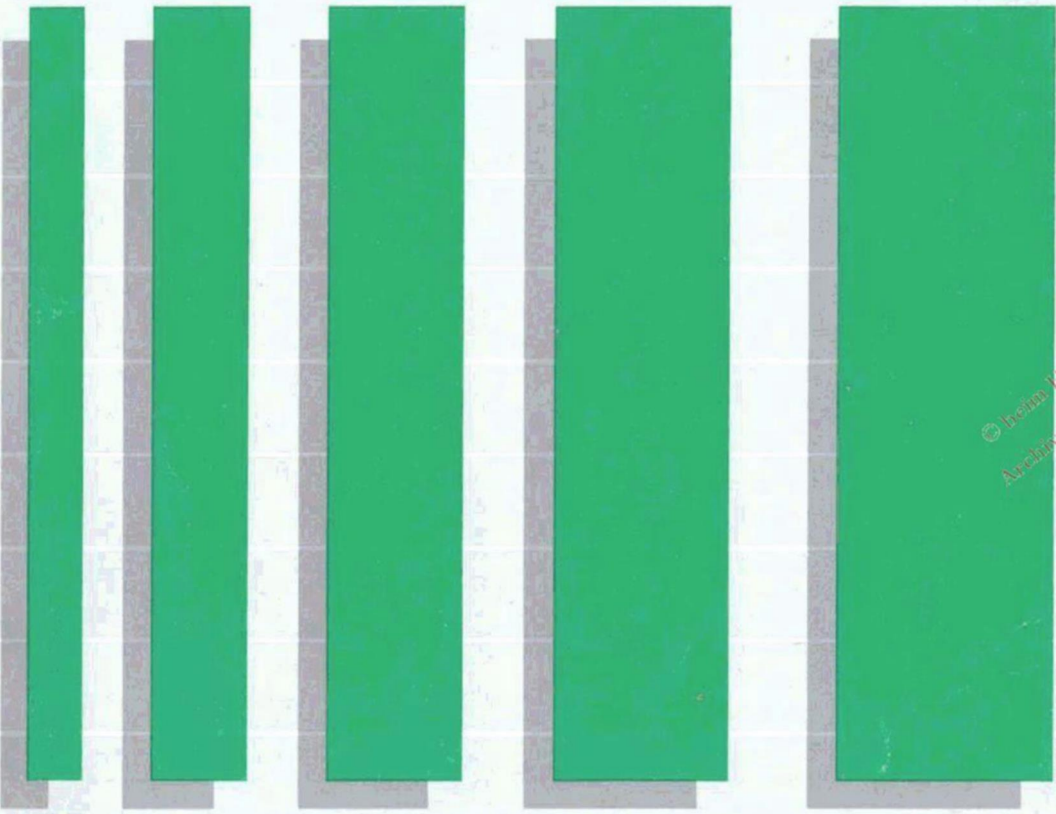

R E C E I V E R S



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Archiv Michael Otto



harman / kardon

Introduction

Harman Kardon, state-of-the-mind technology.

Thirty years ago Harman Kardon introduced the world's first high fidelity receiver. It was built on the philosophy that quality audio must evolve from creative, quality thinking.

Over the years, Harman Kardon continued to introduce original audio theories that were truly "state-of-the-mind," each proving so successful that it was immediately absorbed into the marketplace as "state-of-the-art."

For example, in 1958, Harman Kardon developed the first stereo receiver. A state-of-the-mind theory that instantaneously became state-of-the-art.

In the 60's Harman Kardon introduced a unique concept, ultrawideband frequency response. Today, it's an established fact of sonic quality.

In 1970, Harman Kardon saw the need for a noise reduction system for cassette recording and became the first company to use Dolby* in a cassette deck.

Now, Harman Kardon's most important state-of-the-mind concept, High Current Capability, has turned state-of-the-art. A recently published paper by Dr. Matti Otala entitled "Input Current Requirements of High Quality Loudspeaker Systems" states that in order for an amplifier to properly drive loudspeakers it must have the High Current Capability to instantaneously generate as much as 6 times its rated power into a 1.33 Ohm load. Since 1980, Harman Kardon has consistently used High Current Capability in its receiver and amplifier designs.

High Current Capability, the proven power requirement.

To eliminate performance limitations, all Harman Kardon amplifiers have been designed with High Current Capability (HCC). HCC provides the instantaneous current that is required to precisely drive and control nearly any loudspeaker system. So, while other manufacturers continue to pile on gimmicks, all Harman Kardon receivers deliver the current needed to accurately drive low

impedance loads with up to four times more instantaneous current than competing designs of the same power rating. While most manufacturers design their receivers to produce the best possible FTC power ratings, Harman Kardon designs equipment to produce the best possible musical quality. This essential difference in philosophy is supported by the fact that current FTC governed ratings can be misleading.

FTC power ratings are determined by the power an amplifier can deliver into the continuous impedance of an 8 Ohm resistor. However, Dr. Otala's paper shows that loudspeakers don't act like simple resistors. Their impedance and current requirements change radically, depending on the frequency of the signals they receive. A low frequency transient, such as the beat of a kick drum, can make an 8 Ohm speaker instantaneously draw as much current as a 1.33 Ohm resistor. (A 1.33 Ohm resistor draws 6 times as much current as an 8 Ohm resistor.) Our competitors: receivers can't supply the required current under such demanding conditions, and because of this cannot maintain the low distortion and widebandwidth required for accurate sonic reproduction. The result is music that is clipped and sounds vague and muddy.

Ultrawideband response eliminates audible phase shift.

Signals close to the limits of an amplifier's frequency range are delayed by a time phenomenon called "phase shift." In a narrowband amplifier with a frequency response of only 20Hz to 20,000Hz (+0, -3dB), phase shift in the upper frequencies is noticeable even at 10,000Hz and becomes increasingly more audible at higher frequencies. Similar phase shift occurs at the lower end of the frequency range as well. With extreme high and low frequencies delayed and mid-range reproduced accurately, the spacial position of vocals and musical instruments becomes unclear and vague. Harman Kardon receivers are designed with an extended frequency response of .1Hz to 180,000Hz, so that phase shift can only occur below .2Hz and above 90,000Hz; both are well outside the audible spectrum. By keeping the sonic range free from all time delays, the clarity and stereo imaging so

Low negative feedback for low TIM distortion.

THD is the most commonly measured form of sonic distortion. However, in the middle 1970's, a more noticeable form of distortion was isolated, Transient Intermodulation Distortion (TIM). TIM was found to be noticeable at as low as .03% or a mere 1/10 the level at which THD can be heard.

The audio engineer who discovered TIM, Dr. Matti Otala, traced its cause to the excessive use of negative feedback, a form of electronic compensation used in virtually every amplifier made. Used judiciously, negative feedback can decrease THD distortion and stabilize performance. But, when used in large quantities (up to 50dB in conventional designs), it merely transforms THD into audible TIM, causing the music to sound harsh, grating and smeared. Since most manufacturers don't publish their TIM specs, their low-THD amplifiers look good on paper, but sound noticeably distorted in operation.

To reduce this unwanted distortion, Harman Kardon developed its own unique circuitry and uses it in its receivers and amplifiers. It keeps THD at acceptable levels and allows for minimum use of negative feedback – as low as 12dB. The result is TIM that is so low that it is immeasurable even when using the most sophisticated test equipment available and virtually undetectable to even the most critical ear. This is why Harman Kardon receivers sound smoother and more open in the high frequency range. Cymbals, flutes, guitars and strings sound clear, transparent and more accurate.

Totally discrete audio stages.

Mass produced integrated circuits (ICs) have become very commonplace in the manufacturing of typical audio components. In certain applications such as AM and FM tuners, metering circuits and motor controls, ICs do indeed offer certain benefits as well as low cost. However, the use of ICs in the audio signal path, such as preamplifiers and power amplifiers, results in inferior sonic performance due to their narrowbandwidth, their need for high negative feedback and their inability to deliver High Current Capability. Harman Kardon uses only discrete

harman/kardon hk 590i

DIGITAL SYNTHESIZED QUARTZ-LOCKED STEREO RECEIVER

TAPE MONITOR
tape1 tape2

FUNCTION
phono aux/DAD am fm

FM 96.7 MHz

FM AM
SIGNAL STRENGTH TUNED STEREO

POWER

bass turnover 400Hz 200Hz
tone defeat
treble turnover 2kHz 6kHz

speakers 1 2

tape copy 102
subsonic filter
loudness

radio mode

muting

TUNING
down up

VOLUME

HEADPHONES

BASS

TREBLE

BALANCE

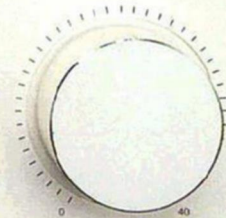
TAPE MONITOR
tape1 tape2 source

FUNCTION
phono aux/DAD am fm

auto manual memory

FM/AM PRESET MEMORY

1 2 3 4
5 6 7 8



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hk690i

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The hk690i provides the combination of pure power, sonic excellence and features that the true audiophile demands.

With its High instantaneous Current Capability of 45 amps, the hk690i will develop far more power under peak demand conditions than its rated 60 Watts per channel.* In fact, its dynamic behavior approaches the ideal; the transient power nearly doubles into 4 Ohms and continues to increase dramatically into 2 Ohms. This means that the hk690i gives you louder, clearer sound than any other 60 Watt* receiver.

It has an Ultrawideband Frequency Response of 0.2Hz to 150kHz, as well as low negative feedback for extremely fast and accurate transient response. The result is a virtual elimination of TIM distortion.

The phono section has a unique dual RIAA equalization circuitry which maintains a constant low level of negative feedback throughout the audio frequency range. The tuner section automatically shuts off when the phono or aux buttons are pressed to eliminate digital switching noise or the possibility of bleed-through.

The digital synthesized quartz-locked hk690i possesses a unique sample-and-hold MPX decoder to decrease high frequency switching noise while eliminating the need for much of the filtering normally required in FM processing.

Features normally expected to be found in top-of-the-line components are, naturally, included: Provisions for two tape decks (with tape copy capability) auto and manual tuning, 8 AM and 8 FM memory presets, switchable bass and treble turnover frequencies, a Moving Coil head amplifier, loudness control, subsonic and high cut filters, muting control and FM high blend.

The hk690i. It's the ultimate receiver from Harman Kardon.

*60 Watts RMS per channel into 8 Ohms, 20Hz-20kHz with less than .06% THD.

harman/kardon hk 690i

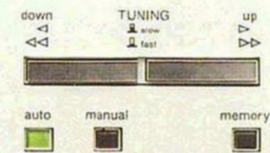
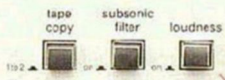
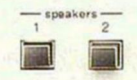
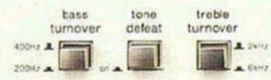
DIGITAL SYNTHESIZED QUARTZ LOCKED STEREO RECEIVER

TAPE MONITOR
tape1 tape2

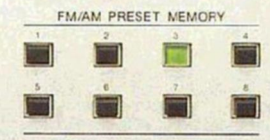
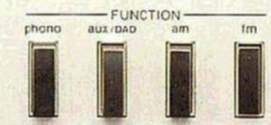
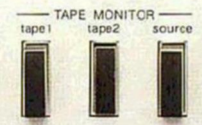
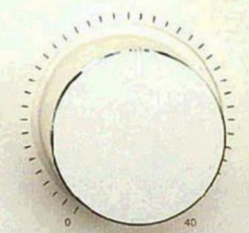
FUNCTION
phono aux/DAB am fm

FM 104.1 MHz

FM AM
SIGNAL STRENGTH TUNED STEREO



VOLUME



Specifications

	hk330i	hk380i	hk490i	hk590i	hk690i
Amplifier Section					
Power Output, (FTC) RMS, per channel, both channels driven into 8 Ohms, 20-20,000Hz:	20 Watts per channel (α <.09% THD	30 Watts per channel (α <.08% THD	30 Watts per channel (α <.08% THD	45 Watts per channel (α <.08% THD	60 Watts per channel (α <.06% THD
4 Ohms, 1kHz, IHF Signal (Dynamic Power):	40 Watts	75 Watts	75 Watts	95 Watts	120 Watts
2 Ohms, 1kHz, IHF Signal (Dynamic Power):	50 Watts	85 Watts	100 Watts	120 Watts	150 Watts
Negative Feedback (overall):	22dB	20dB	12dB	12dB	12dB
HCC (High Instantaneous Current Capability):	10 Amps	18 Amps	18 Amps	35 Amps	45 Amps
Power Bandwidth, at half-rated output, 8 Ohms:	<10Hz-60kHz	<10Hz-60kHz	<10Hz-100kHz	<10Hz-100kHz	<10Hz-100kHz
Frequency Response, at 1 Watt output, +0/ - 3dB	0.3Hz-150kHz	0.3Hz-150kHz	0.2Hz-150kHz	0.2Hz-150kHz	0.2Hz-150kHz
TIM:	Immeasurable	Immeasurable	Immeasurable	Immeasurable	Immeasurable
Slew Rate:	120 Volts/ μ sec	120 Volts/ μ sec	120V/ μ sec	120V/ μ sec	200V/ μ sec
Square Wave Rise Time	2.2 μ sec	2.2 μ sec	1.8 μ sec	1.8 μ sec	1.8 μ sec
Square Wave Tilt, at 20Hz	<5%	<5%	<5%	<5%	<5%
Signal-to-Noise Ratio IHF-A Wtd, ref 1 Watt output, (New IHF) Phono (MC): 500 μ V input Phono (MM): 5 mV input Aux: 0.5 V input	— 80dB 85dB	— 80dB 85dB	— 80dB 83dB	— 80dB 80dB	78dB 80dB 80dB
Input Sensitivity/Impedance Phono (MC): Phono (MM): Aux:	— 2.2 mV/47k, 125 pf 135 mV/22k	— 2.2mV/47k, 125 pf 135 mV/22k	— 2.2mV/47k, 125 pf 135 mV/22k	— 2.2mV/47k, 125 pf 135 mV/22k	120 μ V/47 Ohms 2.2mV/47k, 125 pf 135 mV/22k

(Specifications Con't Next Page)

All features and specifications subject to change without notice

Specifications

	hk330i	hk380i	hk490i	hk590i	hk690i
Overload: Phono/Aux at 1kHz:	120 mV/Infinite	135 mV/Infinite	170 mV/Infinite	170 mV/Infinite	220 mV/Infinite
RIAA Equalization 20Hz-20kHz:	+ 1, - 0.3dB	+ 1, - 0.3dB	+ 1, - 0.3dB	± .3dB	± .3dB
Tone Control Range Bass (50Hz)/ Treble (10kHz):	± 10dB	± 10dB	± 10dB	± 10dB	± 10dB
Subsonic Filter:	—	15Hz, 6dB/Octave	15Hz, 6dB/Octave	15Hz, 12dB/Octave	15Hz, 12dB Octave
Tuner Section					
Usable FM Sensitivity: mono (dBf/μV-75 Ohms):	12.1dBf/1.1μV	11.2dBf/1.0μV	10.8dBf/0.95μV	10.8dBf/0.95μV	10.8dBf/0.95μV
50dB Quieting Sensitivity: stereo (dBf/μV-75 Ohms):	17.3dBf/2.0μV	16.8dBf/1.9μV	15.6dBf/1.65μV	15.6dBf/1.65μV	14.6dBf/1.65μV
FM Signal-to-Noise Ratio: stereo, 65dBf	74dB	74dB	75dB	75dB	76dB
Capture Ratio	1.5dB	1.5dB	1.0dB	1.0dB	1.0dB
Alternate Channel Selectivity	60dB	60dB	70dB	70dB	70dB
IF Rejection	80dB	80dB	80dB	80dB	110dB
AM Rejection: 45dBf	50dB	50dB	52dB	52dB	60dB
Stereo Separation: 1kHz, 65dBf, 100% mod	45dB	45dB	50dB	50dB	55dB
FM THD: mono 1kHz, 100% mod stereo	0.08% 0.12%	0.08% 0.12%	0.08% 0.12%	0.08% 0.12%	0.06% 0.08%
AM Sensitivity:	270μV/m	270μV/m	15μV (ext. ant.)	15μV (ext. ant.)	15μV (ext. ant.)
AM Alternate Channel Selectivity:	45dB	45dB	45dB	45dB	45dB
AM Image Rejection:	33dB	33dB	33dB	33dB	33dB
AM IF Rejection:	30dB	30dB	60dB	60dB	60dB
Dimensions					
Height with legs	4"/101mm	4"/101mm	5 1/8"/134mm	5 1/8"/134mm	5 1/8"/134mm
Depth with knobs and antenna	14 1/2"/368mm	14 1/2"/368mm	14 1/2"/368mm	14 1/2"/368mm	14 1/2"/368mm
Width	17 3/8"/440mm	17 3/8"/440mm	17 3/8"/440mm	17 3/8"/440mm	17 3/8"/440mm
Shipping Weight	18 lbs/8.2 kg	19 lbs/8.6 kg	20 lbs/9.0 kg	21.6 lbs/9.8 kg	26.4 lbs/12 kg

All features and specifications subject to change without notice

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harman/kardon

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516-496-3400

components in all of its amplifier sections. Harman Kardon takes the time, and the money, to use discrete transistors, diodes and resistors because when you cut corners you compromise quality sound.

Quality components need less protection.

Harman Kardon believes the best way to protect components from a power overload is to design them to handle more load than they're ever likely to see. Which is why extra heavy duty output and driver transistors are used. Together, they provide Safe Operating Areas typically 4 to 5 times greater than conventional designs.

For absolute protection Harman Kardon also incorporates a sophisticated electric protection circuit. However, the protection only engages under the most adverse conditions (such as shorted speaker wire) so that it won't prematurely and unnecessarily distort or limit the musical signal.

Dual RIAA equalized phono section.

Unknown to many audio consumers, music signals are equalized before records are made. This process, called RIAA equalization, is basically a low frequency roll-off below 500Hz and high frequency boost above 2,100Hz.

In order to obtain correct frequency response when playing back a record, an equal but opposite equalization must be used to precisely cancel the original. The phono circuits in most amplifiers are effective in steady-state testing; however, when tested with dynamic signals, they produce transient distortion that is far greater than their steady-state specifications imply.

The transient distortion is mainly attributable to the large and inconsistent amount of negative feedback used throughout the frequency range. In order to produce the desired low frequency boost and high frequency roll-off, most manufacturers decrease the amount of low frequency feedback and further increase the feedback at high frequencies. The result is approximately 20dB more feedback at 1000Hz than at 50Hz, and still 200dB more feedback at 20,000Hz.

Harman Kardon's Dual RIAA circuit solves this problem in the following way: One RIAA equalization network pro-

vides the required low frequency boost and high frequency roll-off while another RIAA network maintains the same low level of negative feedback at all frequencies from 20Hz to 20,000Hz.

The result is both flat frequency response and accurate transient reproduction.

Digital Quartz-locked tuning.

Digital Quartz-locked tuning, with 8 AM and 8 FM presets, is featured on the hk490i, hk590i and the hk690i. This precise tuning method is accomplished by a combination of a digital frequency control system and a highly accurate quartz reference crystal. The digital control system automatically locks onto the center of the assigned frequency of any broadcast and compares it to the reference frequency 25,000 times per second. The result is not just automatic centering, but drift-free reception as well.

DC Digital display.

In order to reduce switching noise that may bleed through to other audio circuits, a DC digital display has been incorporated. Unlike conventional designs which scan the various display segments at high frequencies, the DC display draws a steady low level current that does not radiate interference. To further reduce digital noise from other tuner circuitry, the tuning section completely shuts down when the "phono" or "aux" buttons are engaged.

Sample-and-Hold MPX decoder.

Research by the Harman Kardon Digital Audio Development Group found that a new Sample-and-Hold signal processing circuit could have applications in the areas of FM stereo decoding. This circuit, called the Sample-and-Hold multiplex results in wider stereo separation (55dB at 1000Hz), reduced high frequency switching distortion and further improved FM sound quality due to less phase shift.

Tone controls with variable turnover points.

Tone controls with variable turnover points offer flexibility in correcting for speaker system limitations and can be used as a subtle scratch and/or hiss filter without upper midrange effects. Bass turnover points are 400Hz

(standard) + 200Hz, and treble turnover points are 2000Hz (standard) + 6000Hz. Available on the hk590i and hk690i.

State-of-the-Mind receivers.

This brochure will help explain why Harman Kardon receivers exceed the limitations of today's "state-of-the-art." They demonstrate "state-of-the-mind," a way of thinking that goes beyond today's technology and seeks tomorrow's.

So, while other manufacturers continue to pile on unnecessary features and gimmicks, Harman Kardon continues to fine tune the basics and develop fundamentally advanced audio equipment.

Harman Kardon, our state-of-the-mind is tomorrow's state-of-the-art.

*Dolby is the registered trademark of Dolby Laboratories, Inc.

hk330i

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Archiv Michael Otto

Like all Harman Kardon receivers, the hk330i possesses High instantaneous Current Capability, developing much more power under peak loads than its rated 20 Watts per channel.*

Simply stated, the economical hk330i will outperform any conventional receiver in its category. That's because Harman Kardon philosophy maintains that there can be no compromise in sound quality no matter what the cost of the product.

The hk330i has features like High instantaneous Current Capability of 10 amps, which allows it to power two pairs of demanding speaker systems simultaneously, without distorting or shutting down.

Other features found on the Harman Kardon hk330i receiver include Ultrawideband Frequency Response of 0.3Hz to 150kHz in the amplifier section to deliver very fast transient response while virtually eliminating TIM distortion. Low negative feedback additionally assures speed and accuracy while maintaining immeasurable TIM distortion. Phase-locked loop circuitry in the tuner section provides excellent stereo separation and low THD.

The hk330i additionally offers an LED signal strength meter, tape monitor, FM muting, loudness, and accommodations for two sets of speakers.

The hk330i. A 20 Watt* receiver with advanced technology.

*20 Watts RMS per channel into 8 Ohms, 20Hz-20kHz with less than .08% THD.

harman/kardon hk330i ULTRAWIDEBAND LINEAR PHASE STEREO RECEIVER



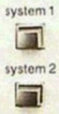
POWER



HEADPHONES



SPEAKERS



BASS



TREBLE



BALANCE



loudness



VOLUME



TAPE



phono



aux/DAD



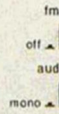
am



fm



fm muting



off



audio mode



mono



hk380i

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The Harman Kardon hk380i receiver delivers truly exceptional sonic quality.

Rated at 30 Watts per channel,* the hk380i actually develops much more power at peak loads. Simply stated, the hk380i outperforms receivers of the same power rating, and provides a musical quality found only in receivers costing much more. The High instantaneous Current Capability of 18 amps will unfailingly power two speaker systems simultaneously, and still deliver pure, clean sound even under peak demand conditions.

The hk380i, with Harman Kardon's Ultrawideband technology, offers a frequency response of 0.3Hz to 150kHz, unprecedented in a low feedback receiver.

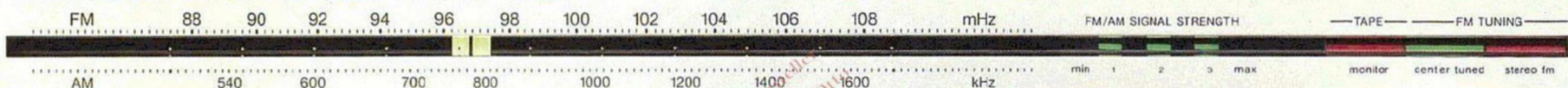
The Harman Kardon commitment to state-of-the-mind technology is evident throughout the hk380i. Its high slew rate keeps distortion low during sharp musical transients; phase-locked loop circuitry in the tuner section provides near perfect stereo separation; and a subsonic filter reduces irritating wow-and-flutter and low frequency signals generated by the turntable.

Convenience features on the hk380i include an LED signal strength meter, tape monitor, FM muting and loudness.

The hk380i. No other receiver can deliver better sonic quality unless it's a Harman Kardon.

*30 Watts RMS per channel into 8 Ohms, 20Hz-20kHz with less than .08% THD.

harman/kardon hk 380i ULTRAWIDEBAND LINEAR PHASE STEREO RECEIVER



POWER



HEADPHONES



SPEAKERS



BASS



TREBLE



BALANCE



subsonic filter



loudness



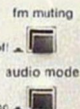
VOLUME



TAPES



FUNCTION



hk490i

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Archiv Michael Otto

The Harman Kardon hk490i delivers the accuracy of advanced digital tuning in an affordable receiver.

The dynamic behavior of the hk490i, with its High instantaneous Current Capability (HCC) of 18 amps, approaches the ideal in that the transient power nearly doubles into 4 Ohms and continues to increase dramatically into 2 Ohms. This means that the hk490i receiver gives you louder, clearer sound than any other 30 Watt* receiver.

With its Ultrawideband Frequency Response of 0.2Hz to 150kHz, the hk490i delivers very fast transient response, while virtually eliminating TIM distortion. The tuning section shuts down when the phono or aux buttons are pressed, to eliminate digital switching noises or the possibility of bleed-through. There are also two tape monitors with copy capability and subsonic filter.

The digital synthesized quartz-locked tuner provides precise, drift-free reception. The display is DC driven, to eliminate switching noise and distortion.

For convenience, stations may be locked into one of the 8 AM or 8 FM memory presets. Additionally, the auto-mode switch allows for scanning up or down to the next station.

Harman Kardon's hk490i. A remarkably sophisticated receiver.

*30 Watts RMS per channel into 8 Ohms, 20Hz-20kHz with less than .08% THD.

harman/kardon hk 490i

DIGITAL SYNTHESIZED QUARTZ LOCKED STEREO RECEIVER

TAPE MONITOR
tape1 tape2

FUNCTION
phono aux/DAD am fm

FM 96.70 MHz

FM AM
SIGNAL STRENGTH TUNED STEREO

POWER



subsonic filter



high cut



speakers
1 2



audio mode



loudness



muting



TUNING
down up



VOLUME



HEADPHONES



BASS



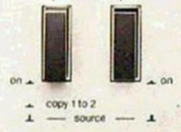
TREBLE



BALANCE



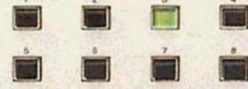
TAPE MONITOR
tape1 tape2



FUNCTION
phono aux/DAD am fm



FM/AM PRESET MEMORY



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hk590i

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Harman Kardon's state-of-the-mind technology is expertly exemplified in the hk590i receiver.

The hk590i offers a full 45 Watts per channel,* with 35 amps of High instantaneous Current Capability (HCC) available under peak demand conditions. With the transient power nearly doubling into 4 Ohms and continuing to increase dramatically into 2 Ohms, the dynamic behavior approaches the ideal.

The Ultrawideband Frequency Response of the hk590i of 0.2Hz to 150kHz in the amplifier section, works along with the phono section's dual RIAA circuitry to provide the most open, transparent sound.

The tuner section shuts down when the phono or aux buttons are pressed to eliminate the possibility of digital switching noise or bleed-through. Switchable bass and treble turnover frequencies allow for custom-tailoring of the tone-control characteristics to the listening environment. In addition, the hk590i has tone defeat and 2-way tape capability.

The digital synthesized quartz-locked tuning section of the hk590i can be tuned up or down manually or will scan automatically to the next station. For added convenience, stations may be locked into one of the 8 AM and 8 FM memory presets.

The hk590i. An advancement in affordably accurate audio.

*45 Watts RMS per channel into 8 Ohms, 20Hz-20kHz with less than .08% THD.

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