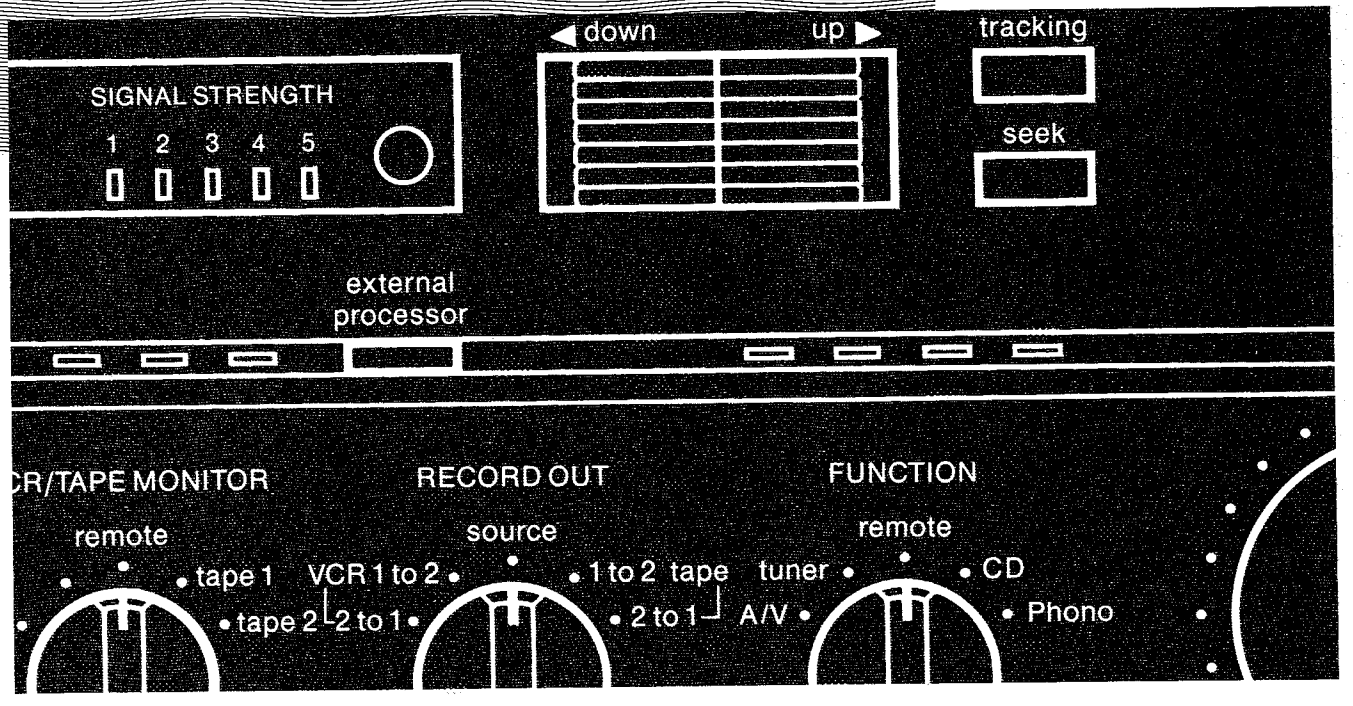
hk990Vxi

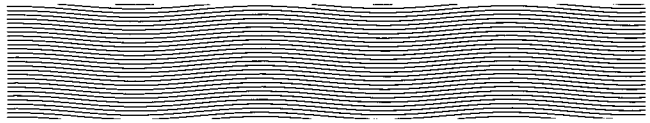
hk880Vxi

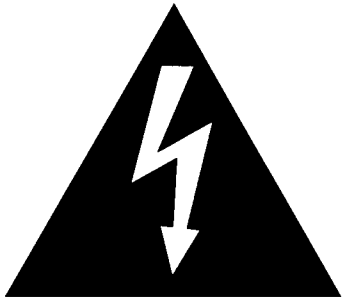


Remote Control High Voltage/High Current Stereo Receiver
Instruction Manual

harman/kardon

Rear Panel Safety Precautions





CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electrical shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions within the literature accompanying the component.

WARNING: TO REDUCE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

1. Read instructions — all safety and operation instructions should be read before using the receiver.
2. Retain instructions for future reference.
3. Heed warnings — all warnings on the receiver and in its operations instructions should be adhered to.
4. Follow all instructions.
5. Water and moisture — do not use the receiver around water, for example near a swimming pool, sink or in a wet basement.
6. Ventilation — The receiver should be situated so that its location or position does not interfere with its proper ventilation.

7. Heat — The receiver should be situated away from heat sources such as radiators, fireplaces, stoves, electric popcorn poppers or other appliances that produce heat. Also avoid prolonged contact with direct sunlight and extremely low temperatures.

8. Power sources — The receiver should be connected ONLY to a power supply of 120 volts, 60 cycles.

9. Power cord protection — Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles and the point at which the cord exits from the receiver. Also never pull or stretch the cord.

10. Cleaning — Do not use volatile solvents such as alcohol, gasoline, benzine etc. to clean the receiver cabinet. Use only a clean dry cloth. If you must use a wet cloth, wet only the cloth lightly with water.

11. Object and liquid entry — Care should be taken so that objects (including excessive dust) do not fall into the unit, and that liquids are not spilled into the inside of the receiver.

12. Abnormal smells — If an abnormal smell or smoke is detected, immediately turn the receiver power OFF and pull out the power cord. Contact your dealer or nearest Harman Kardon Service station.

13. Damage requiring service — The receiver should be serviced by qualified service personnel when:

- **A.** The power supply cord or the plug have been damaged; or
- **B.** Objects have fallen, or liquid has been spilled into the receiver; or
- **C.** The receiver has been exposed to rain; or
- **D.** The receiver does not appear to operate normally in performance; or
- **E.** The receiver has been dropped or the cabinet damaged.

14. Servicing — The user should not attempt to service the receiver beyond those means described in this manual. All other servicing should be referred to qualified service personnel.

15. **IMPORTANT SAFETY PRECAUTION FOR AC PLUG**

CAUTION: TO PREVENT ELECTRIC SHOCK, DO NOT USE THE hk880Vxi/ hk990Vxi's POLARIZED PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

BRANCHEMENT DE LA FICHE SECTEUR

ATTENTION: POUR PREVENIR LES CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR. UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

Thank you for choosing Harman Kardon.

You now own a superb piece of high fidelity equipment. Used properly, it will provide you with thousands of hours of sound and video enjoyment.

Even if you have experience with high fidelity components, we nevertheless ask you to read and carefully follow the instructions in this manual. It will insure a successful partnership between you and your new Harman Kardon receiver.

NOTE: Because this manual has been designed to cover the hook-up and operation of both the hk880Vxi and hk990Vxi receivers, some instructions may not be applicable for both models. Information that is specific only to one or the other of the receivers is noted in bold face. For example: **hk990Vxi ONLY**—ACTIVE TRACKING button.

The following is a short explanation of the operating controls and features on the front panel of your receiver.

1. Power

Beginning on the far lower left hand side is the **POWER (1)** button. It turns your hk880Vxi/hk990Vxi on and off and also controls power to any component plugged into the switched AC outlet on the back panel.

2. Headphone Jack

Here you may plug a pair of headphones for listening independent of either set of speaker outputs. Both the hk880Vxi and hk990Vxi allow you to turn off your speakers so that you can listen to the HEADPHONE output only.

3. Speaker Selectors

Independent selection buttons are provided for two sets of loudspeakers. You may press one or the other, or both. If *neither* button is pressed in, sound will only be routed to the **HEADPHONE JACK (2)**. NOTE: Please consult ***APPENDIX I*** at the end of this manual before you connect two sets of loudspeakers to the hk880Vxi or hk990Vxi.

4. Tone Controls

BASS and **TREBLE (4)** tone controls have been designed to only affect the sound below 400Hz and above 2000Hz, respectively. Their design allows corrective adjustments of up to ±10dB at the lowest and highest octaves without affecting midrange performance.

The tone controls are recommended primarily as a method of gently correcting tonal deficiencies (or overabundances) in the overall sound of your system. Thus an overly shrill recording or "boomy" room acoustics may be improved with a slight decrease in treble and bass, respectively. Smaller loudspeakers lacking in low end may be enhanced with bass boost. An indistinct vocal may be made more clear by "boosting" midrange through the reduction of both treble and bass controls. Another excellent tone control use is for the enhancement of video sound from your VCR or TV tuner.

5. Balance Control

The **BALANCE** control **(5)** is used to distribute sound between right and left speakers. It is especially useful if your main listening position is closer to one speaker than the other. In this case, rotate the control so more sound is coming from the speaker farthest away from you.

6. VCR/Tape Monitor

Your new Harman Kardon receiver allows you to actually route and switch and dub between several VCR's or other video sources, besides providing you with flexibility in tape playback and recording. This is done by selecting one of the VCR or TAPE positions on the **VCR/TAPE MONITOR (6)** selector.

NOTE: It is very important to make sure that the VCR/TAPE MONITOR knob is not left switched to VCR, TAPE or VCR/TAPE inputs after you finish listening to a cassette or watching a video tape. If it is, you will be left with silence and won't be able to listen to CD's, records, FM, etc. until the VCR/TAPE MONITOR switch is returned to SOURCE or REMOTE.

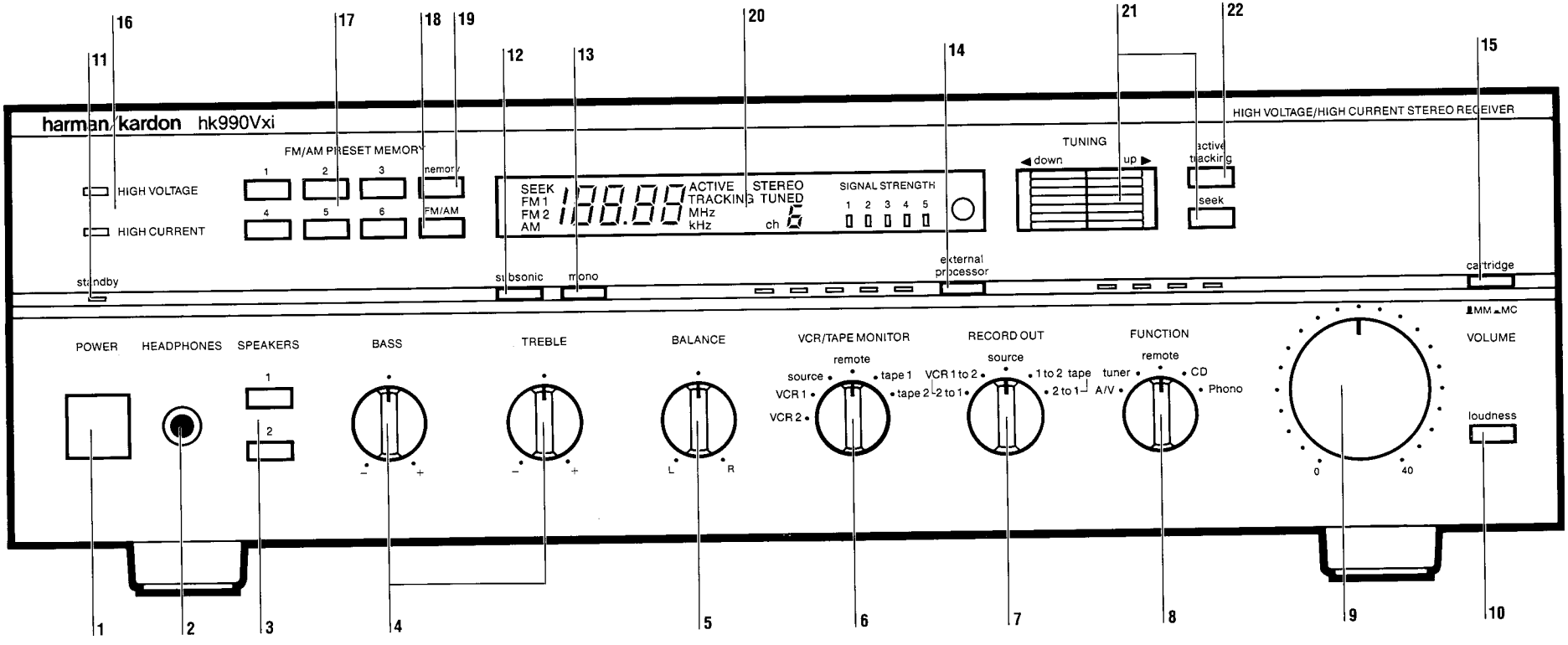


Figure 1 hk990Vxi Front Panel

SWITCH FUNCTIONS hk880Vxi ONLY —

The SOURCE position on this selector may be thought of as a "VCR/Tape On/Off" button. It shuts off output from tape and/or VCR and returns you to the input choices on the FUNCTION (8) switch. Recordings can be made in the SOURCE position, however, since this function is handled with a separate RECORD OUT switch (7).

The center REMOTE position renders the VCR/TAPE MONITOR switch inoperative and transfers control to your hk880Vxi/hk990Vxi hand-held remote.

The two switch positions to the right of center can be used to select input from either tape decks or videocassette recorders. You could have:

2 audio tape decks
OR
1 tape deck and 1 VCR (or other video source)
OR
2 VCR's

An important use for the VCR/TAPE MONITOR selector is monitoring during recording. When recording from another source (or making a copy from one VCR or tape deck to another), set the VCR/TAPE MONITOR switch so that you are listening to the deck which is recording.

SWITCH FUNCTIONS hk990Vxi ONLY —

The two switch positions to the extreme left allow you to select both video and audio input from VCR 1 and VCR 2. Either of these input selections can also be used for a Laser Disc or CDV player, or for additional audio-only tape decks.

The SOURCE position may be thought of as a "VCR/Tape On/Off" button. It shuts off output from tape and/or VCR's and returns you to the input choices on the FUNCTION (8) switch. Recordings can be made in the SOURCE position, however, since this function is handled with a separate RECORD OUT switch (7).

The center REMOTE position renders the VCR/TAPE MONITOR switch inoperative and transfers control to your hk880Vxi/hk990Vxi hand-held remote.

The switch positions on the right of center, (TAPE 1) and (TAPE 2), let you hear the output of cassette decks which are plugged into these tape monitor loops. If you only have one tape deck, we suggest you use TAPE 1 only.

An important use for the VCR/TAPE MONITOR selector is monitoring during recording. When recording from another source (or making a copy from one VCR or tape deck to another), set the VCR/TAPE MONITOR switch so that you are listening to the deck which is recording.

7. Record Out

This important selector switch gives you remarkable flexibility in choosing the source for video or audio recordings. It may be thought of as a "recording source assignment" selector.

When set in the SOURCE position, the signal for your recording will originate from one of the FUNCTION inputs. These include TUNER, CD, PHONO and A/V. Thus, if you wished to make a tape recording of a CD, you would set the **RECORD OUT (7)** selector to SOURCE, and the FUNCTION (8) selector to CD. You could even transcribe an album onto a VHS Hi-Fi VCR tape by leaving the RECORD OUT selector on source and setting the FUNCTION selector to PHONO.

Also note that because the input SOURCE selected on the FUNCTION switch is sent to ALL recording devices connected to the hk880Vxi/hk990Vxi, you can make TWO recordings at the same time.

RECORD OUT hk880Vxi ONLY —

The left and right RECORD OUT positions allow copying between sources connected to the VCR/TAPE inputs. This may be two audio cassette decks, two VCR's or one of each as described above.

RECORD OUT hk990Vxi ONLY —

The left RECORD OUT positions give you the capability of copying between two VCR's, either from 1 TO 2 or 2 TO 1.

The right positions are for copying between two audio tape decks.

8. Function

To the right of the RECORD OUT knob is the **FUNCTION (8)** selector. It lets you choose which sound source you wish to listen to. All settings but the TUNER are used to select inputs from other separate components such as a Compact Disc player or turntable.

Of particular interest is the A/V input. This input allows you to connect the stereo or mono audio output(s) of a TV tuner, Laser Disc player, MTS adaptor or stereo TV output into your hi-fi system. If your source is high quality (such as a Hi-Fi VCR or MTS stereo broadcast), and it is possible to position your television set between your stereo speakers, the enhanced sound field will contribute greatly to your video enjoyment.

Note that all hk880Vxi/hk990Vxi inputs EXCEPT PHONO can be used for virtually any line level playback-only component. You may use any of these to connect program sources (such as an additional VCR or third tape deck to be used only in the playback mode).

9. Volume Control

The extent to which the **VOLUME (9)** control can be increased is determined by several factors. One is how loud you listen to music. Another is the fact that each speaker model has different power consumption and power handling characteristics. If you hear audible distortion while operating the hk880Vxi or hk990Vxi at high sound pressure levels or when bass boost has been added by the LOUDNESS or BASS controls, reduce the volume to prevent possible speaker damage.

10. Loudness

At the far lower left of your receiver is a **LOUDNESS (10)** button. It provides a special equalization curve which compensates for the ear's decreased bass sensitivity at low listening levels. When using your system for low level background music, engage this button to restore frequency balance.

11. Standby Light

When the hk880Vxi/hk990Vxi has been turned OFF using the remote control, the **STANDBY** light **(11)** will remain lit, signalling that the main POWER switch is still on. The hk880Vxi/hk990Vxi can safely remain in this mode indefinitely.

12. Subsonic Filter

The **SUBSONIC** filter **(12)** circuit helps control the acoustic consequences of warped records and turntable resonance. If you can see your speaker's woofer cones visibly flutter in and out when you play a record, subsonic frequencies are present. While directly inaudible, subsonics can rob amplifier power, cause intermodulation distortion at audible frequencies and actually damage woofer cones if the movement is violent enough. The hk880Vxi/hk990Vxi's SUBSONIC filter circuit reduces sub-bass frequencies at 6dB per octave below 15Hz. Audible bass response will probably not be significantly affected by this action, so you may leave this button pressed in whenever you play phonograph records.

13. Mono

The **MONO** button **(13)** combines left and right channel signals and routes their sum to both power amplifier channels. It has several purposes.

The most obvious application for this switch is with mono records, such as old 45's, 78's and many excellent classical LP's you may have collected. NOTE: It is not necessary to engage the Mono button when listening to Compact Discs of older albums which have retained the original mono format, however.

Another use is with the input from a mono VCR. Engaging the MONO button will route the sound to both left and right speakers.

You can also use the MONO button as a means of testing speaker phase during system hook-up. After connecting your speakers to their power amplifier, play a stereo record with a vocal or instrumental that images in the center between the two speakers. While sitting in a normal listening position in front of and between the speakers, have someone switch the MONO button on the hk880Vxi/hk990Vxi in and out. There should be no change in the low frequency intensity or imaging of the vocal or instrumental. If there IS a change, one of the speakers has been connected out of phase, which results in poor stereo imaging and a diminution of bass. Re-check the polarity of your speaker-to-amplifier connections.

14. External Processor

This switch activates a special "loop" which routes sound out of the hk880Vxi/hk990Vxi, into a signal processor and back into the receiver.

It can be used for equalizers, Surround Sound processors, dynamic noise reducers, or for special outboard processors required for certain speaker designs.

Don't press this button when no external processor has been connected to the hk880Vxi/hk990Vxi. Doing so results in silence. If you have added a signal processor, also remember to turn it on before pressing **EXTERNAL PROCESSOR (14)**.

15. hk990Vxi ONLY — MM/MC Cartridge Selector

To the right of the MONO button is the **MOVING MAGNET/ MOVING COIL CARTRIDGE** input selector **(14)**. The normal (OUT) position selects the hk990Vxi's input for regular moving magnet cartridges and high output moving coil cartridges which generate at least 2.2mV. The "IN" position switches to the moving coil inputs and engages a special MC step-up amplifier stage.

Note that you can connect both MM and MC cartridge inputs to the hk990Vxi and use this selector button to switch between them.

16. Operating Mode Indicator Lights

At the top left hand side of your receiver are two LED's. **HIGH CURRENT** and **HIGH VOLTAGE (16)** refer to the mode of operation to which the hk880Vxi/hk990Vxi is currently set. This is covered in the HOOK-UP section farther on in this manual.

17. FM/AM Presets

The **FM/AM PRESET MEMORY** section **(17)** is used to set and recall up to 12 FM and 6 AM stations. How can you select 18 stations with just 6 buttons.

18. Band Selection

At the lower right of the numbered preset buttons is a selection button marked **FM/AM (18)**. This selector cycles the operation of the presets from FM 1 (the first 6 FM presets) to FM 2 (the second 6 FM presets) to AM and then back to FM 1, depending on how many times you press it. In each case, an appropriate indicator lights up in the tuner section display next to the selector button.

19. Memory

Above the FM/AM selector is a **MEMORY** button **(19)** which is used to enter station memory presets. You do not need to use all of the presets. Full instructions on entering memory presets are in the ***Operation*** section of this manual.

20. Tuner Section Display

Next to the FM/AM PRESET MEMORY section, is the hk880Vxi/hk990Vxi's LCD display panel. First are indicators for the 3 groups of presets: FM 1, FM 2 and AM.

Next is the digital station frequency display. Depending on whether an FM or AM station has been selected, it will read in MHz (FM) or kHz (AM).

HK990Vxi ONLY — When Active Tracking circuitry is engaged, an ACTIVE TRACKING indicator will light above the MHz/ kHz indicators.

Next on both the hk880Vxi and hk990Vxi tuner panel are an FM stereo indicator and a digital display that tells you which preset has been selected. Note that it also displays the *second* set of FM presets as 1-6.

21. UP, DOWN and SEEK Tuning

The large square **TUNING** buttons and the smaller one to their right marked **seek** work together to select stations from FM and AM broadcast bands. The **seek** button determines the action of the large **UP** and **DOWN TUNING** buttons.

When the **seek** button is pushed, the receiver's tuner circuitry is in **SEEK** mode and the word "SEEK" will light up in the LCD display area. Pressing either the UP or DOWN TUNING buttons causes the tuner to scan across the broadcast band "seeking" (and stopping) at the next strong signal. In the SEEK mode, the scanning circuit will automatically jump to the opposite end of the tuning band and begin searching again.

When the **seek** button is pushed again **(MANUAL)**, the UP and DOWN TUNING buttons function much like a tuning knob on a simple radio. Pushing UP moves "up" the FM or AM broadcast bands; DOWN tunes "down". This allows you to locate weak or adjacent stations which might be skipped over while in the SEEK mode.

When you reach the top or bottom limit of either band, you must press the opposite direction button to begin moving back across the broadcast band.

22. hk990Vxi ONLY — ActiveTracking

This receiver includes *unique active circuitry* which increases *adjacent FM channel selectivity* with no degradation of overall sound quality. It's especially useful in areas with many FM signals close to each other on the broadcast band.

Harman Kardon engineers approached the problem of rejecting adjacent FM bands by designing active circuitry that works from the *center* of the FM band, instead of filtering the *outsides* as do competitive designs. A Phase Locked Loop configuration literally locks onto the FM carrier, isolating the central carrier frequency of the desired listening band and then determining the precise modulation deviation caused by the music signal during broadcasting.

By limiting the PLL's tracking range to just slightly more than that of the modulation, only the signal necessary for good separation and low distortion is "read". Total Harmonic Distortion and stereo separation attain levels which will please even the most critical listener.

Only activate **ACTIVE TRACKING (22)** when listening to a station which is difficult to tune due to "overlap" from another station.

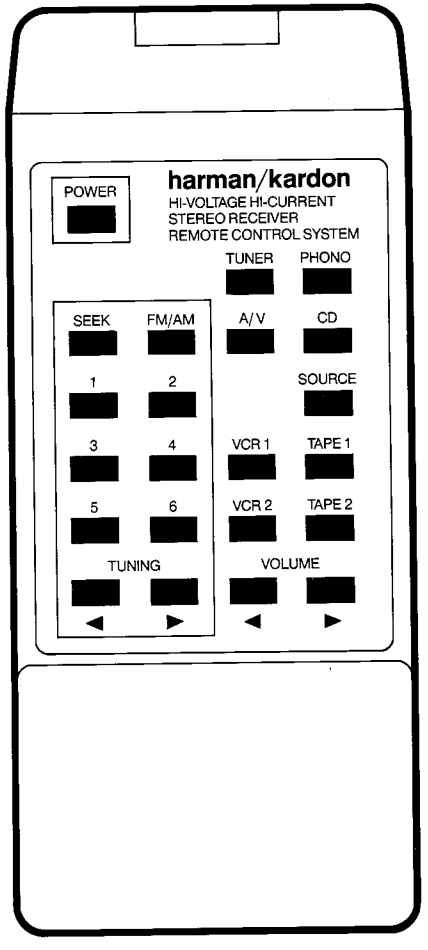


Figure 2 hk990Vxi Remote Control

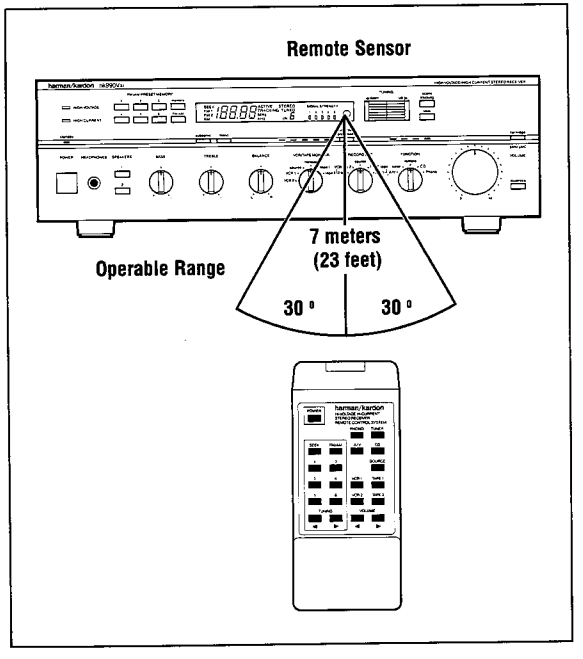


Figure 3 Remote Control Angle of Operation

The hk880Vxi/hk990Vxi remote duplicates the most often used front panel controls in a compact, wireless infrared device.

hk880Vxi ONLY — The buttons marked TAPE 1 and TAPE 2 are not used with this receiver. Instead, tape decks may be connected up to VCR 1 and VCR 2, and selected with those remote control buttons.

The remote control operates within a 30-degree angle of the hk880Vxi/hk990Vxi.

Two batteries (included) must be loaded into the remote before the remote control unit will operate. See further instructions on page 16 of this manual.

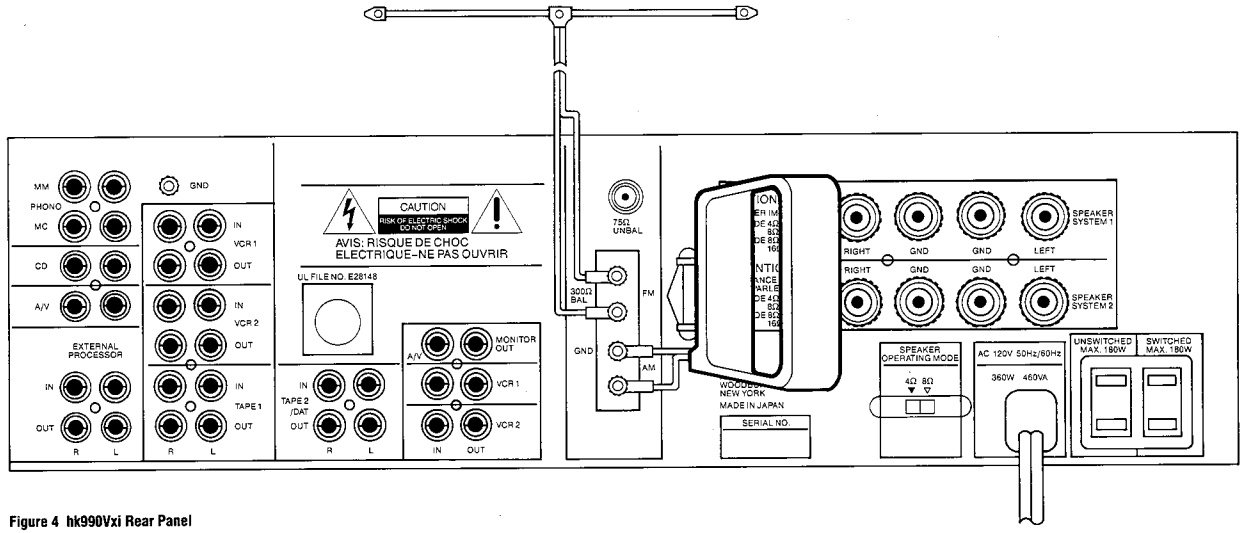


Figure 4 hk990Vxi Rear Panel

Packing and Paperwork

Save all packing material from your new receiver. While the box is quite large and may be a nuisance to store, it is essential for shipping if you move or should the unit ever need repair.

Also be sure to fill out the warranty card and save your sales receipt in a safe place. It is necessary to establish the date on which your warranty begins, and as proof of ownership in the event of something drastic such as fire or theft.

Placement

The hk880Vxi and hk990Vxi are fully shielded and may be placed on top of or under other stereo components, provided that their 3/8-inch "feet" provide sufficient clearance for the cooling needs of the component below.

Ground (GND) Connection

At the top left of the receiver is a GROUND terminal. It should be connected to the ground wire on your turntable cable to prevent audible hum.

Input Connections

First make sure that the receiver and all other components are switched off.

Take care to match left and right component plugs with the left and right input jacks on the back of the receiver. Common practice is to treat the *red* plug as *right* and the *grey* (or black or white) plug as *left*.

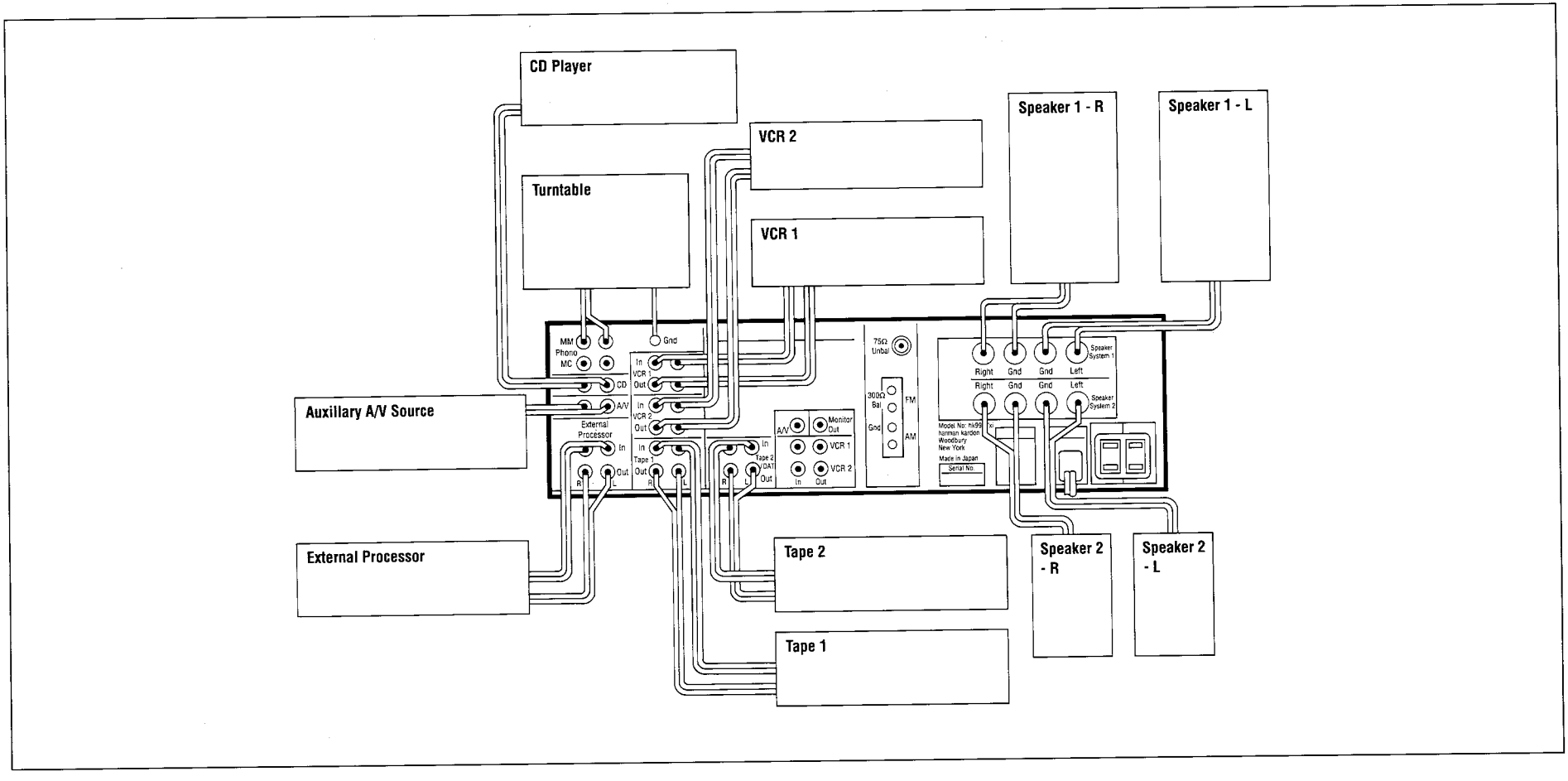


Figure 5 Audio Connection Diagram

hk880Vxi ONLY — Phono (Turntable) Inputs

The PHONO input is designed for moving magnet cartridges only. If you are using a moving coil cartridge, you will need a step-up transformer between the cartridge and your Harman Kardon receiver. Make sure to connect the thin ground lead from the turntable to the GROUND post on the hk880Vxi.

hk990Vxi ONLY — Phono (Turntable) Inputs

The hk990Vxi has provisions for both moving coil and moving magnet cartridge inputs.

Make sure to plug turntables with moving magnet cartridges only into the **MM** inputs on the hk990Vxi, as the sizeable gain boost found at the **MC** inputs will cause volume level problems and severe distortion.

The MM inputs are rated for cartridges with at least a 2.2mV output rating.

Make sure to connect the thin ground lead from the turntable to the GROUND post on the hk990Vxi.

CD Input

Simply attach patch cords from these input sockets to your Compact Disc player.

External Processor

This "loop" allows you to add an external equalizer, dynamic processor or Surround Sound unit. Connect patch cords from the hk880Vxi/hk990Vxi EXTERNAL PROCESSOR OUT sockets to the input sockets of the signal processor. Return the signal with another set of patch cords from the signal processor's outputs to the EXTERNAL PROCESSOR IN on the hk880Vxi/hk990Vxi.

hk880Vxi ONLY — VCR/Tape Audio

The sockets directly below the GROUND connection are for AUDIO to and from cassette decks/VCR's. Remember, you have the option of using these connections for VCR sound, tape decks or one of each.

VCR/TAPE 1 and VCR/TAPE 2 inputs and outputs (tape monitor loops) correspond to their opposite sockets on your tape deck(s) or VCR(s). That is, OUT on the recorder connects to IN on the receiver.

hk990Vxi ONLY — VCR and Tape Audio

Sets of inputs and outputs are provided for the AUDIO from two VCR's and two tape decks. Each of the four groups of inputs and outputs (tape monitor loops) correspond to their opposite sockets on your tape deck(s) or VCR(s). That is, OUT on the recorder deck connects to IN on the hk990Vxi receiver.

A Note on "Mono" For Both The hk880Vxi and hk990Vxi

If your VCR has mono sound output, it will have only one audio output jack instead of both left and right. Use a standard set of connection cords, but only hook up the red plug to the single AUDIO OUT socket. Connect the other end to the RIGHT AUDIO input on the hk880Vxi/hk990Vxi. For sound from both speakers, make sure to press the MONO button on receiver front panel.

A/V

This audio/video input can be used for TV's with VIDEO OUT, Laser Disc players, outboard TV or satellite tuners, CDV players or even some video game systems and home computers.

VCR 1 and VCR 2 (video loops)

The hk880Vxi/hk990Vxi's VCR video/audio inputs and outputs correspond to the opposite sockets on your videocassette recorder(s). That is, VIDEO OUT on your VCR connects to VIDEO IN on one of the receiver's sets of VCR inputs.

hk880Vxi ONLY — Remember that the VCR 1 and VCR 2 video inputs/outputs are intended for both VCR and tape use. If you plug a cassette deck into the VCR/TAPE 1 audio tape loop, the corresponding VCR video input is inoperative. In that case, make sure to plug your VCR to VCR/TAPE 2 (audio) and VCR 2 (video) sockets.

Monitor Output

Connect a hook-up cable from the receiver's MONITOR OUTPUT to the RCA-type VIDEO INPUT of your TV monitor/receiver.

Convenience Receptacles

The hk880Vxi/hk990Vxi has one switched and one unswitched 120V convenience receptacle. The general rule of thumb is to use the switched outlets for components which are used each time you operate your stereo system. These may include any

outboard signal processors (if you leave them switched into the system at all times), speaker equalization boxes and/or whichever sound source you use most often. This gives you the convenience of being able to power up most of your system with the receiver's POWER switch.

The unswitched socket may be used with any other component rated at 180 watts or less. It is especially convenient for powering your VCR.

Antenna Connections

Depending on the type of antenna connector, attach your FM antenna to either the terminals marked 300 Ω BAL or 75 Ω UNBAL at the left side of the chassis back. The flexible dipole FM antenna supplied with your receiver should be sufficient for reception of most stations.

If you are adding an external AM antenna, connect a ground wire to the terminal marked GND next to the 300 Ω BAL. NOTE: A roof top FM antenna mast should be grounded directly to the earth ground using 10-gauge or heavier wire, stand-off insulators and a metal stake. The FM antenna should then be connected to the ground mast via an antenna discharge unit .

The quality of your FM and AM reception is directly proportional to the quality of the antenna you use. If you live in a "problem" area or are simply interested in better reception, please refer to ***Appendix II*** in this manual.

Note to CATV system installer:
This reminder is provided to call the CATV system installer's attention to Article 820-22 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

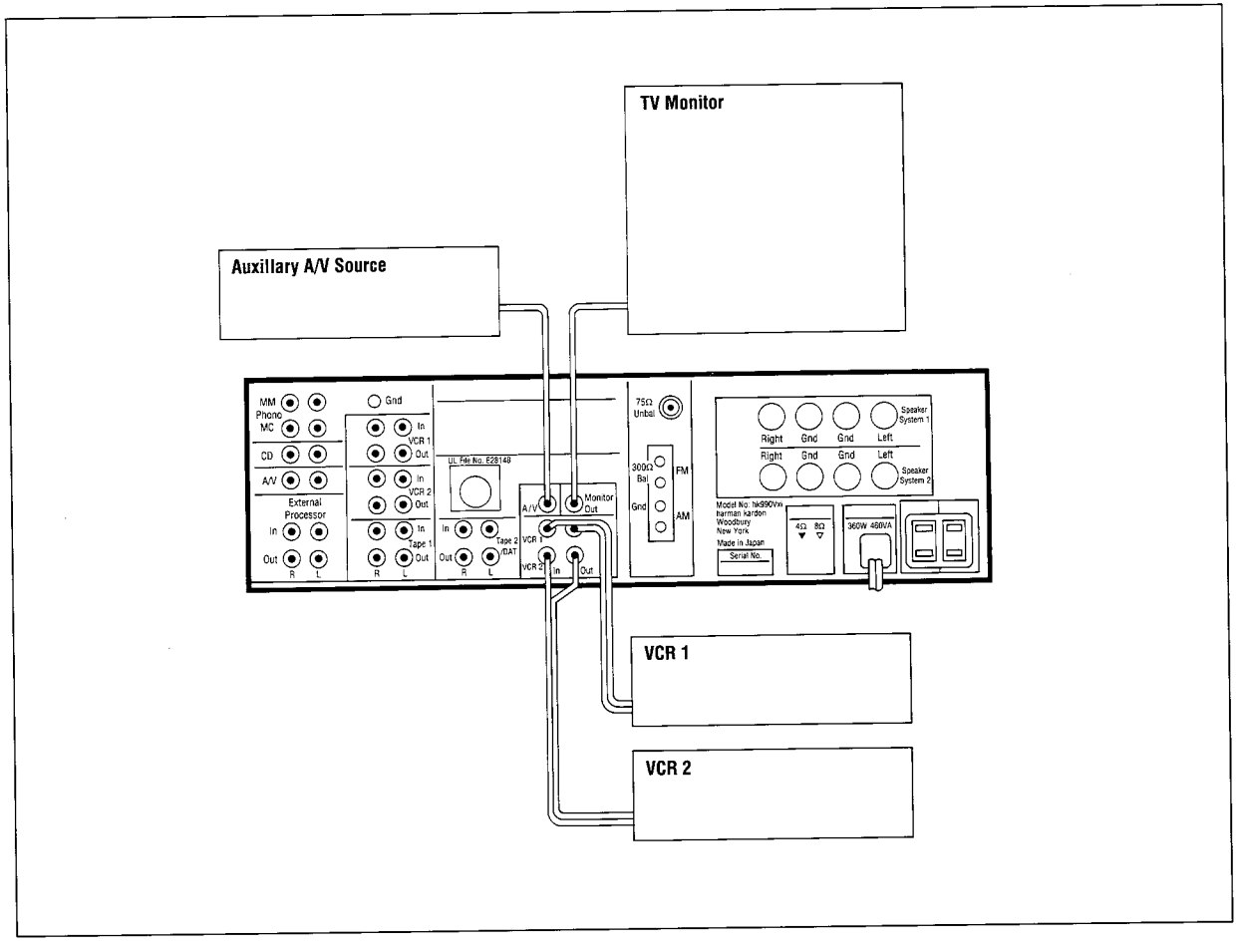


Figure 6 Video Connection Diagram

Speaker Connections

Cabling. For optimal sonic performance, you should use the highest quality speaker cables you can afford. However, common "zip cord" from a hardware store can be employed if care is taken to use the proper gauge. This will depend on the distance from your receiver to your speakers. Use the following chart as a guide:

WIRE LENGTH	GAUGE OF COPPER WIRE
Up to 8 ft	18 gauge
Up to 12 ft	16 gauge
Up to 20 ft	14 gauge
Almost any distance	Special speaker cable

Make sure that both right and left speaker wires are the same length, even if the distance from amp to each speaker is different. Also, avoid coiling any excess wire near or with line level hook-up cords, especially the sensitive cable from your turntable to the receiver.

Connection. First, determine the polarity of your speaker wires. If you are using zip cord, they may **1)** be different colors, such as silver and copper-colored, **2)** have a series of ridges on one conductor, or **3)** include a strand of yarn with one conductor.

Note that the terminals for both SPEAKER SYSTEM 1 and SPEAKER SYSTEM 2 are marked LEFT and RIGHT with GND (ground) terminals in between. A good practice is to use the red/copper/ridged/yarn conductor for the RIGHT (positive) conductors on both receiver and speaker terminals. Use the black/silver/non-ridged/no-yarn conductor for the GND/LEFT (negative) connection.

1. Strip 1/2 inch of conductor off each speaker conductor.
2. Twist the individual strands together so that no loose strands stick out.
3. Taking care to maintain proper polarity (positive to positive/ negative to negative), insert 1/2" of conductor into the hole in each speaker terminal connector. Remember, even one loose strand touching another connector can cause a short circuit.
4. If you're using two sets of speakers, repeat these connections for the second pair of loudspeakers, using SPEAKER SYSTEM 2 terminals.
5. Recheck the polarity of both sets of speaker wires, making sure that you have connected "red to red" and "black to black".

Connecting Two Sets of Speakers

While the hk880Vxi/hk990Vxi are equipped to let you operate two sets of loudspeakers at once, the impedance of each set of speakers is very important. If you are intending to use two sets of speakers, please consult ***APPENDIX I — Multiple Speakers in Parallel*** before proceeding with the Speaker Operating Mode setting.

EXTREMELY IMPORTANT: Setting the Speaker Operating Mode Switch.

Both the hk880Vxi and hk990Vxi have a special selector switch that optimizes the receiver's amplifier section for best operation with your individual speakers. It is very important that you set this switch before playing your speakers.

Determining the impedance of your speakers. For proper performance, you must set the SPEAKER OPERATING MODE switch to correspond with the impedance load of your loudspeakers. If you know the impedance of your speakers (generally 4 or 8 ohms), then proceed to **Setting the switch.** If you don't know the impedance rating of your speakers, it may be, **A)** printed on the back of the speaker, **B)** noted in the speaker's owner's manual, **C)** available by calling your dealer or the manufacturer.

If you often or always play two sets of speakers at once, be sure to use the combined impedance of both (see ***APPENDIX I***).

Setting the switch. If your speakers are rated at 4 or 6 ohms, set the SPEAKER OPERATING MODE switches to the left hand (4-ohm) position. If you have one pair of 8-ohm speakers, set the switch to the right (8-ohm) position. Should you change speakers, or add extension speakers (which changes the overall impedance) you should reset the Speaker Operating Mode switch at that time.

IMPORTANT NOTE: If you are in doubt, use the 4-ohm position, since the power amplifier section of your receiver runs cooler in this mode. Overheating, or the failure of an internal fuse may occur if the 8-ohm mode is used with 4-ohm speakers.

SPECIAL OPERATING NOTE: The hk880Vxi is equipped with a thermal protection circuit that senses abnormally high internal temperature and temporarily shuts of the power output **before** it becomes damaged. The unit will automatically become fully operational again as soon as it cools down, which may take 60 to 90 minutes. The high temperature is most likely caused by the speaker operating mode switch set in the "8 Ω" mode when it should be in the "4 Ω" mode. To prevent the unit from overheating again, be sure to place this switch in the "4 Ω" mode.

Plugging in Your Receiver

Finally, plug in the hk880Vxi/hk990Vxi's own power cord after reading the warnings at the beginning of this manual. We recommend that your receiver be plugged directly into a polarized wall socket. If you must use an extension cord or power strip, check that it is terminated in a polarized plug and rated in excess of the power to be drawn as printed on the back panel of your hk880Vxi/hk990Vxi.

After checking all connections one final time, you're ready to turn on your new receiver and begin enjoying its convenient features and great sonic performance.

A good habit to get into is to FIRST power up any signal sources not connected to the receiver's switched convenience receptacle (CD player, turntable, tape deck etc). Then the hk880Vxi/hk990Vxi . This will protect your speakers and ears from turn-on thumps (transients).

If you intend to power up the receiver by remote control, you must press in the POWER button on the front panel. When the unit is then turned OFF via remote control, the STANDBY light will light, although all other indicator lights will go off. The hk880Vxi/hk990Vxi draws minimal current in this standby mode. However, you should turn off the main POWER button if you are going on vacation or otherwise not using your stereo system for long periods of time.

A Test Run

After turning the FUNCTION selector to the appropriate input, play a record or Compact Disc to check out the performance of your new receiver. If you don't get any sound, consult ***APPENDIX III —Troubleshooting.***

Setting FM and AM Presets

Being able to recall your favorite stations is an extremely convenient feature. The hk880Vxi/hk990Vxi will "remember" the last station preset that you were listening to and tune to that station when you turn the receiver back on.

You can add or change presets any time you want. There is no "right" or "wrong" way to use presets. Some people only set a couple of them. Others assign a station to every one. There are, however, several common approaches which you might consider. You might **1)** rank stations in order of how often you listen to them, assigning Preset 1 to your most listened-to station; or **2)** give stations preset numbers that correspond to their position on the AM or FM dial, with a station "low on the dial" occupying a low preset number, etc.

To set a preset:

1. Switch the FUNCTION selector to TUNER.
2. Press the FM /AM selector to choose the broadcast and preset "bank".
3. Tune in a station you wish to preset using the TUNING UP & DOWN buttons and tuning SEEK selector.
4. When the station is tuned in as well as possible, press the MEMORY button.
5. You have eight seconds in which to press a preset button. Push one of them. The appropriate channel (preset) number will light on the tuning section display. If you had previously set that particular preset number with another station, the old preset will be erased.
6. Repeat steps 2-5 for any other FM or AM presets you wish to add at this time.

Selecting and Playing a CD, Phonograph Record, FM or A/V Component

1. Turn on the source component and then the hk880Vxi / hk990Vxi.
2. Select the appropriate input (A/V, TUNER, CD or PHONO) with the FUNCTION selector (8).
3. Activate the source component.
4. Adjust the master VOLUME control.

- If this operation is being performed with the remote control, set the front panel FUNCTION switch (8) to REMOTE. Then select the source from the remote.

Selecting and Playing an Audio Tape or Videocassette

1. Turn on the tape deck or VCR; then the hk880Vxi/ hk990Vxi.
2. Select the appropriate VCR or tape input using the VCR/TAPE MONITOR switch (6).
3. Activate the source component.
4. Adjust the master VOLUME control.

- Make sure to return the VCR/TAPE MONITOR switch to SOURCE again before listening to the tuner, turntable or Compact Disc Player.
- If your VCR has a mono output, press the MONO button (13). Remember to turn off the MONO circuit when again listening to stereo sources.

Recording to a Tape Deck or VCR

1. First select the recording source with the RECORD OUT knob (7). This output is now available at the record outputs of VCR 1, VCR 2, TAPE 1 and TAPE 2 (in the case of the hk990Vxi), or VCR/TAPE 1 and VCR/TAPE 2 (hk880Vxi).
2. Press RECORD on the cassette deck or VCR.
3. To monitor the recording, select the appropriate VCR/ TAPE MONITOR position (6).

3A. To listen to another source (such as FM while you're making a CD-to-tape copy), return the VCR/TAPE MONITOR (6) to SOURCE and select another input using the FUNCTION switch (8).

- To compare source to recording, simply alternate between the source position and the appropriate position of the VCR/ Tape monitor knob.
- If you wish to make more than one copy, simply engage record on both audio tape decks or VCR's. The same signal will be routed to each.
- The effects of the MONO and SUBSONIC filter circuits are not transferred to the recording outputs, even if they are audible while monitoring the source.

Copying From One Tape Deck or VCR to Another

1. Select the "direction" of the copy using the RECORD OUT (7). For example, if you have two VCR's, load the tape to be copied into VCR 1 and select VCR 1 TO 2 (hk990Vxi) or 1 TO 2 (hk880Vxi).
2. Press RECORD on the cassette deck or VCR connected to the other hk880Vxi/hk990Vxi tape or video loop (In our example above that would be VCR 2).
3. To monitor the recording, set the VCR/TAPE MONITOR knob so you can hear (and/or see) the signals from the component making the copy.

3A. To listen to another source (such as FM while you're making a CD-to-tape copy), return the VCR/TAPE MONITOR (6) to SOURCE and select another input using the FUNCTION switch (8).

- To compare source to recording, simply alternate between the source position and the appropriate position on the VCR/Tape monitor knob.
- When making copies of Dolby B or C-encoded audio cassettes, activate the noise reduction circuits on *both* the source and record decks. This will allow the encoded tape to be *decoded* first, before being routed to the record deck (where noise reduction will be *re-encoded* on the copy).

Remote Control

When the strength of the remote control's batteries becomes weakened, the operating range of the remote control is shortened.

To change the batteries (or initially load the batteries provided with your new receiver):

1. Slide the battery compartment cover on the back of the remote in the direction of the embossed arrow and remove it.
2. Insert two AA (1.5V/R6/UM3) cells according to the + and - polarity symbols at the bottom of the battery well. Always replace both batteries at the same time.
3. Replace the cover.

- Make sure that both the remote's front infrared projection "lens" and REMOTE SENSOR on the hk880Vxi/ hk990Vxi front panel are kept free from dirt to insure proper optical transmission and reception.
- Do not use the remote control near fluorescent lamps which may shorten the operating range of the remote.
- If you do not intend to use the remote regularly, but have loaded it with batteries to experiment with it, remove them to prevent damage from corrosion.

Cleaning

When cleaning your receiver, avoid direct use of dusting sprays, abrasive cleaners or caustics (such as dilute ammonia window cleaning solutions). Use only a mild soap and water solution, applied to a soft cloth, rather than sprayed directly onto the component.

Once again, thank you for choosing Harman Kardon. We wish you many happy years of audio/video enjoyment.

APPENDIX I — Multiple Speakers in Parallel

Your Harman Kardon receiver is equipped with 2 sets of speaker outputs, making it possible to add extension speakers for use in another part of your home, or for matrix surround sound. However, the total impedance of both speaker pairs can be no less than 4 ohms. If the combined impedance is lower, you will not be able to play either set of speakers very loudly without causing overload problems.

Total impedance (Z) when operating 2 sets of speakers is calculated with the following formula: $Z = \frac{R1 \times R2}{R1 + R2}$

where R1 and R2 are the individual impedances of the two speaker systems.

Therefore, two sets of 8-ohm speakers in parallel represents a 4-ohm total load, well within the operating parameters of your hk880Vxi/hk990Vxi receiver, providing you re-set the SPEAKER OPERATING MODE switch to the 4-ohm setting.

However, two sets of 4-ohm speakers is a 2-ohm load and is NOT recommended. If you have any questions, consult your Harman Kardon Dealer before adding a second set of speakers.

APPENDIX II — Antennas For Your hk880Vxi / hk990Vxi

The Role of Your Antenna

While it may seem obvious that an antenna is critical to good reception, it is often not given sufficient consideration. The results can be significantly reduced tuner performance (a classic example of "garbage in, garbage out"). The question of just how elaborate an antenna installation you need can be determined by considering the following:

1. **How good is reception in your area?** If you live in an area with a moderate number of strong FM and AM stations, you may not need as large an antenna as you would if you live in a rural area or an urban area with many adjacent stations.
2. **Are you interested in receiving weak or distant stations?** Some very interesting programming (ethnic, classical, college formats, for example) is often on stations with very low transmitting power. Or you may simply live in an area far removed from all stations. If so, you should consider a more elaborate antenna installation.
3. **Is stereo separation, bandwidth and freedom from interference critical?** If you often tape broadcasts, or own a system where you can hear critical differences in broadcast quality, investing in a better antenna can increase the overall fidelity of many stations.

4. **Does your living environment allow a large antenna, either indoor or outdoor?** Sometimes space, physical layout (such as living in an apartment house) or even city ordinances can affect your decision in this respect.
5. **Do you have access to FM through a TV cable system?** The benefits of using commercial cable as a high quality FM source are many and you should investigate this option if it is available. In general, the higher the antenna, the better it will perform. Radio waves travel better in straight lines from the transmitter and if your antenna is free and clear of obstructions, it will perform better and you will enjoy greater signal strength.

Indoor FM Antennas

An indoor antenna, such as the one included with your new receiver will work well if you enjoy good "line of sight" with the area's FM transmitters or live in the upper stories of a building. Remember, however, that indoor antennas cannot provide height and may be prone to receiving interference from cars on the street or small appliances in the kitchen.

If you are satisfied with the performance of an indoor antenna (or are limited in this respect), your first choice is the half-wave dipole antenna included with the hk880Vxi/hk990Vxi. It will work well in many situations and can be used until you decide whether or not you need a more extensive antenna system. Because it is basically bi-directional, it may be prone to interference or may limit your ability to "fine tune" certain stations that are not on its axis.

The next choice is a pair of "rabbit ears" like the ones often used with television sets. While they have some of the same drawbacks as a flexible dipole, "rabbit ears" are easier to manually adjust for a given station. Make sure that they are not equipped with an FM trap, which would remove the FM signal from TV stations received. The best possible indoor antenna is a table top model specially designed for FM reception. There are many brands on the market including some powered designs and models with manual fine-tuning adjustments. Check with your Harman Kardon dealer for advice on which is most appropriate for your needs and budget.

Outdoor FM Antennas

Properly set up, an outdoor FM antenna can provide significantly better reception than any indoor design. Options range from simple, omni-directional dipoles to elaborate directional designs with rotators that can give you the best possible reception of any given station.

If you are plagued by severe localized noise and multipath interference, you should consider a directional Yagi-style antenna if possible. Consult with your Harman Kardon dealer or with a local radio/television supply shop, since this decision must be made on the basis of your individual area.

Feedline Considerations

Just as the cables used to connect your system contribute to its sound quality, the feedlines running from your antenna to your new receiver play an important part in good reception.

300-ohm twin lead-in is inexpensive and has relatively low signal losses (1.25dB per 100 ft. at 100MHz), but if improperly installed, can act as an antenna itself, picking up unwanted signals. It also suffers signal losses when it becomes wet. Twin lead should be routed to avoid gutters, electrical wiring, pipes and other metal objects.

75-ohm coaxial cable is more expensive and has slightly higher signal losses (3.5dB per 100 ft. at 100MHz) but is far less prone to external noise, interference and weather, due to its shielding and design. You will need to use a matching transformer at the antenna end.

APPENDIX III — Troubleshooting

Checking these possibilities first may save you time and effort getting your receiver serviced. Your Harman Kardon dealer will also be able to answer questions and help you discover the problem.

No light from any receiver indicator panels.

1. Receiver is not plugged into wall socket.
2. Wall socket or extension cord is faulty. Check for poor connections and/or blown fuse.

No sound.

1. Speakers are connected to wrong set of speaker terminals.
2. SPEAKER selector buttons have not been switched to the correct speakers.
3. FUNCTION selector hasn't been switched to the source currently playing.
4. VCR/TAPE MONITOR selector is turned to a tape or VCR source while attempting to listen to CD, PHONO or TUNER.
5. Speaker wires are touching one another, causing a short circuit, which activates protection circuits within the receiver.
6. EXTERNAL PROCESSOR button has been pressed in but there is either no processor hooked up, or the external component has not been turned on.

No sound from cassette deck / No picture or sound from VCR when in "PLAY".

1. VCR/TAPE MONITOR selector set on wrong position.
2. Cassette deck plugged into wrong set of inputs.
3. Output of cassette deck plugged into OUT instead of IN on back of receiver.
4. EXTERNAL PROCESSOR button has been pressed in but there is either no processor hooked up, or the external component has not been turned on.

Correct input source cannot be selected from remote.

1. VCR/TAPE MONITOR and/or FUNCTION selectors are in the wrong position. When using the remote, both of the selectors must be in their REMOTE position.

Phono sound is extremely faint.

1. Phono output has been plugged into the wrong receiver input.
2. Turntable cartridge is a low output Moving Coil type. Plug into MC inputs (hk990Vxi) or use step-up transformer (hk880Vxi).

Phono input has hum mixed with the sound.

1. Ground wire from turntable has not been connected to receiver's ground terminal.
2. Cable from turntable is too close to power cords or speaker cables.

Speakers lack bass.

1. Polarity of one speaker cable has been reversed. Check connections.

Low frequency ringing, oscillation or "howling", especially in phone mode.

1. Too much bass boost is being applied. Switch off LOUDNESS button and/or reduce the amount of BASS tone control boost.
2. Turntable is too close to speakers.
3. Turntable is placed on unstable surface.

Remote does not function correctly.

1. Make sure the distance and operating angle do not exceed those described in this manual.
2. Check that the remote transmitter lens and front panel REMOTE SENSOR window are clean.
3. Make sure that strong fluorescent lights are not being used in your listening room.
4. Check that the batteries inside the remote are fresh.

Warranty and Service

If you have followed the suggestions in this manual and are reasonably sure that your compact disc player requires service, call the Harman Kardon dealer from which you purchased your hk880Vxi or hk990Vxi. It is important that service be carried out only by a designated Harman Kardon Service agent to insure both proper service and to comply with the terms of the hk880Vxi and hk990Vxi Limited Warranty.

Remember to keep your sales slip or receipt in a safe place since you will be required to show it for service during the duration of the Limited Warranty.

harman/kardon
A Harman International Company
240 Crossways Park West
Woodbury, NY 11797

hk880Vxi Specifications

AMPLIFIER SECTION

Continuous Average Power (FTC)	
20Hz–20kHz, both channels driven—8 Ohms:	60 Watts @ 0.08% THD
4 Ohms:	60 Watts @ 0.3% THD
Dynamic Power (IHF 1kHz toneburst)	
High Voltage/High Current Mode—8 Ohms:	90 Watts
4 Ohms:	140 Watts
2 Ohms:	190 Watts
High Current Mode—4 Ohms:	90 Watts
2 Ohms:	140 Watts
HCC (High instantaneous Current Capability):	± 30 Amps
Negative Feedback (overall):	20dB
Power Bandwidth, at half-rated output, 8 Ohms:	< 10Hz – 100kHz
Frequency Response, at 1 Watt Output, + 0/ – 3dB:	0.5Hz – 150kHz
Slew Rate:	90 Volts/µsec
Square Wave Rise Time:	2.0µsec
TIM:	Unmeasurable
Damping Factor:	65
Signal-to-Noise Ratio (ref rated power output, A-Wtd)—Phono (MM):	78dB
Video/CD:	98dB
Input Sensitivity/Impedance—Phono (MM):	2.2mV/47k Ohms, 125pf
Video/CD:	135mV/22k Ohms
Phono Overload:	120mV
RIAA Equalization 20Hz–20kHz (22k Ohm Load):	± 0.3dB
Tone Control Range, Bass (50 Hz)/Treble (10kHz):	± 10dB/ ± 10dB
Subsonic Filter:	15Hz, 6dB/oct
Loudness Contour (– 40dB) at 50 Hz/10kHz:	+ 10dB/ + 3dB

TUNER SECTION

FM	
Usable Sensitivity, mono:	11.2dBf
50dB Quieting Sensitivity, stereo:	37dBf
Signal-to-Noise Ratio, mono/stereo @ 65dBf:	82/74dB
Capture Ratio:	1.2dB
Selectivity (Alternate/Adjacent Channel):	70dB/5dB
IF Rejection:	90dB
AM Rejection (45dBf):	55dB
Stereo Separation (1kHz, 65dBf):	50dB
THD (1kHz, 65dBf) mono/stereo (%):	0.08/0.10
AM	
Sensitivity, ext. antenna:	15µV
Alternate Channel Selectivity:	55dB
Image Rejection:	40dB
IF Rejection:	60dB
Dimensions (w x h x d):	17⅜" x 5¼" x 14½"
	443mm x 134mm x 368mm
Weight:	22 lbs/10 kg

Feature and specification subject to change without notice.

Made in Japan

Printed in Japan

hk990Vxi Specifications

AMPLIFIER SECTION

Continuous Average Power (FTC)	
20Hz–20kHz, both channels driven—8 Ohms:	90 Watts @ 0.08% THD
4 Ohms:	90 Watts @ 0.09% THD
Dynamic Power (IHF 1kHz toneburst)	
High Voltage/High Current Mode—8 Ohms:	120 Watts
4 Ohms:	200 Watts
2 Ohms:	260 Watts
High Current Mode—4 Ohms:	120 Watts
2 Ohms:	200 Watts
HCC (High instantaneous Current Capability):	± 40 Amps
Negative Feedback (overall):	12dB
Power Bandwidth, at half-rated output, 8 Ohms:	< 10Hz – 100kHz
Frequency Response, at 1 Watt Output, + 0/ – 3dB:	0.5Hz – 150kHz
Slew Rate:	180 Volts/µsec
Square Wave Rise Time:	1.8µsec
TIM:	Unmeasurable
Damping Factor:	65
Signal-to-Noise Ratio (ref rated power output, A-Wtd)—Phono (MM):	78dB
Phono (MC):	75dB
Video/CD:	98dB
Input Sensitivity/Impedance—Phono (MM):	2.2mV/47k Ohms, 125pf
Phono (MC):	120mV/56 Ohms
Video/CD:	135mV/22k Ohms
Phono Overload, MM/MC:	120mV/12mV
RIAA Equalization 20Hz–20kHz (22k Ohm Load):	± 0.2dB
Tone Control Range, Bass (50 Hz)/Treble (10kHz):	± 10dB/ ± 10dB
Subsonic Filter:	15Hz, 6dB/oct
Loudness Contour (– 40dB) at 50 Hz/10kHz:	+ 10dB/ + 3dB

TUNER SECTION

FM	
Usable Sensitivity, mono:	11.2dBf
50dB Quieting Sensitivity, stereo:	37dBf
Signal-to-Noise Ratio, mono/stereo @ 65dBf:	82/74dB
Capture Ratio:	1.2dB (2.0dB*)
Selectivity (Alternate/Adjacent Channel):	70dB/5dB (80dB/30dB*)
IF Rejection:	90dB
AM Rejection (45dBf):	55dB
Stereo Separation (1kHz, 65dBf):	50dB (30dB*)
THD (1kHz, 65dBf) mono/stereo (%):	0.08/0.10 (0.15/0.2*)
AM	
Sensitivity, ext. antenna:	15µV
Alternate Channel Selectivity:	55dB
Image Rejection:	40dB
IF Rejection:	60dB
Dimensions (w x h x d):	17⅜" x 5¼" x 14½"
	443mm x 134mm x 368mm
Weight:	28 lbs/11.8 kg

*Active Tracking Mode

1111-J30283 8805-2