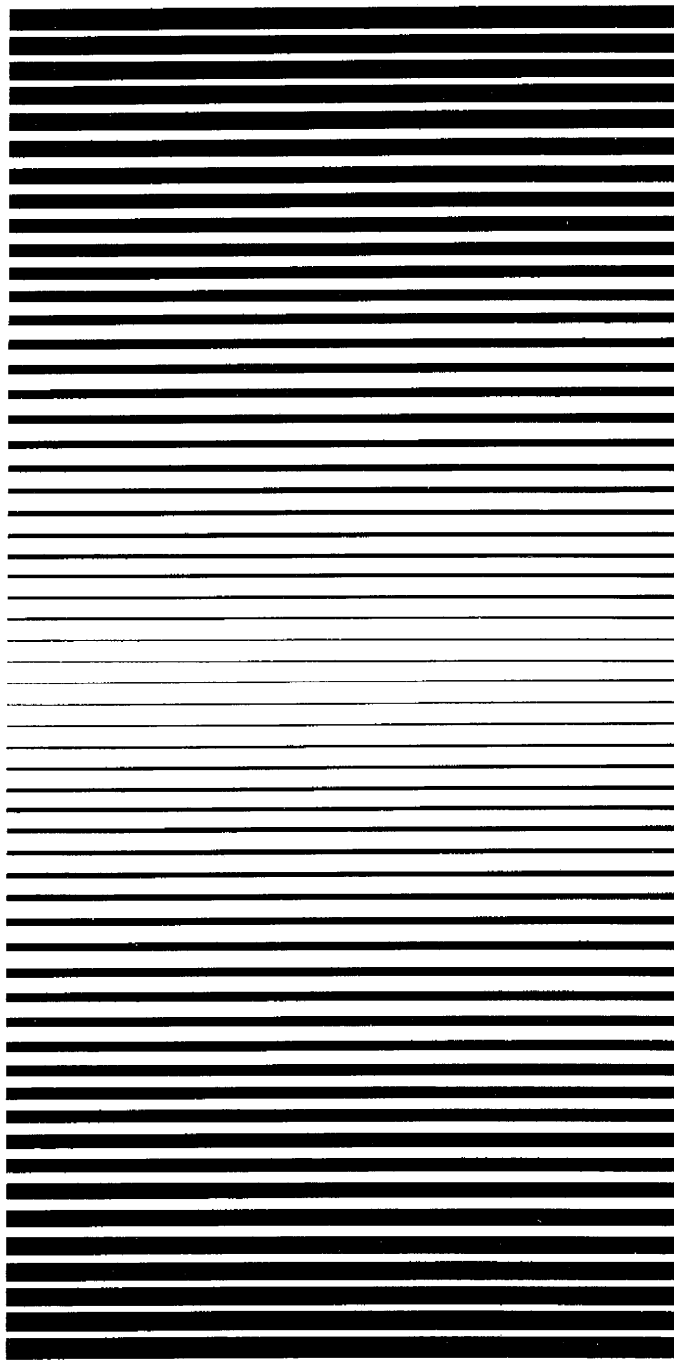
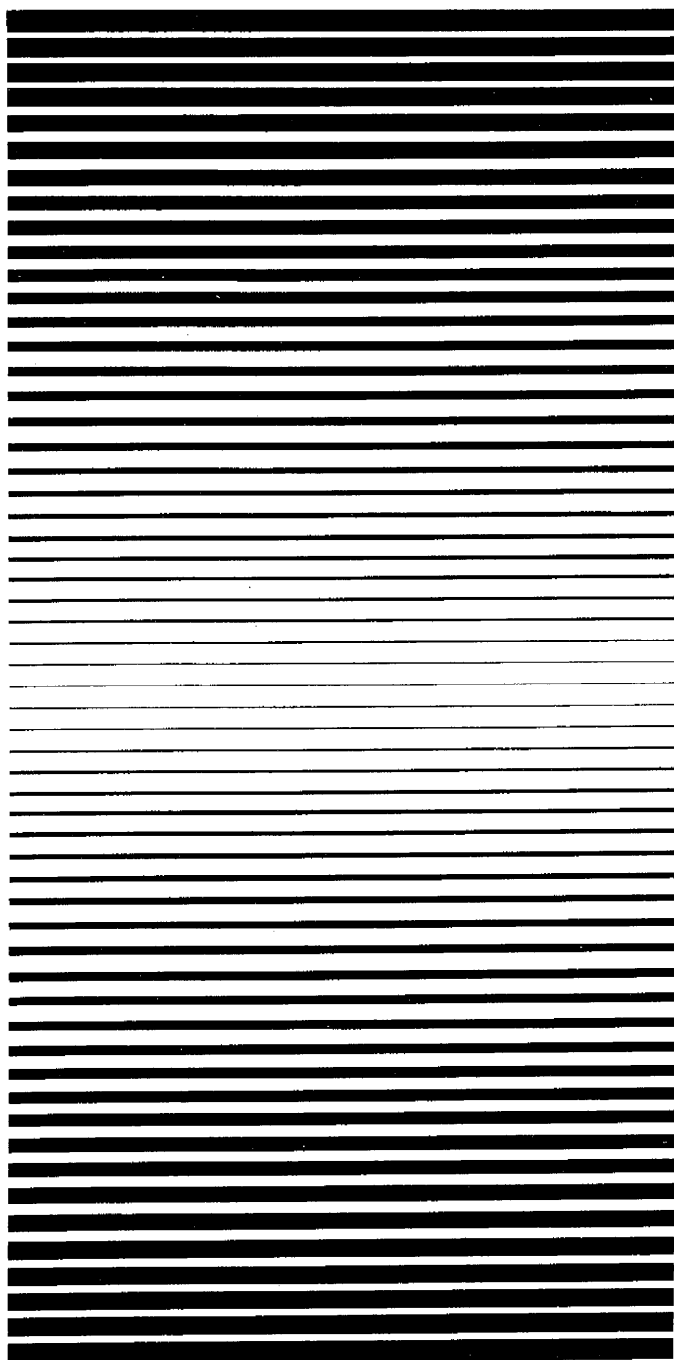


harman/kardon

A402

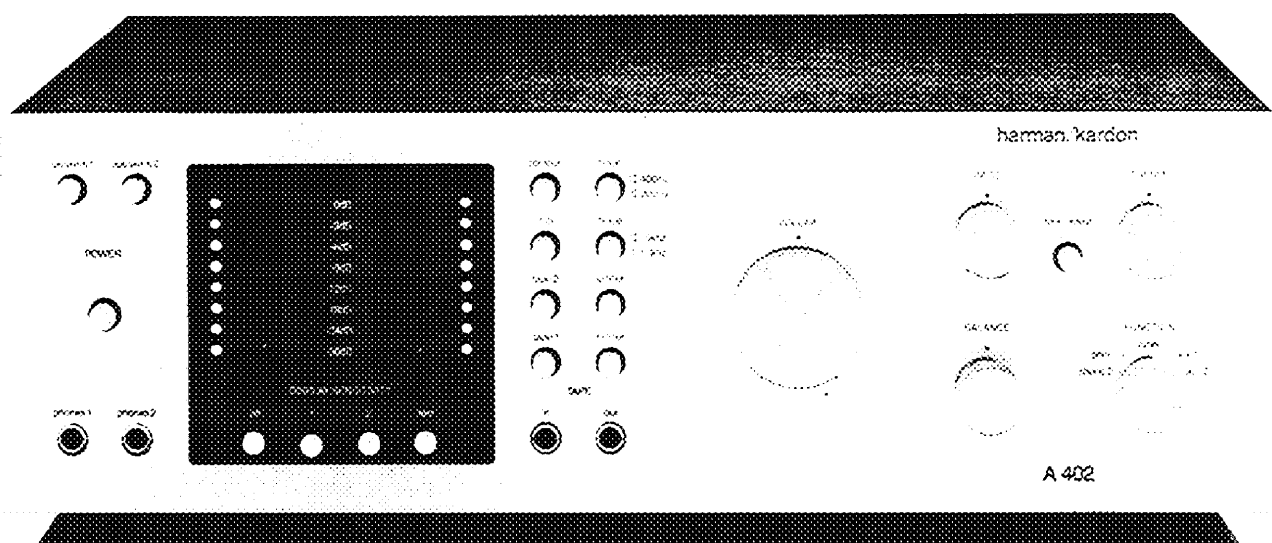
amplifier/preamplifier
owner's manual



INTRODUCTION

Your investment in a component high fidelity system indicates you 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 unit, we have made every effort to assure it will meet all of your expectations.

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



WARNING:

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

CONNECTING THE A402

Before proceeding with the connection of the A402 you should make a record of your purchase. 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 your A402 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 also provides identification if your unit is stolen. Also remember to fill out and mail in your registration card.

Place the A402 on a shelf or table near where it will finally be located. Leave enough working space to make your connections easily.

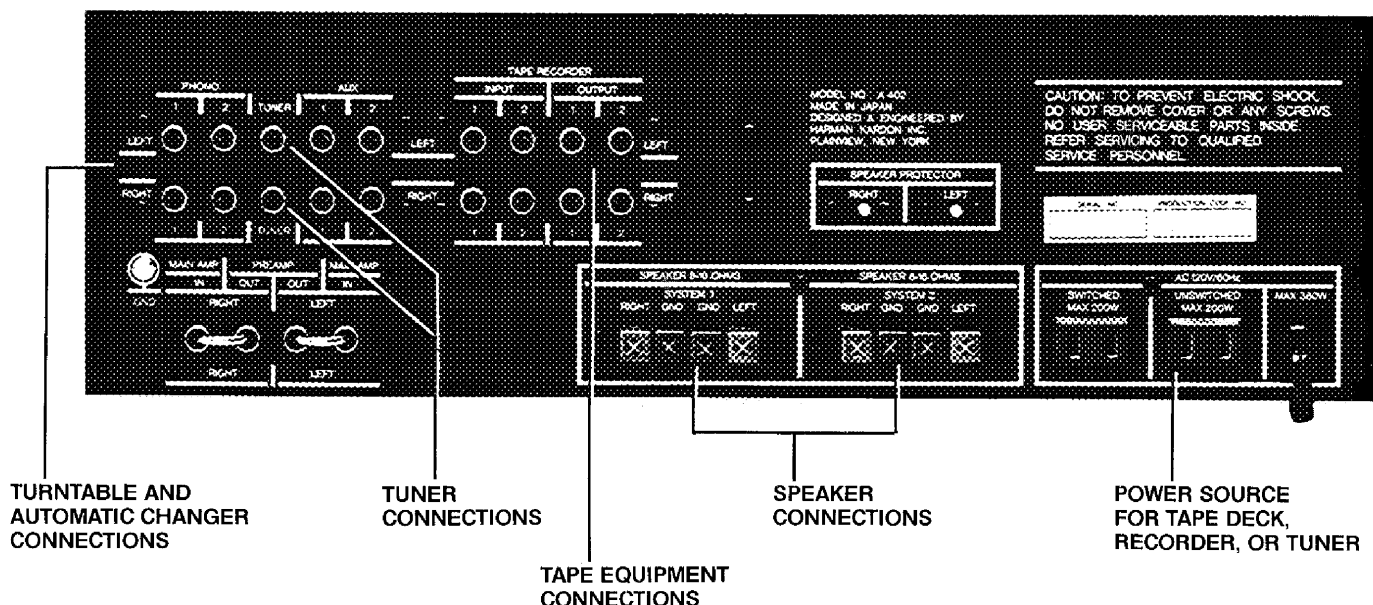
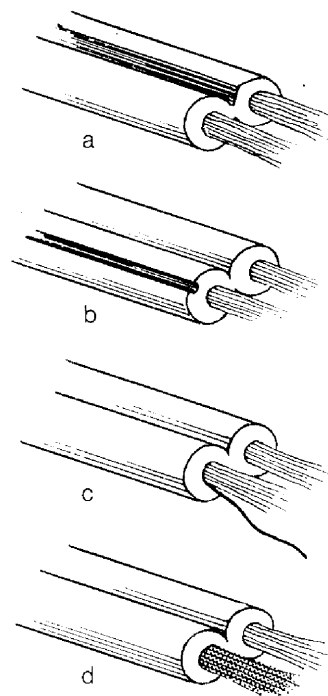
Although the A402 is a solid-state device, its power amplifiers will generate heat. The A402 is designed to operate efficiently over a wide range of ambient temperatures, but adequate ventilation must be provided. If the A402 will operate on an open shelf, no special provisions need to be taken. If a shelf will exist above the A402, allow at least 1 to 2 inches of free space above the unit. If it will operate in a 3 or 5-sided (bottom, back, top and sides) closed space allow at least 3 to 4 inches of free space above 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 housing). Open-back custom installations require no special attention. Finally, free air must flow through the bottom of the A402. Never operate it on a rug or mat that could prevent air from entering the bottom of the unit.

PREPARING FOR CONNECTIONS:

Choosing the right wire for connecting your speakers to the receiver 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. Lengths of up to 50 feet can be used without affecting the low frequency performance of your system. For longer runs use 16 gauge wire. If the run is short you may use the thinner 20 gauge wire, though 18 gauge wire is preferred.

Lamp cord usually provides a "code," which is a means of identifying the conductors; 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"), or the two conductors are different colors (see "d").



SPEAKERS



Find the row of four connectors on the back panel of the A402 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. Note to which connector (red or black) on the A402, 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 A402 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 as you face the speakers. The right channel connection should be made to the speaker placed at the right side of your listening area. **BE CERTAIN** all these connections are tight and that all the strands of the wires are firmly seated in the connectors of the A402 and under the terminals of your speaker systems. Any loose strands of wire could touch other terminals and cause short circuits, which might cause a speaker circuit breaker to open.

If you wish to connect a second pair of speakers, you may use the **SPEAKER SYSTEM 2** connectors following the procedure outlined previously. Each speaker should have a rated impedance of 8 ohms or higher.

Although your A402 has been designed for use with speakers with rated impedances of 8 or 16 ohms, the A402 can accommodate one pair of 4 ohm speakers adequately. You should not use more than **ONE** pair of 4 ohm speakers. Damage to the A402 could result.

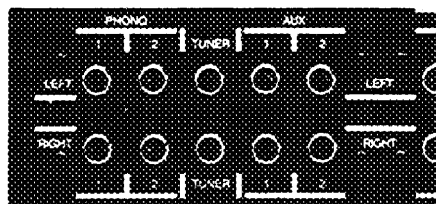
TURNTABLES OR AUTOMATIC CHANGERS

The A402 has provision for connecting two record playing units. All record playing units provide two or three cables (aside from the power cord) for connection to the A402. 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 a color code or tabs, or the channel identifications are molded into the insulators around the pin-type RCA connectors. Insert the connectors into the two corresponding receptacles on the rear panel of the A402 marked **PHONO 1**. 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**. Power can be supplied to the turntable by plugging into the **UNSWITCHED** outlet on the A402.

If a second record playing unit is to be used, connect it to the **PHONO 2** inputs in the same manner.

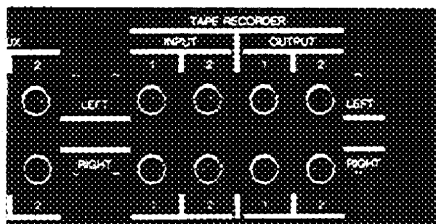


TUNERS

Connect a cable having pin-type RCA male plugs between the **LEFT** channel **OUTPUT** receptacle of your tuner and the **LEFT TUNER** receptacle of the A402. Similarly connect a cable between the **RIGHT** channel **OUTPUT** receptacle of your tuner and the **RIGHT TUNER** receptacle of the A402. Push the plugs in all the way so they are firmly seated, making good electrical contact. 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.

If the AC power cable of your tuner is plugged into the switched receptacle the tuner will be activated by the front panel power switch of the A402.

TAPE EQUIPMENT

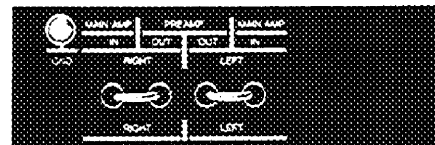


The A402 provides facilities for both recording and playback of tape programs to and from open-reel, cassette, or eight-track cartridge equipment. Using the signal cables provided with your tape deck or recorder, connect the left and right channel **TAPE RECORDER 1** receptacles (under the bracket labeled **OUTPUT** on the rear panel of the A402) to the corresponding input receptacles of your tape equipment. The A402 provides inputs and outputs for two tape recorders.

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 (**TAPE RECORDER INPUT 1, INPUT 2**) 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 input receptacles of the A402. Tape equipment capable of playback only, can be connected to either tape input.

OTHER EQUIPMENT

Provision is made at the rear of the A402 to connect any equipment designed to be installed between the preamplifier and power amplifier. To use this feature simply disconnect the patch cords from the **MAIN AMP IN** and **PREAMP OUT** jacks and follow instructions supplied with the accessory equipment.



NOTE: With no accessory equipment, patch cords **MUST** be installed to use the receiver.

Two pair of auxiliary inputs (**AUX 1, AUX 2**) also are available at the rear of the A402 to connect any "high level" output equipment.

Consult your dealer for information as to what equipment is compatible with the electrical requirements of the **AUX** inputs of the A402.

The **SWITCHED AC OUTLET** on the rear of the A402 can be used to provide power for your tape deck, recorder, or tuner. This outlet is "live" only when the A402 is 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 A402. If you use this outlet, be sure the recorder's drive system is disengaged before you switch the A402 off. If you have not used the **SWITCHED AC OUTLET** for a tape recorder or tuner you can use it for other accessory equipment.

The **UNSWITCHED** can be used to provide power for your turntable. This outlet is live whenever the A402 is plugged in to the AC power line. By supplying power even when A402 **POWER** Switch is off it allows automatic turntables to complete their reject cycles and thus avoid damage to their mechanisms.

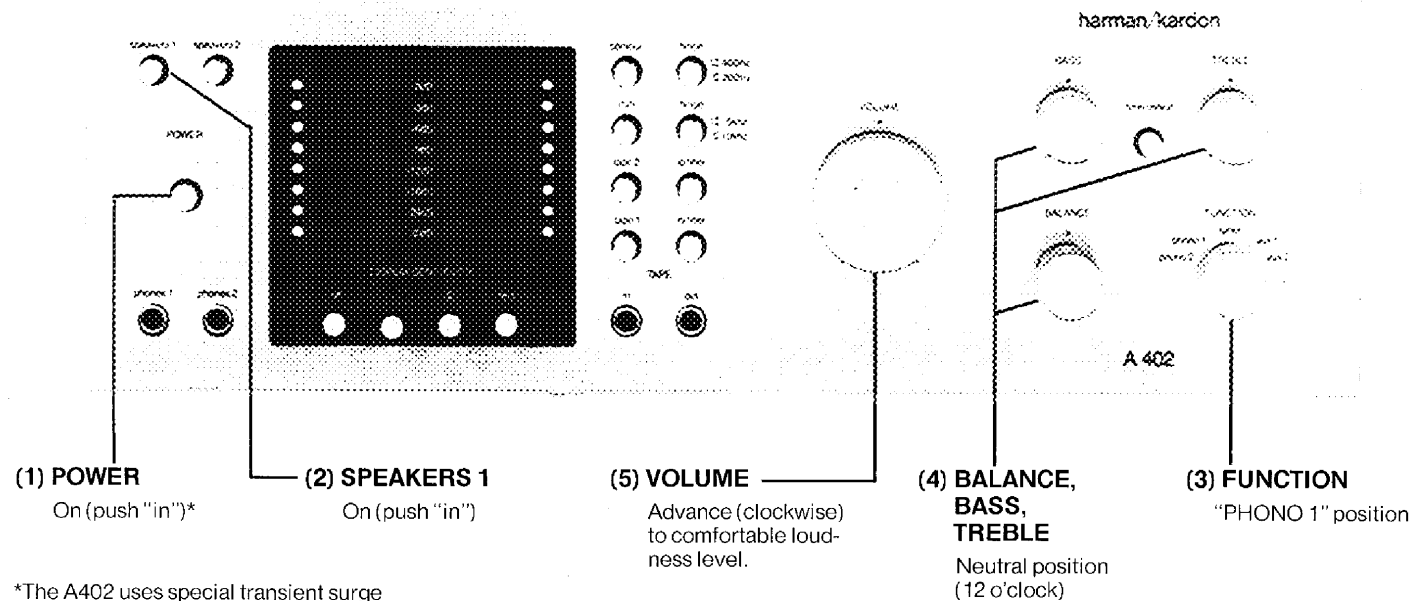
The connections at the rear panel are now complete. Place the A402 in its final position and insert its AC power plug into a convenient wall outlet.

OPERATING THE A402

Familiarize yourself with the front panel controls. There are five knobs and 15 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 A402. Find the **VOLUME** control and turn it down (counterclockwise).

PLAYING RECORDS WITH THE A402

Five basic controls are used to play back disc recordings through the A402. **FUNCTION**, **VOLUME**, **BALANCE**, **TREBLE** and **BASS**. Make the following adjustments to these controls after activating your turntable or record changer:



*The A402 uses special transient surge protection which may delay sound output up to ten seconds.

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 **SPEAKERS 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.

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 **TAPES 1** and **TAPES 2** switches are in the "out" position. Leave the volume control at the 9 o'clock position

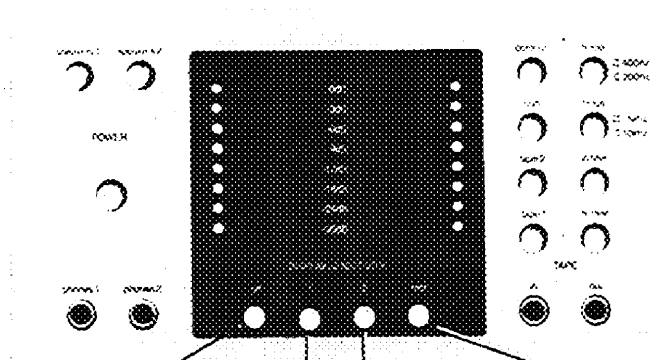
while you are adjusting the other controls. If you still get no sound, check the back panel connections for **PHONO 1**; then check the turntable itself.

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 A402. 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 A402. Check this thoroughly.

DISPLAY SENSITIVITY

The Sensitivity Display is comprised of a light-emitting diode display and four pushbutton switches that select mode of operation. The LED display is a faster, more responsive and, therefore, more accurate indication of dynamic range and power level. The ranges for the display are established by pushbutton switches 1 and 2 under the display. Once the range is established the dB level of the signal below full scale is indicated by the calibration on the LED panel. For example, if pushbutton 1 is depressed, which is 40 watts full scale, the first green lamp will come on at 30 dB below 40 watts, the second green lamp at 24 dB below 40 watts, etc. The top red lamp will glow at 40 watts output.



If the display is to be inhibited depress the OFF pushbutton.

Pushbutton 2 represents 6 watts full scale.

Pushbutton 1 represents 40 watts full scale, that is the 0 dB LED will light at 40 watts output.

To test if all the lamps are operative press the TEST pushbutton.

The following table shows the amount of power required into an 8-ohm load to light each LED for the 40 watt and 6 watt scales.

dB	Range 1 (watts)	Range 2 (watts)
0	40	6
-3	20	3
-6	10	1.5
-9	5	0.750
-12	2.5	0.375
-18	0.63	0.095
-24	0.159	0.024
-30	0.040	0.006

OTHER CONTROLS

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

PHONES 1 and 2. Headphones may be connected. Insertion of headphone connector WILL NOT automatically defeat speaker systems. Headphones can therefore be used whether your speakers are "on" or "off."

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

DUB. When this pushbutton switch is released and TAPE 1 is depressed (latched in) allows dubbing (recording) from Tape Recorder 1 to Tape Recorder 2. When depressed (latched in) will allow dubbing from Tape Recorder 2 to Tape Recorder 1.

TAPE 2. Admits programs from any "high level" source (usually tape recorder) connected to TAPE INPUT 2 receptacle. DOES NOT affect signal

appearing at the TAPE OUTPUT 1 receptacle 2. Thus, the use of the TAPE INPUT switch does not disturb the recording process of whatever source the FUNCTION switch is set. (Note: If the rear panel TAPE INPUT 2 is unoccupied and TAPE 2 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 INPUT 2 is off.)

TAPE 1. Same as Tape 2, except applies to TAPE INPUT 1.

TAPE IN/OUT. These are stereo phone jack connected in parallel with TAPE INPUT 1 and TAPE OUTPUT 1. They provide a convenient method of connection for tape recording and playback.

HINGE 400Hz/200Hz. Bass control effect will be more pronounced when pushbutton is out (400Hz); it will be less pronounced when pushbutton is in (200Hz).

HINGE 5kHz/10kHz. Treble control effect will be more pronounced when pushbutton is in (10kHz), and less pronounced when pushbutton is out (5kHz).

LO FILTER. Rumble from your turntable (if present) or other low frequency

problems can be effectively reduced with this switch.

HI FILTER. A filter to reduce high frequency content of any program material. Tape hiss, record scratches and other problems found in program material can be effectively reduced.

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

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

Two circuit breakers are provided to protect the A402. The circuit breakers are labelled SPEAKER PROTECTOR and protect the amplifier circuitry from external short circuits or other conditions that 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, correcting any short circuit condition. (Wire strands touching the wrong terminal are the usual cause.) Then locate the circuit breaker for that channel. Press the reset button firmly and release immediately. DO NOT hold button in.

SPECIFICATIONS

POWER OUTPUT:	40 WATTS MINIMUM RMS PER CHANNEL, BOTH CHANNELS DRIVEN INTO 8 OHMS, FROM 20Hz TO 20,000Hz WITH LESS THAN 0.1% THD.	
Power Bandwidth:	From 10Hz to 60,000Hz with less than 0.1% THD, both channels driven simultaneously into 8 ohms, at 20 watts per channel.	
Frequency Response:	Less than 4Hz to 160,000Hz, —3dB Less than 4Hz to 100,000Hz, —1.0dB	
Square Wave Rise Time:	Less than 1.5 microseconds (power amplifier only) Less than 2.0 microseconds (system)	
Square Wave Tilt:	Less than 5% at 20Hz	
Total Harmonic Distortion:	Less than 0.1% from 250 milliwatts to 40 watts RMS, both channels driven simultaneously into 8 ohms from 20Hz to 20,000Hz.	
Intermodulation Distortion:	Less than 0.08% at 40 watts (SMPTE measurement) Less than 0.04% at 1 watt (SMPTE measurement)	
Damping Factor:	Greater than 50	
Hum and Noise:	Greater than 100dB (power amplifier only) Greater than 77dB (tuner, aux and tape monitor input) Greater than 69dB (phono input)	
Input Impedance:	Greater than 33,000 ohms (power amplifier) Greater than 33,000 ohms (aux and tape monitor) 47,000 ohms (phono)	
Input Sensitivity:	1.2 volts RMS for rated power output (power amplifier only) 125 millivolts for rated power output (tuner, aux and tape monitor) 2.2 millivolts for rated power output (phono)	
Overload:	90 millivolts input (phono preamplifier)	
Preamplifier Harmonic Distortion:	0.018% (tuner, aux and tape monitor) 0.055% (phono)	
RIAA Equalization:	± 1.0dB	
Preamp Output Impedance:	Less than 600 ohms	
Tone Control Effect:	Bass hinge at 200Hz: Treble hinge at 5kHz: ± 3dB at 200Hz ± 3dB at 5kHz ± 9dB at 60Hz ± 9dB at 14kHz Bass hinge at 400Hz: Treble hinge at 10kHz: ± 3dB at 400Hz ± 3dB at 10kHz ± 9dB at 120Hz ± 9dB at 28kHz	
Contour Effect:	+10dB at 50Hz, +3.5dB at 10,000Hz at —40dB attenuation	
Filter Effect:	—3dB at 3500Hz 6dB/octave (high cut) —3dB at 65Hz 12dB/octave (low cut)	
Dimensions:	15-1/2"W x 14-3/4"D x 5-1/4"H (394mm x 375mm x 134mm)	
Weight:	24 lbs., 2 ozs. (11.0 kg.)	