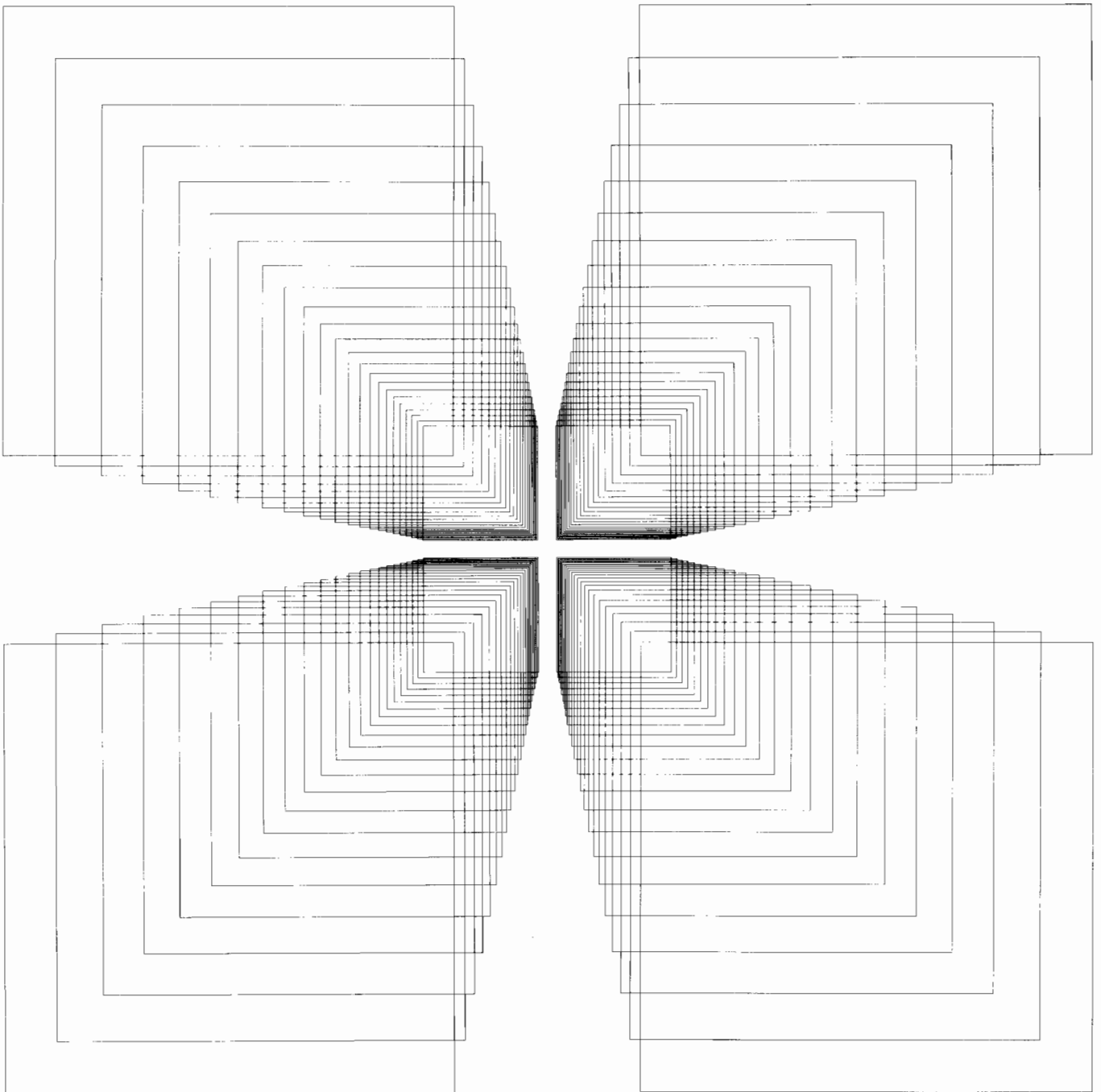


harman/kardon

730

twin powered receiver
owner's manual



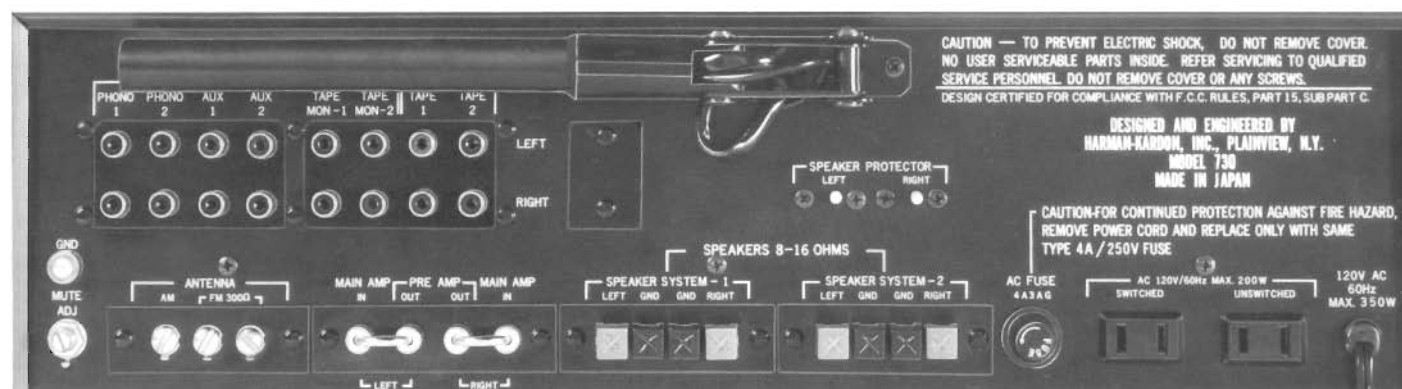
INTRODUCTION



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 receiver shows us your appreciation of uncompromised reproduction of the music you enjoy. Throughout the design and manufacture of this receiver, we have made every effort to assure it will meet all of your expectations. We are confident the 730 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 730 and the expert use of all its controls.

We understand your desire to have the 730 operating in the shortest possible time, so this manual has been organized to make the installation procedure rapid, simple, and accurate. We believe a comprehensive understanding of the various controls and features of the 730 can best be obtained when you can hear their effects as we describe them, so this manual is organized in that way.

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 receiver to rain or moisture.

Before proceeding with the connection of the 730, 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 730 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.

On the rear panel of the 730 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 730 **unconnected**. Place the 730 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.

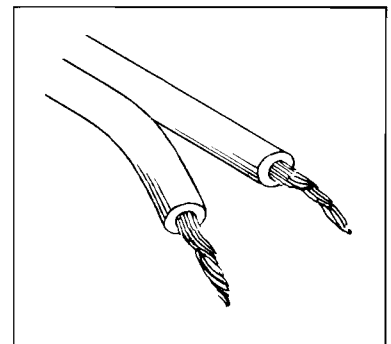
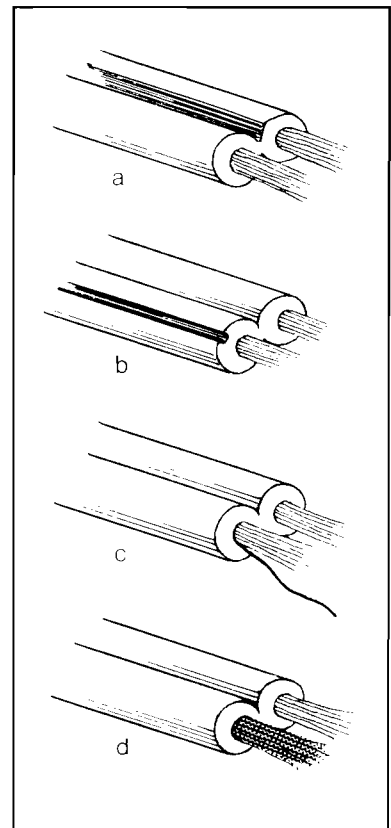
Although the 730 is a solid state device, its powerful amplifiers and even dial scale illumination lamps will generate heat. The 730 is designed to operate efficiently over a wide range of ambient temperatures, but the heat it generates must be allowed to escape to prevent internal temperatures from rising too high. Adequate ventilation must be provided. If the 730 will operate on an open shelf, no special precautions need be taken. If a shelf will exist above the 730, allow at least 1" to 2" of free space above the receiver. If the 730 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 receiver (not in the 730 housing!!!). Open back custom installations require no special attention. Finally, free air flow through the bottom of the receiver must be allowed. **Never operate the 730 on a rug or cushion that could prevent air from entering the bottom of the receiver.**

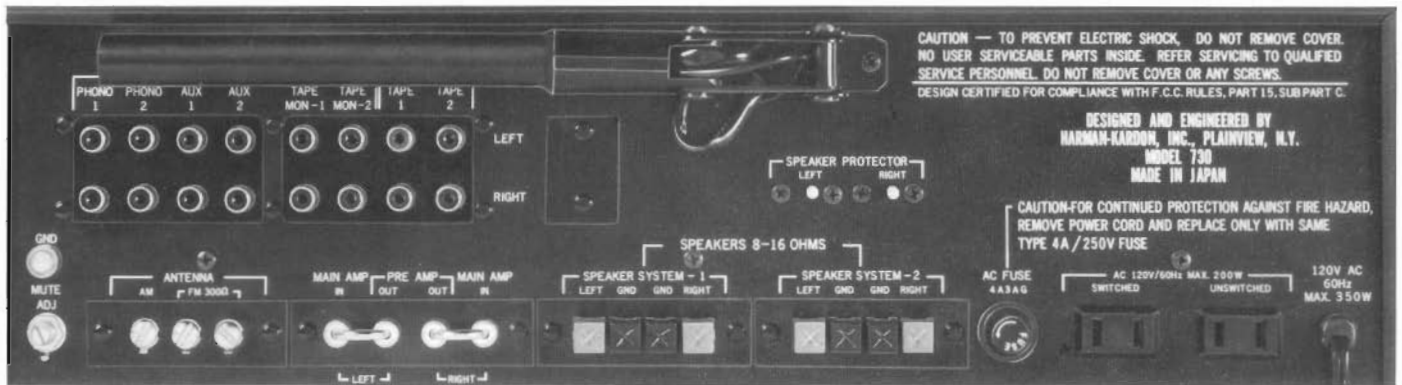
Preparing for Connections:

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. Wire of 18 gauge 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.

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.

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





Connecting Speakers to the 730:

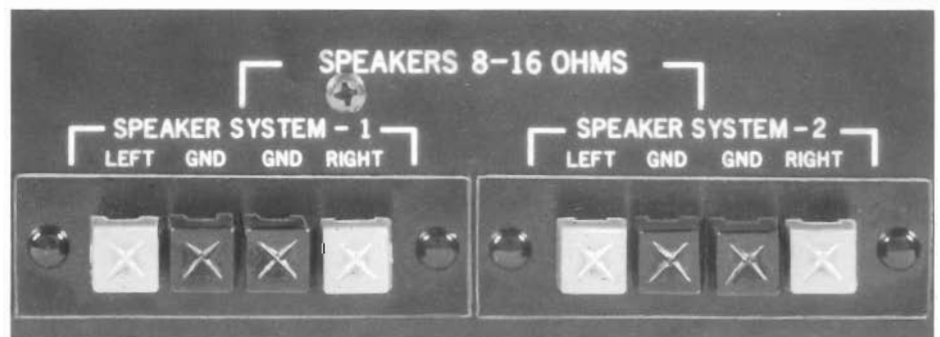
Find the row of four connectors on the back panel of the 730 marked **SPEAKER SYSTEM 1**. Starting with either **LEFT** or **RIGHT** pair of connectors, push firmly in on the plastic head of each connector, revealing an opening. Insert one bare conductor at the end of each of the lengths of wire you've prepared into each connector. Release the connector. Each conductor should be locked firmly in place in its own connector. Take the end of this wire and connect the bare conductors to the two terminals of one of your speakers. Now (this is important) note to which connector (red or black) on the 730, and to which speaker terminal, the coded side of the wire is connected. Connect the second speaker to the other two connectors under **SPEAKER SYSTEM 1**, being sure the coded side of this wire is connected to both the 730 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 [very important] all these connections are tight and that all the strands of the wires are firmly seated in the connectors of the 730 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 circuit breaker to open.

If you have followed 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.

Note: Two equal lengths of wire are suggested to prevent any imbalance in the system, even if one speaker will be quite close to the 730. Later, when you put the components in your system into their final positions, you can neatly coil any excess wire and place it inconspicuously.

If, now or later, you wish to connect a second pair of speakers, you can use the **SPEAKER SYSTEM 2** connectors of the 730, following the procedure outlined previously. The speakers in your system should **ALL** have a rated impedance of 8 ohms or higher.*

Although your 730 has been designed for use with speakers with rated impedances of 8 or 16 ohms, the 730 can accommodate **ONE** pair of 4-ohm speakers more than adequately. You should not, however, use more than **ONE** pair of 4-ohm speakers. Damage to the 730 could result from such use.

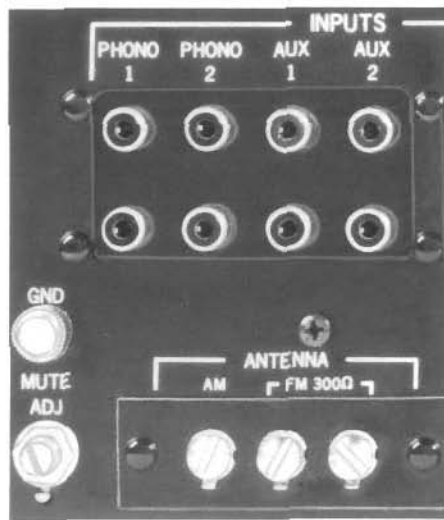


TURNTABLES OR AUTOMATIC CHANGERS

The 730 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 730. 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. Determine which of the cables is left and which right and insert them into the two corresponding receptacles on the rear panel of the 730 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** on the rear panel of the 730. The phonograph signal connections are now complete.

If a second record playing unit is to be used connect it to the **PHONO 2** inputs in the same manner as the first unit was connected to **PHONO 1**.



Note: The 730 is designed to operate with a high-quality **Magnetic** cartridge. If you purchased your 730 and turntable separately, be sure the turntable is equipped with a cartridge of this type.

Insert the AC power cord of your turntable into the AC receptacle marked **UNSWITCHED** on the rear of the 730. This receptacle is "live" so long as the 730 itself is connected to a live AC outlet, regardless of whether the 730 is itself operating. Your turntable or automatic changer should be connected to this receptacle.

FM ANTENNA CONNECTIONS

A "T"-shaped, folded dipole antenna is provided with the 730 for FM reception. However, FM performance of the 730 will be greatly enhanced if it is connected to an outdoor antenna system. Many apartment buildings in urban areas provide a master antenna system for television reception which can often be used for FM purposes. In some suburban and rural areas, cable television systems exist that can also be used for FM reception. In fact, television antennas on private houses are often good for FM reception.

Two types of wire, 300 ohm and 75 ohm, are used as lead-in for outdoor antenna systems. Either type can be connected to the 730. Find the three-conductor terminal strip on the rear panel of the 730 marked **ANTENNA**.

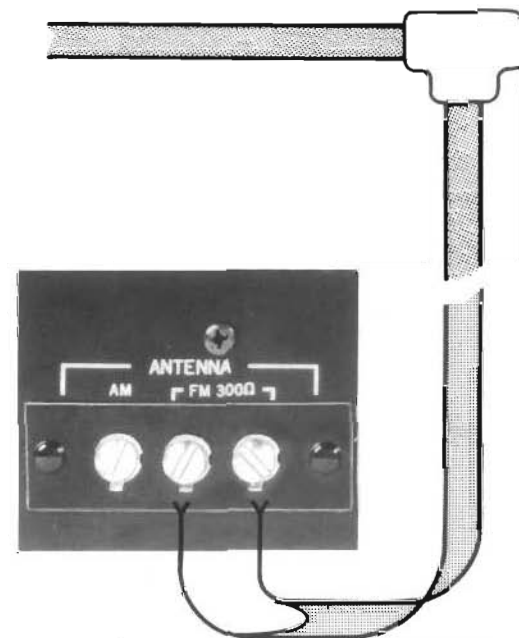
If your lead-in is 300 ohm, it will be a very flat wire with a conductor at each edge. Carefully cut about 1½" of the insulation material from the center of the lead-in without damaging either conductor. Strip off about ¾" of insulation from each conductor and connect one of them to each of the terminals on the three-conductor **ANTENNA** strip under the bracket labeled **300Ω**. (The term "ohm" and the symbol "Ω" have equivalent meaning.)

If your lead-in is 75 ohm, you must use a matching transformer. The lead-in wire will be a single round wire with a termination consisting of a metal connector with a short length of bare, solid, copper-colored wire protruding from its center. This connector is intended to be joined to a 75Ω to 300Ω matching transformer. These transformers are inexpensive and available at many television or electronic parts supply stores. Once they are joined to the lead-in they provide two 300 ohm conductors that are connected to the 730 as described above. If your 75Ω lead-in has a bare end, the appropriate connector must be attached to it so that you can use a matching transformer.

Where there is only one lead-in and it must supply signal for both a television receiver and the 730, a "signal splitter" or "2-set coupler" can be used. Consult your high fidelity or television dealer for information on such devices.

If no outdoor antenna is available to you, connect the lugs of the dipole antenna to the 300Ω terminals.

The dipole antenna will perform best if its arms are carefully extended in a straight line horizontally, and the entire antenna fixed to a wall or tacked to the back of a shelf. Dipoles are most sensitive on the axis perpendicular to the plane of the two arms so antenna position is important for optimum reception.



AM ANTENNA CONNECTIONS

A ferrite loopstick AM antenna is provided on the rear of the 730, which will yield good reception in many areas. It can be oriented to improve reception of distant stations. The third terminal of the **ANTENNA** strip is a connection for a "long wire" AM antenna. AM reception over extremely long distances can be obtained with a well-designed long wire antenna. Many high fidelity dealers, especially those who have experience with amateur and shortwave radio, can help you with a long wire AM antenna system.



WARNING: DO NOT MISTAKE THE FERRITE LOOPSTICK AM ANTENNA FOR A HANDLE. ITS BRACKET CANNOT SUPPORT THE WEIGHT OF THE 730. THE 730 SHOULD NEVER BE LIFTED, PULLED, OR PUSHED BY GRIPPING THE AM ANTENNA.

CONNECTING TAPE EQUIPMENT

The 730 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 1** receptacles (under the bracket labeled **OUTPUTS**) on the rear panel of the 730 to the corresponding input receptacles of your tape equipment. The 730 provides 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 MON-1, TAPE MON-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 monitor receptacles of the 730. Tape equipment capable of playback only, can be connected to either tape monitor.

The remaining **SWITCHED AC OUTLET** on the rear of the 730 can be used to provide power for your tape deck or recorder. This outlet is "live" only when the 730 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 730. If you use this outlet, be sure the recorder's drive system is disengaged before you switch the 730 off.

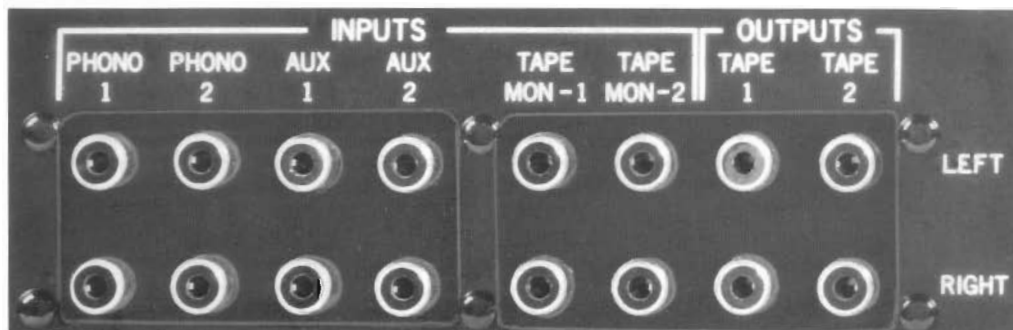
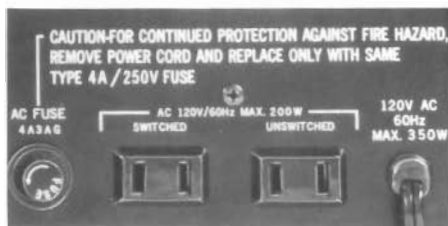
OTHER EQUIPMENT

Provision is made at the rear of the 730 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.

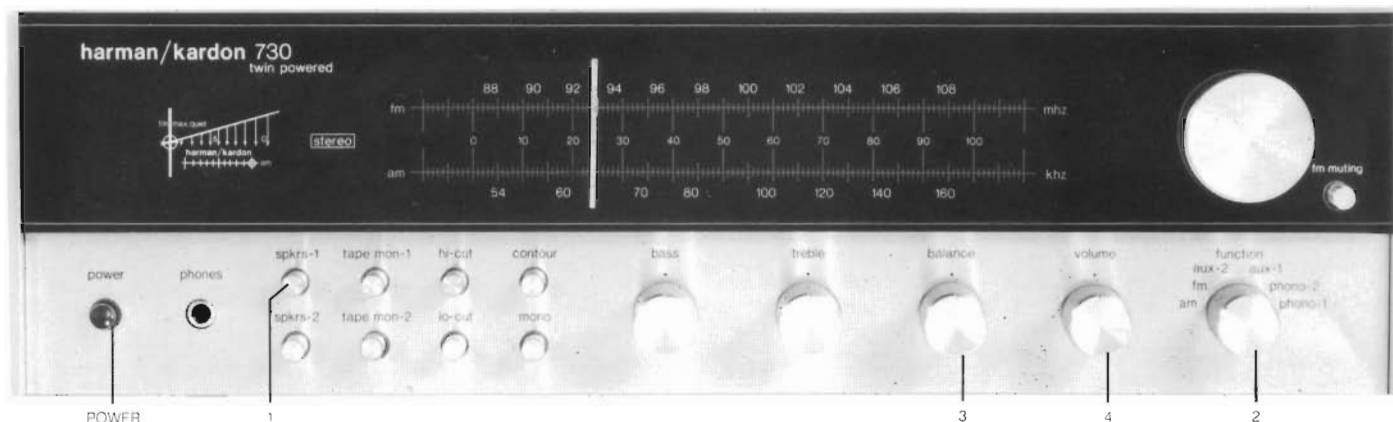
NOTE: With no accessory equipment, patch cords **MUST** be installed to use the receiver.

Two pair of auxiliary inputs (**AUX 1, AUX 2**) also are available at the rear of the 730 to connect 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 electrical requirements of the **AUX** inputs of the 730. If you have not used the **SWITCHED AC OUTLET** for a tape recorder, you can use it for accessory equipment.

The connections at the rear panel are now complete. Place the 730 in its final position and insert its AC power plug into a convenient wall outlet.



OPERATING THE 730



Familiarize yourself with the front panel controls. There are six knobs and ten pushbuttons controlling the functions of the receiver. Each control 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 730. Find the **VOLUME** control and turn it down (counterclockwise). Push the **POWER** switch to turn the 730 on. The red power indicator will light.

Playing Records with the 730

Four basic controls are used to play back disc recordings through the 730: **FUNCTION**, **VOLUME**, **BALANCE**, and **SPKRS-1**. Make the following adjustments to these controls after activating your turntable or record changer:

- [1] **SPKRS-1** — On (push "in")
- [2] **FUNCTION** — Phono 1 position
- [3] **BALANCE** — 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) the right speaker. When turned in the other direction, it has the opposite effect. The **SPKRS-1** pushbutton connects or defeats the speakers connected to **SPEAKER SYSTEM 1**. [If you have speakers connected to **SPEAKER SYSTEM 2**, they are controlled by the **SPKRS-2** pushbutton on the front panel].

If you do not get sound at this point, check the control positions given. Also, be sure that both tape monitor 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, then check the turntable itself.

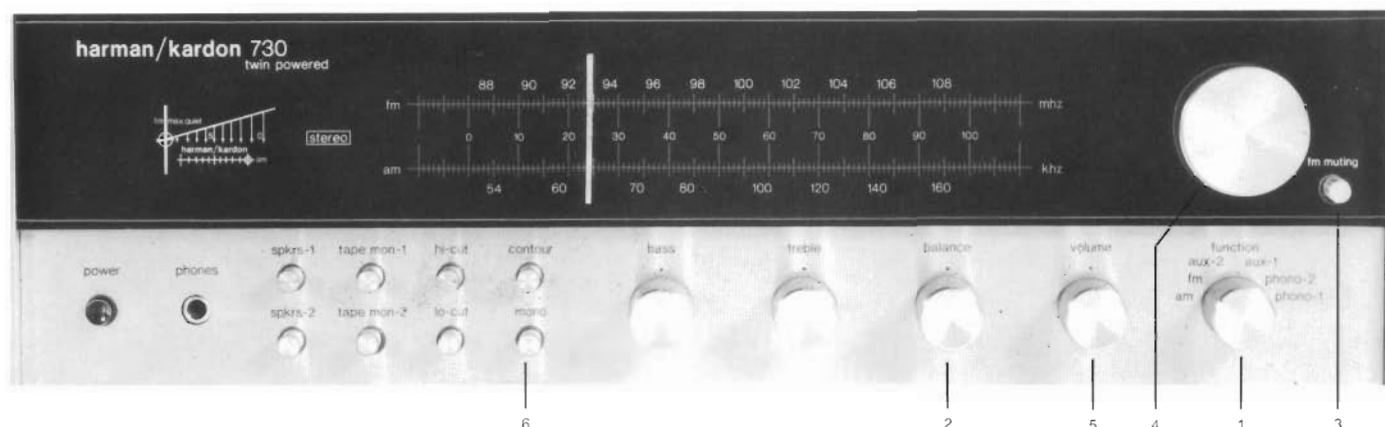
Note: Whenever you check connections at the back panel, always push the POWER switch off.

Now that you're listening to sound you can check the phasing of your speakers. While playing a stereo disc, depress the **MONO** pushbutton switch and position yourself midway between the left and right speaker systems, facing them. The source of sound should now appear to be coming from a point directly ahead of you, centered between the two speakers. If the sound has no clear cut centered image, you did not connect the speaker systems correctly. Push the **POWER** switch off. Recheck your connections both at the rear of the 730 and at the terminals of both speakers. If you are using two dissimilar speakers, it is possible that their internal connections have opposite polarity, causing them to be out of phase. Reverse the connections made at the speaker or the receiver (NOT BOTH) for one channel ONLY. The system should now be in phase. Push the **MONO** switch to return it to stereo (out) position.

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

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 730. Some turntable/cartridge combinations actually produce less hum this way. Another source of hum is inadequate seating of the input signal cables in the receptacles of the 730. Check all cable seating carefully.

RECEIVING FM BROADCASTS



Five basic controls are used to receive FM broadcasts through the 730:

FUNCTION, VOLUME, BALANCE, and FM MUTING. Make the following adjustments to these controls after activating the **SPKRS-1** switch:

- [1] **FUNCTION** —FM
- [2] **BALANCE** —Neutral (12 o'clock)
- [3] **FM MUTING** —Out
- [4] Tuning —Use this control to move the dial pointer to the extreme end of the dial scale.
- [5] **VOLUME** —Advance until hiss is audible
- [6] **MONO** —Out

You should now hear a mild hissing or rushing sound — this is atmospheric noise picked up by the tuner section. Depress the **FM MUTING** button and the noise disappears; it has been muted. Turn the tuning knob in either direction until a broadcast signal is received. The **FM MAX QUIET** meter should have deflected and should now be registering the relative quality of the FM signal you are receiving. Note that the meter deflects to the left in an increasing degree as signal quality improves. Maximum obtainable deflection to the left represents the best listening point.* If the broadcast is in stereo, the red **STEREO** beacon is lit; the beacon does not light when an FM station is broadcasting monophonically. If you have a stereo station tuned press the **MONO** switch in.

*Conventional signal strength or center channel meters simply indicate the strength of a signal and pass band accuracy. Harman/Kardon's extraordinary Quieting meter actually indicates the signal-to-noise ratio or the quality of the received signal.

The 730 is now receiving the stereo broadcast monophonically. In addition, the red **STEREO** beacon light is disabled. This feature is useful for weak stereo stations where reception is accompanied by a large amount of noise. The program can be received monophonically without the noise. Very weak monophonic stations may be received if **FM MUTING** is defeated, but tuning from station to station is no longer noise-free.

The upper dial scale of the 730 is calibrated for FM broadcast station frequencies from 88 to 108 MHz. Each FM station in your area has an assigned frequency that falls within these limits. You can use the illuminated dial pointer and scale of the 730 to find any station in your area if you know the assigned frequency. Similarly, the lower dial scale is calibrated for AM stations in your area, which have assigned frequencies ranging from about 550 kHz to 1600 kHz. Note that when an AM station is being tuned in the **FM MAX QUIET** meter deflection is from left to right. In other words the best listening point is when the meter is as far to the right as possible. For convenience, a third "logging" scale with arbitrary numbers from 0-100 is provided so you can simplify the task of memorizing the various assigned frequency numbers of the FM and AM stations in your area. With the logging scale, all you need remember is that your favorite FM station is at 80 on the logging scale, select FM, tune to 80, and listen.

The preceding examples give you a working familiarity with the primary controls of the 730.

Muting Adjustment

The **MUTE ADJ** control on the rear panel controls the signal threshold at which muting action takes place when the **FM MUTING** pushbutton is activated. The control has been set at our factory to accommodate the majority of FM reception conditions. If you wish to readjust this control, depress the **FM MUTING** pushbutton and tune away from any station. Turn the **MUTING ADJ** control until the interstation noise (hiss) disappears.



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.

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 switch has no effect at VOLUME control settings beyond 12 o'clock.

TAPE MON-1, TAPE MON-2 Admit programs from any "high level" source (usually tape recorder) connected to TAPE MON receptacles. They DO NOT affect signal appearing at the TAPE OUTPUT receptacles. Thus, the use of the TAPE MON switches does not disturb the recording process of whatever source the FUNCTION switch is set. (Note: If the rear panel TAPE MON inputs are unoccupied and either TAPE MON 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 MON inputs is off). TAPE MON also allows for connection of signal processing devices.

MONO Changes any program from stereophonic to monophonic format. Also processes any single channel source connected to a single input receptacle (such as television sound) through BOTH channels. Disables red **STEREO** beacon light.

HI CUT 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 with this switch.

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 with this switch.

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

FUNCTION Selects programs for playback through system. Same signal appears at both TAPE OUT receptacles.

CIRCUIT PROTECTION



Two circuit breakers and an AC power fuse are provided to protect the 730. 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.

The AC fuse protects the entire receiver from excessive current through the AC power line. Should this fuse blow:

THE REPLACEMENT FUSE MUST BE PRECISELY THE SAME TYPE AS THAT SPECIFIED ON THE REAR PANEL. USING ANY OTHER FUSE WILL NOT PROTECT THE 730: SERIOUS DAMAGE TO ITS CIRCUITRY CAN RESULT.

CLEANING THE DIAL GLASS

Dust or smudges can be removed from the dial glass with a diluted liquid glass cleaner and a soft cloth or damp paper towel. DO NOT use a strong solvent-type cleaner or ammonia as these may remove the lettering on the face panel or cloud the dial glass.

730 SPECIFICATIONS

SPECIFICATIONS

Power Output	40 Watts Min. RMS per channel both channels driven into 8 ohms from 20Hz to 20kHz, with < 0.1% THD.	Preamp Output Impedance	600 ohms
Power Bandwidth	From 10Hz to 40kHz at < 0.1% THD into 8 ohms, both channels driven simultaneously at 20 watts per channel.	Phono Overload	>95 mV
Frequency Response	4Hz-130kHz±0.5 dB	RIAA Equalization	±1.0 dB
System Rise Time	1.5μsec	Tone Control Action	
System Square Wave Tilt	<5%	a. 50Hz	±12 dB
Total Harmonic Distortion	<0.1% from 250 milliwatts to 40 watts RMS, both channels driven simultaneously into 8 ohms, 20Hz to 20kHz.	b. 10kHz	±12 dB
Intermodulation Distortion (40 watts—SMPTE)	<0.12%	Contour Effect (50Hz)	+10 dB
Intermodulation Distortion (1 watt—SMPTE)	<0.15%	High Cut Filter (10kHz)	-10 dB
System Hum and Noise	Better than 60 dB below rated output (unweighted)	Low Cut Filter (50Hz)	-6 dB
Damping Factor (1kHz @ 1 watt)	>30	FM Sensitivity	
Power Amplifier Input Sensitivity	<1.2V	a. IHF	1.9μV
Power Amplifier Input Impedance	33 kilohms	b. -50 dB (mono)	3.5μV
Power Amplifier S/N (40 watts)	>90 dB	c. -50 dB (stereo)	35μV
Power Amplifier Square Wave Rise Time	<1.5μsec	Ultimate S/N	-70 dB
Preamp Input Sensitivity		Capture Ratio	2 dB
a. Aux	<150 mV	Image Rejection	-80 dB
b. Tape Mon.	<150 mV	Spurious Response Rejection	-80 dB
c. Phono	<2.5 mV	IF Rejection	-90 dB
Preamp Input Impedance		AM Rejection	-60 dB
a. Aux	30 kilohms	Alternate Channel Selectivity	80 dB
b. Tape Mon.	30 kilohms	Multiplex Separation (1 kHz)	40 dB
c. Phono	47 kilohms	FM Harmonic Distortion (1kHz)	
Preamp Input S/N		a. Mono	0.3%
a. Aux	-77 dB	b. Stereo	0.4%
b. Tape Mon.	-77 dB	Pilot Suppression	-55 dB
c. Phono	-72 dB	De-Emphasis	75μsec
Preamp Harmonic Distortion	<0.15%	Mute Level	Variable
Crosstalk		Mute Suppression	-65 dB
a. Aux	-47 dB	Stereo Indicator Threshold	
b. Tape Mon.	-47 dB	a. "off"	<3%
c. Phono	-37 dB	b. "on"	>6%
		Audio Output	0.5V
		AM Sensitivity	>250μV:m
		AM Signal for 1 watt Output	<150μV:m
		AM Selectivity	35 dB
		Alternate Channel Selectivity	55 dB
		Image Rejection	-75 dB
		IF Rejection	-60 dB
		Hum	-40 dB
		Dimensions	17"W × 14½"D × 5½"H (43.2 cm. W × 36.8 cm. D × 14.0 cm. H)
		Weight	28.6 pounds (13.7 kg.)