









Turntable

Tape Deck

Speakers

Wall Outlet

FM Antenna

## **OWNER'S MANUAL hk450**

To ensure continuing high performance, read this manual carefully before you connect and operate your hk450 receiver.

**Warning:** Do not mistake the ferrite loopstick AM antenna for a handle. Its bracket cannot support the unit.

## CONNECTIONS

For the moment, leave the power cord (1) of the hk450 unconnected. Put the unit on the shelf or table where it will be installed. Leave enough working space so you can make connections easily.

All receivers require adequate ventilation. The hk450 should not be installed on a cushion or rug, and a minimum of two inches' clearance should be provided above and behind.

### Connecting Speakers

Use two-conductor stranded wire to connect your speakers to the receiver. Eighteen gauge lamp cord (zip cord) is satisfactory, but a heavier gauge (16 or 14 gauge) is preferable, especially for distances over 25 feet.

Cut two segments of wire long enough to reach each speaker. Separate the conductors at each end of the wire segments for a length of two or three inches. Then carefully remove about one-quarter inch of insulation from each free end. Twist the strands of each conductor so they are smooth and tight with no loose strands.

Lamp cord usually provides a "code" that differentiates the two conductors. A conductor may be coded by a rib, sharp corner, or indentations molded along the length of the insulation. In some cases, a thin colored thread is molded inside the insulation of one conductor. In others, one conductor is darker than the other, or the insulation of each conductor is of a different color.

Connect the bare ends of one segment of lamp cord to your right speaker as follows: Connect the coded conductor to the speaker's positive ("+") terminal, and the uncoded conductor to negative ("−"). (The "+" and "−" markings are in general use, although some speakers use other labeling systems, such as "1" and "2", "A" and "B", and so on.) Find the appropriate row of speaker connectors on the receiver marked SPEAKER 8-16 OHMS, SYSTEM 1 (2). Push in on the

red plastic head of the connector marked RIGHT to reveal an opening beneath. Insert the bare end of the coded conductor into the opening. Release the connector. The conductor should now be locked firmly into place. Insert the uncoded conductor into the adjacent black connector marked GND.

Repeat the procedure for the left speaker, taking care to observe the coding of the conductors as described for the right speaker. If the code is followed as described, your speakers will be connected "in phase", which is important for solid bass and precise lateral location of the sound source. To connect a second pair of speakers, repeat the procedure for the right and left speakers of the second pair, using the receiver terminals marked SYSTEM 2 (3).

### Connecting AM Antennas

The ferrite loopstick AM antenna (4) on the rear of the hk450 can be rotated to improve the reception of distant stations. AM reception over extremely long distances can be obtained with an external "long wire" antenna, which can be connected to the AM ANTENNA terminal (5).

### Connecting FM Antennas

A T-shaped (dipole) FM antenna is supplied with the receiver. However, reception will be greatly improved if the receiver is connected to an outdoor FM antenna system. If you live in a fringe reception area, or if your house is situated among obstructions (such as mountains or tall buildings), you may need a powerful, directional FM antenna.

If no outdoor antenna is available, connect the lugs of the dipole (supplied with the unit) to the FM 300Ω BAL terminals (6). The dipole can then be tacked or taped to a wall or the back of a shelf.

## Connecting Your Turntable

The PHONO inputs (7) have been designed to operate with a high-quality magnetic phono cartridge. Do not use a ceramic phono cartridge. Turntables are supplied with their own signal cables. Consult the turntable owner's manual and determine which cable is for the left channel and which for the right. Insert the plugs of the signal cables into the jacks on the receiver marked PHONO, LEFT and RIGHT. If the turntable has a separate ground wire, connect it to the knurled lug on the receiver marked GND (8).

## Tape Deck Connections

To connect a tape deck, first connect the line outputs of the tape deck to the left and right TAPE 1 IN jacks (9) of the receiver. Then connect the left and right TAPE 1 OUT jacks (10) of the hk450 to the line inputs of the tape deck. A standard DIN socket (11) is provided for tape decks equipped with a DIN connector. To connect a second tape deck, connect the line outputs of the second deck to the left and right AUX INPUTS (12) of the hk450. Then connect the left and right TAPE 2 OUT jacks (13) of the hk450 to the line inputs of the tape deck.

## Time Delay and Signal Processing

In addition to providing connections for tape decks, the TAPE IN and OUT jacks of the hk450 can be used to connect signal processors such as equalizers, noise reduction units, and dynamic range enhancers. In particular, the TAPE 2 OUT jacks can be used to connect a time delay system. In this configuration, the TAPE 2 OUT jacks provide the input for a time delay unit, which is then connected to separate amplifiers and speakers.

## Auxiliary Input Connection

The AUX inputs (12) provide for playback with a second tape deck, as described above. If a second tape deck

is not used, a special tuner for long wave, marine, aircraft, citizen's band, or the audio output of a television set are among the components that can be connected to the AUX inputs.

## AC Convenience Outlet

The AC outlet (14) on the rear panel provides connection for a turntable, tape deck, or other equipment drawing as much as 180 watts of current. The outlet is marked SWITCHED and is "live" only when the receiver is switched on.

## Power Connection

If you have completed all the connections you wish to make, you are now ready to place the receiver in its permanent position and plug its power line cord (1) into an AC outlet.

## OPERATION

### Power

The POWER switch (15) is located on the left side of the front panel, and is "on" in the depressed position.

### Speaker Selection and Headphones

The SPEAKER 1 (16) and SPEAKER 2 (17) switches select the pair of speakers to be played. When either switch is depressed, the corresponding pair of speakers is activated.

The front panel HEADPHONES jack (18) accepts headphones for personal listening. Headphones may be used simultaneously with speakers if desired.

### Selecting Function

Use the FUNCTION control (19) to select the desired program source.

### To Play Records

Set the FUNCTION control (19) to PHONO, activate your turntable, and advance the VOLUME control (20) clockwise to a comfortable level.

If you hear hum at average listening levels, turn the POWER switch (15) off and check to see that PHONO (7) and GND (8) connections are secure.

### **Tone Controls**

To increase the loudness, turn the VOLUME control (20) clockwise. The BALANCE control (21) shifts the sound to one speaker or the other.

The BASS and TREBLE controls affect the frequency balance of the program material. Their neutral positions are at 12 o'clock. Turning the TREBLE control (22) clockwise increases the high frequencies. The BASS control (23) has the same effect on the low frequencies.

When the LOUDNESS switch (24) is depressed, very high and very low frequencies are boosted at low settings of the VOLUME control. This compensates for the ear's relative insensitivity to extreme frequencies at low volume levels. The switch has little effect at VOLUME settings beyond 12 o'clock.

When the MONO switch (25) is depressed, the audio signals from left and right channels are combined, and this monophonic signal is supplied to both speakers. This switch has no effect on the FM tuner section, and the STEREO LED (26) may stay on when the switch is depressed.

### **FM Tuning**

Turn the FUNCTION control (19) of the hk450 to STEREO FM. Rotate the tuning knob (27) to tune in a station on the FM dial scale (28), calibrated from 88 to 108 megahertz. The red LED (26) labeled STEREO will glow when you are receiving a broadcast in stereo.

The tuning meter (29) indicates the relative strength of the incoming broadcast signal, the highest reading usually indicating the best reception.

A green in-tune LED (30) above the dial pointer will glow when you are tuned to the center of the broadcast channel. The illumination of the in-tune

LED will usually coincide with the best reading of the tuning meter. When the two indications do not coincide, tune according to the meter.

Occasionally, an FM stereo multiplex circuit will introduce a high-frequency noise or hiss when processing a weak FM stereo broadcast. Setting the FUNCTION control (19) to FM will disengage the multiplex circuit and reduce the noise. The broadcast will be received monophonically and the red STEREO LED (26) will be off.

The hk450 incorporates an FM muting circuit to eliminate the hissing atmospheric noise you normally hear when turning between FM stations. To engage this circuit, depress the FM muting switch (31).

### **AM Tuning**

Set the FUNCTION control (19) to AM and tune according to the AM dial scale (32), calibrated from 540 to 1600 kilohertz. The tuning meter (29) indicates the best reception.

### **Auxiliary Source**

You can listen to the auxiliary source that you have connected by setting the FUNCTION control (19) to AUX.

### **To Play Back Tapes**

The TAPE MONITOR switch (33) admits programs from any line-level source (usually a tape deck) connected to the TAPE IN jacks. When you wish to play back a tape, set the TAPE MONITOR switch to TAPE. The red LED (34) above the switch will glow. Note that as long as the switch is set to TAPE, no sound will be heard from any other program source regardless of the position of the FUNCTION control.



## **To Record Tapes**

The TAPE out jacks allow you to record program material from any source selected by the FUNCTION control. The VOLUME and BALANCE controls, and the various tone controls do not affect the signal at the TAPE OUT jacks. Hence you can change the settings of these controls without altering a tape recording in progress.

If your tape deck has a separate monitor head, you can use the TAPE MONITOR feature of the hk450 to compare the original source with the recording. Set the TAPE MONITOR switch (33) to TAPE, and you will hear the recording a fraction of a second after it has been made. Return the TAPE MONITOR switch to SOURCE, and you will hear the original source.

## **Speaker Protection**

Circuit breakers on the hk450 protect your speakers from short circuits and other conditions of excessive current. If one of your speakers stops producing sound, turn the receiver off and check the speaker connections. Make sure that no wire strands touch the wrong terminal. Locate the SPEAKER PROTECTOR pushbutton (35) for that channel. Press the button in firmly and release immediately.

## **Maintaining Appearance**

Clean the metal panel with mild, diluted detergent applied with a soft cloth or cotton swab. Never use a strong abrasive cleaner.

Remove dust or smudges from the acrylic front window with diluted glass cleaner applied with a soft cloth. Do not use a strong solvent-type cleaner or ammonia.

The hk450 is a high-quality precision instrument. If the instructions in this manual are followed thoughtfully, the receiver should provide many years of musical pleasure.