less hum this way. Another source of hum is inadequate seating of the phono signal cables in the receptacles of the A-401. Check this thoroughly.

Other Controls

By far the most frequently used controls are the FUNCTION, VOLUME, and POWER controls, but each of the controls we haven't yet mentioned has a specific purpose and value. Listen to their effect as we describe them.

TREBLE Raises (clockwise) or lowers (counterclockwise) high frequency content in program material on both channels simultaneously. Neutral position is 12 o'clock.

BASS Same effect as TREBLE control, except works on low frequencies.

CONTOUR Works in conjunction with VOLUME control to increase bass energy at low volume settings. Progressively less effect as volume level is increased. The CONTOUR control has no effect at VOLUME control settings beyond 12 o'clock.

TAPE-MON Admits program from any "high level" source (usually tape recorder) connected to TAPE MONITOR receptacles. It does not affect signal appearing at the TAPE OUTPUT receptacles. Thus, the use of the TAPE MONITOR switch does not disturb the recording process of whatever source the FUNCTION switch is set to. (Note: If the rear panel TAPE MONITOR inputs are unoccupied and the TAPE MONITOR switch is depressed, no sound will be heard regardless of the position of the FUNCTION switch. The same will be true if the equipment connected to the TAPE MONITOR inputs is off). TAPE MONITOR also allows for connection of signal processing devices.

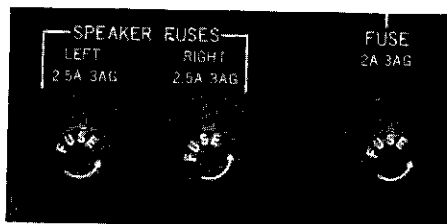
MONO Changes any program from stereophonic to monophonic format. Also processes any source connected to a single input receptacle (such as television sound) through both channels.

PHONES Two receptacles for headphones for private listening. Does not automatically defeat speaker systems. Headphones can be used whether your speakers are "on" or "off".

FUNCTION Selects program for playback through system. Same signal appears at TAPE OUT.

SPKRS-1, SPKRS-2 Permits either or both of two speaker systems to be driven. To permit private listening, these controls are independent of the signal appearing at the PHONES receptacles.

Fuses



Three fuses are provided to protect the A-401. Two of these are the speaker fuses and labeled as such. They work to protect the amplifier circuitry from external short circuits or other conditions which would cause excessive current to be drawn through the amplifiers. If one of your speakers stops reproducing sound, first check the connections for that speaker, then check the speaker fuse for that channel. Replace the fuse after correcting any short circuit conditions (wire strands touching the wrong terminals are the usual cause).

The remaining fuse protects the entire amplifier from excessive currents through the AC power line. Should any fuse blow:

THE REPLACEMENT FUSES MUST BE OF PRECISELY THE SAME TYPE AS THAT SPECIFIED ON THE REAR PANEL. USING ANY OTHER FUSES WILL NOT PROTECT THE A-401. SERIOUS DAMAGE TO ITS CIRCUITRY MAY RESULT.

A-401 Specifications

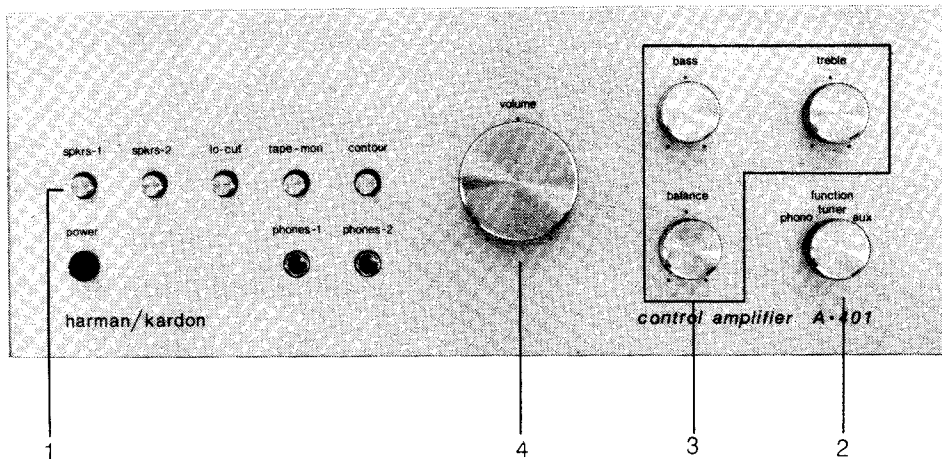
Power Output:	20 WATTS MIN. RMS PER CHANNEL. Both channels driven into 8 ohms from 20 Hz to 20 kHz, with less than 0.5% THD.
Power Bandwidth:	From less than 10 Hz to greater than 35 kHz at less than 0.5% THD into 8 ohms, both channels driven simultaneously at 10 watts per channel.
Frequency Response:	From less than 10 Hz to greater than 80 kHz at less than 0.5% THD into 8 ohms, both channels driven simultaneously at 1 watt per channel with electrically flat tone controls.
Square Wave Rise Time:	Less than 2 microseconds.
Square Wave Tilt:	Less than 5% at 20 Hz.
Total Harmonic Distortion:	Less than 0.3% from 250 milliwatts to 20 watts RMS, both channels driven simultaneously into 8 ohms from 20 Hz to 20 kHz.
Intermodulation Distortion:	Less than 0.2% at rated power.
Noise:	Less than 52 dB residual (unweighted).
Sensitivity:	120-150 millivolts, AUX, TAPE MON; 2.5-3 millivolts, PHONO.
Damping Factor:	Greater than 30.
Input Impedance:	Greater than 20k ohms AUX. Greater than 10k ohms TAPE MON 47k ohms PHONO.
Tone Control:	Plus and minus 12 dB at 50 Hz; Plus and minus 14 dB at 10 kHz.
Dimensions:	13" W x 10 $\frac{3}{4}$ " D x 5 $\frac{1}{4}$ " H. 33 cm. W x 27.5 cm. D x 13.4 cm. H.
Weight:	13 $\frac{1}{2}$ lbs./6.2 kg.

Dear Owner,

A technical improvement has been made to your Harman/Kardon A401 Stereophonic Control Amplifier. This insert is provided as a replacement for the sixth and seventh pages of your Owner's manual. The revised paragraphs are marked with a bar in the right hand margin.

Thank you for your interest in Harman/Kardon products.

Operating the A-401



Familiarize yourself with the front panel controls. There are five knobs and six pushbuttons controlling all the features of the amplifier. Each of the controls performs a different function, but instead of discussing each control separately, we will illustrate how they work together to control the reproduction of sound through the A-401. Find the VOLUME control and turn it down (counterclockwise). Push the POWER switch to turn the A-401 on.

Playing Records with the A-401

Five basic controls are used to play back disc recordings through the A-401. FUNCTION, VOLUME, BALANCE, TREBLE and BASS. Make the following adjustments to these controls and the SPEAKERS switch after activating your turntable or record changer:

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- (2) FUNCTION — "Phono" position
- (3) BALANCE, BASS, TREBLE — Neutral position (12 o'clock)
- (4) VOLUME — Advance (clockwise) to comfortable loudness level.

You should now hear sound from the disc through your system. To increase or decrease the loudness of the playback, the VOLUME control may be advanced (clockwise) or turned down (counterclockwise). The BALANCE control if turned counterclockwise will shift the loudness to the left speaker by attenuating (reducing the loudness of) the right speaker. When turned in the other direction, it has the opposite effect. The SPEAKER 1 pushbutton connects or defeats the loudspeakers connected to SPEAKER SYSTEM 1. (If you have speakers connected to SPEAKER SYSTEM 2, they are controlled by the SPEAKERS 2 pushbutton on the front panel).

Play a stereo disc with strong bass passages. Listen carefully to the bass. If you don't think it is as full as it should be reverse the speaker connections for one speaker. If the bass response improves your speakers were out of phase. If the bass response is poorer reconnect the speaker as it originally was.

Push the POWER switch off. Recheck your connections both at the rear of the A-401 and at the terminals of both loudspeakers. If you are using two dissimilar loudspeakers, it is possible that their internal connections have reverse polarity, causing them to be out of phase. Reverse the connections made at the speaker or the amplifier (NOT BOTH) for one channel ONLY. The system should now be in phase. Push the MONO switch to return it to stereo position.

The phasing test can be done with any program material, but disc recordings are the recommended method. Stereo material is suggested to make the effect more obvious.

If you do not get sound at this point, check the control positions given above. Also, be sure the TAPE MONITOR switch is in the "out" position. Leave the volume control at the 9 o'clock position while you are adjusting the other controls. If you still get no sound, check the back panel connections for PHONO, then check the turntable itself. **NOTE: Whenever you check connections at the back panel, always push the POWER switch off.**

If, at average listening levels, you hear an objectionable (i.e. easily audible) amount of hum, try disconnecting the ground wire from the turntable to the A-401. Some turntable/cartridge combinations actually produce less hum this way. Another source of hum is inadequate seating of the phono signal cables in the receptacles of the A-401. Check this thoroughly.

Other Controls

By far the most frequently used controls are the FUNCTION, VOLUME, and POWER controls, but each of the controls we haven't yet mentioned has a specific purpose and value. Listen to their effect as we describe them.

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BASS Same effect as TREBLE control, except works on low frequencies.

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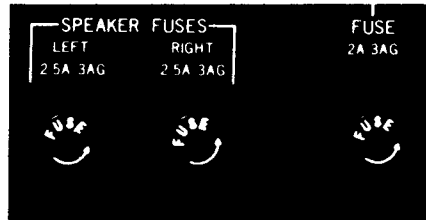
LO CUT A filter to reduce low frequency content of any program material. Rumble from your turntable (if present) or other low frequency problems can be effectively reduced.

PHONES Two receptacles for headphones for private listening. Does not automatically defeat speaker systems. Headphones can be used whether your speakers are "on" or "off".

FUNCTION Selects program for playback through system. Same signal appears at TAPE OUT.

SPKRS-1, SPKRS-2 Permits either or both of two speaker systems to be driven. To permit private listening, these controls are independent of the signal appearing at the PHONES receptacles.

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The remaining fuse protects the entire amplifier from excessive currents through the AC power line. Should any fuse blow:

THE REPLACEMENT FUSES MUST BE OF PRECISELY THE SAME TYPE AS THAT SPECIFIED ON THE REAR PANEL. USING ANY OTHER FUSES WILL NOT PROTECT THE A-401. SERIOUS DAMAGE TO ITS CIRCUITRY MAY RESULT.

A-401 Specifications

Power Output:	20 WATTS MIN. RMS PER CHANNEL. Both channels driven into 8 ohms from 20 Hz to 20 kHz, with less than 0.5% THD.
Power Bandwidth:	From less than 10 Hz to greater than 35 kHz at less than 0.5% THD into 8 ohms, both channels driven simultaneously at 10 watts per channel.
Frequency Response:	From less than 10 Hz to greater than 80 kHz at less than 0.5% THD into 8 ohms, both channels driven simultaneously at 1 watt per channel with electrically flat tone controls.
Square Wave Rise Time:	Less than 2 microseconds.
Square Wave Tilt:	Less than 5% at 20 Hz.
Total Harmonic Distortion:	Less than 0.3% from 250 milliwatts to 20 watts RMS, both channels driven simultaneously into 8 ohms from 20 Hz to 20 kHz.
Intermodulation Distortion:	Less than 0.2% at rated power.
Noise:	Less than 52 dB residual (unweighted).
Sensitivity:	120-150 millivolts, AUX, TAPE MON; 2.5—3 millivolts, PHONO.
Damping Factor:	Greater than 30.
Input Impedance:	Greater than 20k ohms AUX. Greater than 10k ohms TAPE MON 47k ohms PHONO.
Tone Control:	Plus and minus 12 dB at 50 Hz; Plus and minus 14 dB at 10 kHz.
Dimensions:	13" W x 10¾" D x 5¼" H. 33 cm. W x 27.5 cm. D x 13.4 cm. H.
Weight:	13½ lbs./6.2 kg.