KENWOOD

# L-08M/C

SIGMA DIRECT DRIVE AMPLIFIER SYSTEM

# The rebirth of the amplifier as a total system

**Here is a unique, back-to-the basics amplifier design that considers every aspect of performance between the preamplifier input to the speaker input terminals.**

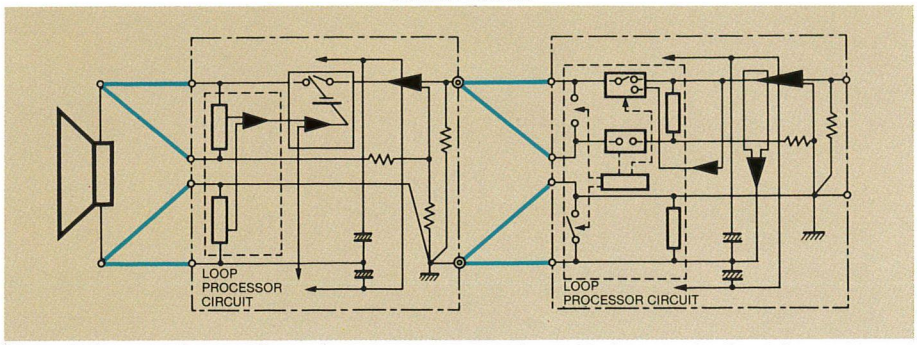
For the dedicated audiophile seeking perfection in sound reproduction, the ideal hi-fi setup includes separating the preamplifier's small-signal circuitry from the large-current using circuits of the power amplifier. Yet, in spite of all the recent improvements in amplifier performance, the perceptive listener is often left with the nagging feeling that the sound is still not at all as "total" as it should be by the time it emanates from the speakers.

Breaking away from conventional "tunnel vision" in amplifier design, Kenwood engineers intensively investigated this credibility gap between specification promises and actual results, to reach an amplifier design concept that takes into account every single stage of signal handling, including the link between the separate units, the power supply system, and even dynamic effects of the speakers themselves.

The L-08 Sigma Direct Drive Amplifier System thus actually achieves what must become the primary objective in amplifier design—a stunning mirror-image of the purity of the original music signal all the way to speaker system.

# Sigma Drive: the brilliant new landmark on the rocky path toward perfection in sound reproduction

**SIGMA DRIVE**



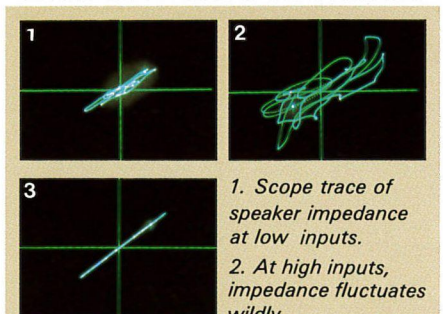

*Sigma Drive extends amplifier performance to speaker input. Σ shape is the Greek letter Sigma symbolizing "sum total".*

## Sigma Drive achieves the ultimate control over speaker behavior

Unlike the simple static dummy resistance loads set up at the test bench, the active speaker producing music signals represents a highly volatile and variable complex load with an impedance that can fluctuate wildly. But one of the more destructive effects, in terms of tonal quality, is a reactive voltage that is fed back from the speaker via the conventional speaker connecting cords, appearing as audible distortion that does not show up in ordinary distortion percentages. Kenwood engineers conducted tests which showed that when a high-energy signal is cut abruptly, the voice coil tends to continue to be active. This creates a counter-electromotive force which is not constant but varies according to the amplitude and duration of the signal. Such voltages are generated by the speaker's magnetic circuit, and exist simultaneously with themusic signals driving the speaker coil. In addition to this, there is even a kind of "crosstalk" generated when external sound waves (such as from another speaker) set up intermodulating sympathetic vibrations in the cone. In such conditions, it is clear that ordinary Damping Factor (measured with a simple 8-ohm dummy load) has little to do with the actual ability of the amplifier to control excessive speaker voice-coil movements. This is the background to Kenwood Sigma Drive, a circuit design that eliminates the back-emf voltages and leaves only pure, undistorted signals to be sent to the speaker.

New Hi-Speed circuitry extends the amplifier's negative feedback loop up to the speaker input terminals by means of NFB sensors that are part of the 4-cable layout. Through this radically superior application of negative-feedback, the L-08 amplifier system literally forces speakers to reproduce, to the best of their ability, exactly and only the music signals sent from the amplifier.

**SPEAKER IMPEDANCE FLUCTUATION**

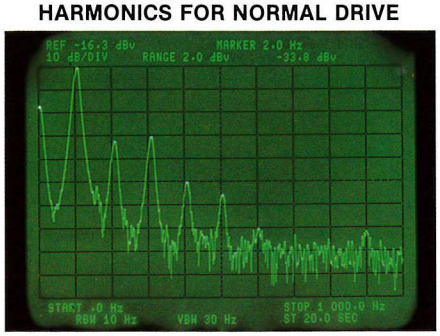



*1. Scope trace of speaker impedance at low inputs.*

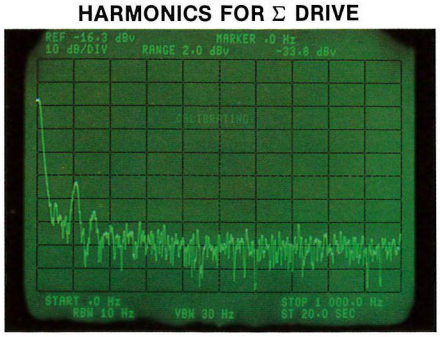
*2. At high inputs, impedance fluctuates wildly.*

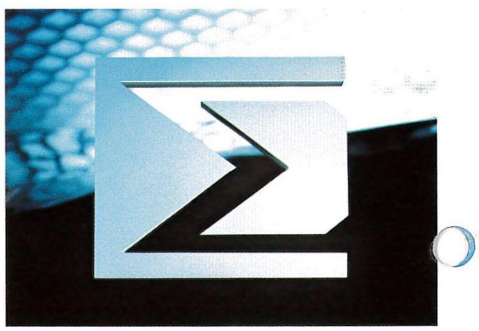
*3. Ideal impedance is constant at both low and high inputs, a state rarely achieved by speakers.*

**SPECTRUM ANALYSIS OF HARMONICS FOR NORMAL DRIVE**




**SPECTRUM ANALYSIS OF HARMONICS FOR Σ DRIVE**

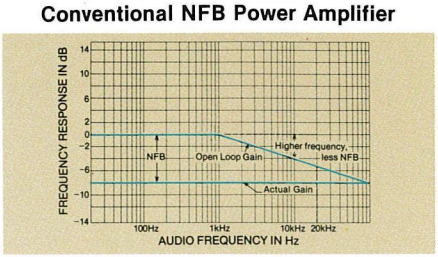


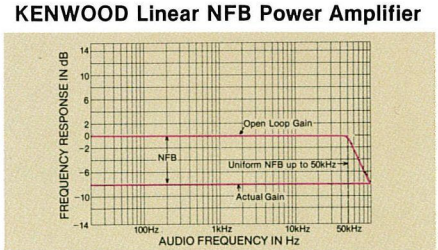
## Sigma Drive and new NFB technology: a 50-times increase in NFB effectiveness

Negative-feedback, or NFB, takes a portion of the output signal and feeds it back in reverse-phase to the input in order to reduce distortion. However, NFB is an extremely difficult technique to use because of its lack of effectiveness from the mid-frequency range upward. In the newly designed circuitry of the L-08M, Kenwood engineers have successfully applied advanced Hi-Speed techniques to provide a virtually flat open-loop gain extending far beyond the audible upper limit, to 50kHz. In other words, NFB effectiveness is increased 50 times.

**OPEN LOOP GAIN**
**Conventional NFB Power Amplifier**



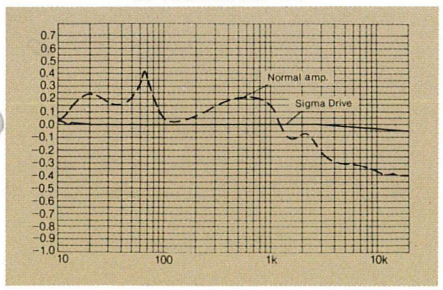

**KENWOOD Linear NFB Power Amplifier**



## Dynamic Damping Factor: a phenomenal 20,000 at L-08M output; over 15,000 at 1-meter cable end

To anyone accustomed to Damping Factor specified in the normal way (a typical example: 100 at 1kHz) the Damping Factor specified for the L-08M is almost unbelievable. Measured at the end of a 1-meter Sigma Drive speaker connecting cable, at a frequency of 55Hz (chosen here because it is close to a woofer's of) the Kenwood Dynamic Damping Factor is specified at over 15,000. Naturally, it will be less as the speaker cord length is increased, but it will still be far greater than any conventional measurement for an equivalent length, and probably superior to any other conventional DF specified at the amplifier output. One of the main reasons for such excellent damping capability is the extremely low output impedance of the L-08M. Normal calculation of Damping Factor includes only the impedance of power amplifier circuitry. The Dynamic Damping Factor also includes impedances of the relay, coil and ground as well as that of the speaker cord itself. This therefore gives a more realistic view of damping ability and results in the superb working harmony that exists between the L-08M and the speaker system.

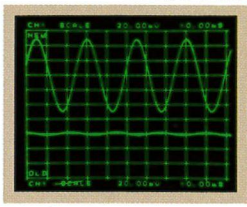
**FREQUENCY RESPONSE AT SPEAKER INPUT**




## New Sigma connection maintains purity of signal flow between pre- and power amplifiers

Sigma Drive is the first system of its kind that is capable of exercising complete control over the "maverick" load represented by the speaker system. But there's more to Sigma Drive than this. Kenwood engineers also took a close look at what goes on at the input side of the power amplifier and discovered that dynamic distortion also occurs in the connection between preamplifier and power amplifier. The separate amplifier system is one that offers improved tonal quality by separating the small-signal from the large-signal stages. Isolating right and left channel grounding to prevent crosstalk is another advantage. But Kenwood engineers have found that the connection between pre- and power amps is a major weak link. The oscilloscope revealed a surprising degree of distortion that is created by the common ground loop between the two units. Naturally, it had been assumed that only signal voltages were active in this area. In fact, as Kenwood tests showed, voltage variations in the primary transformer that supplies the power amplifier can influence the corresponding primary winding for the preamplifier. This results in a voltage difference between the two ground cables, leading to a feedback of distortion via their common ground loop.

**ABSORPTION OF AC CURRENT FROM POWER AMP**

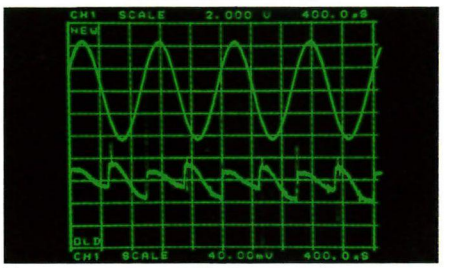


*Upper trace: conventional amplifier.*

*Lower trace: L-08C with power absorption circuit.*

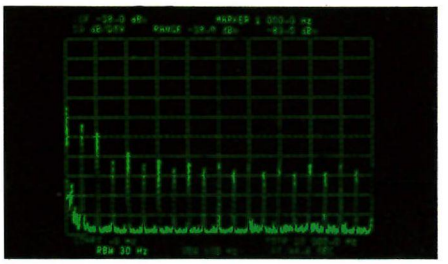
The reason is that transformer windings have capacitance that electrostatically couples primary and secondary windings, affecting especially the high frequency range. This loop functions in just the same way as if there were an AC lead between the primaries of the pre- and power amps. But that's not all. In a normal situation where an ordinary household AC outlet has extensive internal wiring behind it, impedance can be high. Thus, whenever the amplifier is called upon to deliver a high-energy signal, a sudden drop in voltage can occur, resulting in variations in the secondary voltages. In this way, a loop is created between the power amp and preamp transformers. Such spurious voltages are amplified via the ground loop and account for much of the distortion that listeners have described as "uneven" or "grid-like". Kenwood engineers therefore developed a Sigma connection to form a bypass exclusively for the power supplies and to absorb the mutual interference between power supply transformer windings. This leaves the actual music signal routing intact. The Sigma connection thus satisfies the basic requirement for the separate amplifier system. It provides a connection that is free of ground loop voltages and sends only pure, distortion-free signals to be amplified.

**ANALYSIS OF COMMON GROUND LOOP WAVEFORM**



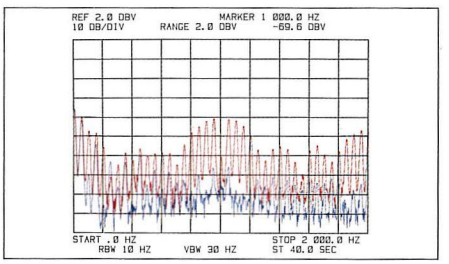
*Upper trace: pure 1kHz sine wave. Lower trace: distorted waveform, distortion ratio 0.1% for normal connection. Sigma connection distortion ratio is less than 0.0007%.*

**SPECTRUM ANALYSIS OF GROUND LOOP CURRENT WAVEFORM**

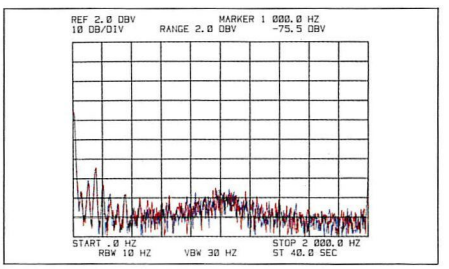


*Conventional connection.*

**HIGHER HARMONIC DISTORTION FROM MUTUAL INTERFERENCE CONVENTIONAL VS SIGMA CONNECTION**




*Red: 8 ohms at 100W (L-08M conventional connection)*
*Blue: 8 ohms at zero power*




*Red: 8 ohms at 100W (L-08M Sigma connection)*
*Blue: 8 ohms at zero power*

# L-08C

**The quiet simplicity of the L-08C front panel conceals some of the most sophisticated preamplifier design concepts known today.**

**•Sigma connection to L-08M •New Hi-Speed design**
**•Integration of power supply and current-absorption circuitry**
**•MM S/N ratio 90dB (2.5mV) at 0.0007% distortion**
**•4-parallel differential DC low-noise MC head amplifier**
**•Restrained, functional front panel with volume Fader**
**•Loudness control with variable frequency turnover**
**•Non-Magnetic structure**

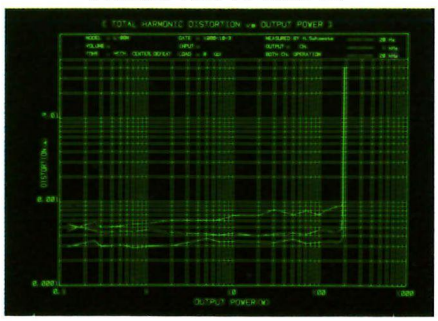
## Sigma connection sends pure signals to the power amplifier

The L-08C is probably the first separate preamplifier design in the world that fully takes into account influences from the power amplifier. Kenwood engineers have developed their brilliantly conceived Sigma Drive concept to provide a similar Sigma connection between the output terminals of the L-08C and the input terminals of the L-08M. The results are dramatic. Distortion deriving from the power supply side, often regarded as inevitable, is reduced to the extent that hard-won preamplifier performance is now maintained at the power amplifier input. The method of ensuring this pure signal transfer is not simply by means of a 4-line connection. It involves many of the radical new circuits developed by Kenwood engineers, such as New Hi-Speed and Non-Magnetic design. But one new preamp circuit concept does play a key role in this new achievement: the elimination of the problem-causing constant-voltage state in the power supply through the incorporation of a multi-power supply system. This provides independent, interference-free processing of signals at each amplifier stage.

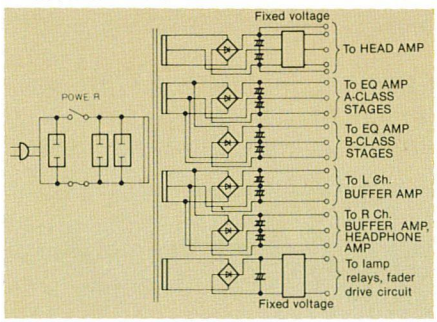
## New multiple-power supply system virtually eliminates problem of interference

In conventional power supply design, a constant-voltage source is used in order to obtain a constant-voltage output. This design has always been known to be responsible for degraded sound quality, which expert listeners often say tends to be "flat" or "two-dimensional." The problem lies in the fact that the constant-voltage power supply system incorporates negative feedback and therefore suffers from similar problems as an NFB power amplifier. The Kenwood solution to this problem once again points up the benefits of dynamic-oriented research aims. The constant-voltage state is eliminated altogether from the L-08C layout. In its place is a new multiple power supply system that feeds each amplifier independently. This discrete power supply system provides a rectifier circuit and separate transformer winding for each amplifier. Flat-response amplifiers have independent left and right channel supplies while the MM equalizer amplifier is provided with its own twin power supply system. Both flat and MM equalizer amplifiers utilize the newly developed power supply current-absorbing circuit and are therefore totally free of influences from AC currents via the hot or ground loop circuit. Since the power source and ground circuits remain static at any signal level and these circuits have an impedance equivalent to zero, the need for a constant-voltage power supply and ground bus line is eliminated. Thus, independent handling of signals at each amplifier stage, plus the new power supply current-absorbing circuit, ensures the transfer of pure, interference-free signals between stages.

**PHONO THD vs OUTPUT**



**MULTIPLE POWER SUPPLY SYSTEM**



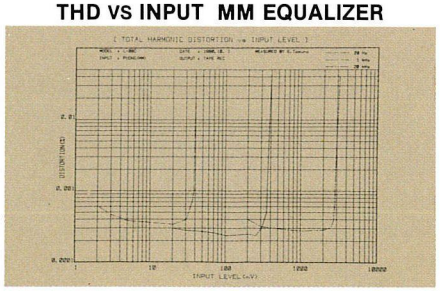

## New Hi-Speed design eliminates problem of TIM distortion

As with the L-08M, the L-08C preamplifier incorporates the Kenwood New Hi-Speed design that extends the flat open loop gain into frequencies far beyond human hearing. Since the internal impedance and negative-feedback amount are constant throughout this range, TIM and other distortion is virtually absent and transient response is superb. The buffer "flat-response" amplifier utilizes a new low thermal drift, single-chip, dual-FET arrangement in a two-stage differential plus differential SEPP output, DC-coupled configuration that is totally free of any influences from the power supply. The design totally rejects power supply-to-ground AC currents and impedance is effectively zero.

## Differential MM equalizer reproduces purist-quality phono sound

In the design of the L-08C, Kenwood engineers have given top priority to the needs of the demanding record listener. For one proof, the conventional specs indicate top-quality sound (i.e. 90dB S/N ratio for 2.5mV input at 0.0007% total harmonic distortion). But the audiophile should also take note of the sophisticated DC amplifier configuration that produces such performance. The 3-stage differential circuit incorporates a high-gain FET input for low noise, while the new power supply current-absorbing circuit frees the amplifier from any power supply/ground loop effects.

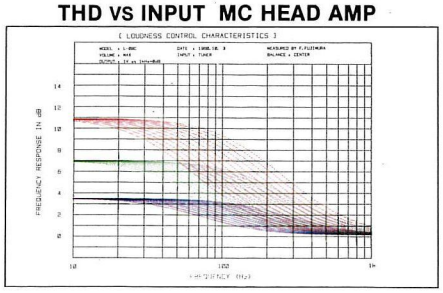
**THD VS INPUT MM EQUALIZER**




## New differential MC head amplifier for the ultimate in reproduced record sound

If a Moving Coil cartridge represents the ultimate in record pick-up quality, the MC head amp design incorporated in the L-08C will allow it to create its finest sound. The 4-parallel differential design utilizes 8 ultra-low-noise input transistors to obtain a S/N ratio of 70dB at 100$\mu$V input sensitivity. Translated into more actual-use terms, for a 200$\mu$V input, 77dB is achieved. Distortion is a minimal 0.0007%, thanks to a two-stage differential output stage.

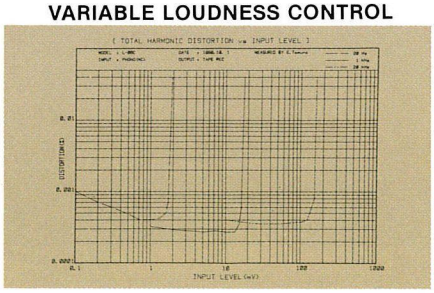
**THD VS INPUT MC HEAD AMP**




## Highly effective Loudness control has continuously variable frequency turnover

When listening at low volume levels, many audiophiles have individual preferences for acceptable levels of low frequency tonal adjustment. Speaker systems and room acoustics are also unknown variables that influence the effectiveness of conventional loudness controls. For this reason, Kenwood engineers have provided the L-08C with continuously variable loudness contouring that covers the entire low frequency range. Cut-off frequencies can be varied in the range from 100Hz down to 30Hz at three levels of 3dB, 6dB and 9dB. This provides sensitive control through the combination of frequency and sound level.

**VARIABLE LOUDNESS CONTROL**




## Elegant panel design with new input selector display and unique volume Fader touch-key

Kenwood innovations are not restricted to circuitry alone, as the beautifully refined front panel of the L-08C shows. This simple, appealing design clearly reflects the needs of today's discriminating audiophile. All seldom-used controls are concealed behind a touch-operated panel that slides inside the cabinet when opened. Externally, the viewer sees only the power touch-key with its LED indicator, two input selector touch keys side-by-side, an inset dark panel that illuminates in letters the input selected, and the rectangular Fader touch-key with its accompanying Preset Level slider beneath. The volume Fader is one more well-conceived Kenwood innovation whose usefulness will be obvious time and again. It mutes the volume naturally to zero in one second, taking the same time to revert to the preset volume level when re-pressed. When activated, the word FADER appears in the adjacent indicator panel. When deactivated, the Fader control is removed from the signal flow in the interests of signal purity.

## More highlights of the L-08C

- **Headphones** use newly developed operational amplifier for direct-coupled drive.
- **Subsonic filter**
- **REC OFF** input selector position allows unrestricted access to the other program sources while recording or dubbing.
  At the OFF position, any impedance presented by unused sources such as a tape deck is eliminated from the amplifier's circuitry.
- **Two selector inputs each for MM, MC cartridges**
- **Input impedance selectable at 30k, 47k and 100k ohms for MM cartridge**

# L-08M

**The L-08M single-channel, Sigma Direct Drive amplifier. State-of-the-art design forces speakers to follow the signal faithfully.**

- **Direct Drive design with Sigma Drive to speakers**
- **New Hi-Speed circuitry with increased NFB range**
- **Rise Time 0.6μsec, Slew Rate ± 200V/μsec**
- **Non-Magnetic structure**
- **Flexible amplifier location**

## The Direct Drive amplifier with Sigma Drive creates a unified amplifier-speaker relationship

The L-08M is a single-channel power amplifier that "directly drives" the speaker to which it is connected. The concept of Direct Drive is based on the accepted theory that the shorter the speaker connecting cord, the better the sound quality. In the original Kenwood Direct Drive amplifier system, an excellent amplifier-speaker relationship was obtained through locating each single-channel amplifier a meter away from its speaker. However, the New Hi-Speed amplifier with Sigma Drive functions as a direct-drive amplifier in the same way, even when the L-08M is located at some distance from the speaker. As Kenwood data shows, the L-08M provides outstanding performance relative to any other amplifier setup. For example, Damping Factor at the end of the 3-meter Sigma cords is still 15,000, while even at 10-meters it is over 20,000, which is more than 100 times better than most other amplifier DFs measured at the amplifier output terminals. Moreover, such is the innate superiority of the L-08M's circuitry that even without using the Sigma cords and substituting conventional speaker cords instead (the L-08M can still be used as a "normal" amplifier), the tonal quality has a clear edge over others, as a comparative listening test will prove.

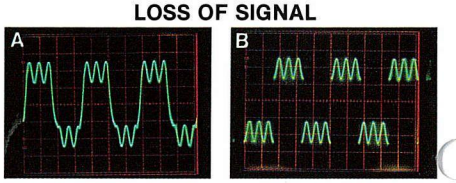
## The Sigma Drive connection

A single Sigma cord connects the positive side of the speaker to the feedback point of the L-08M. This circuit system therefore controls the various kinds of distortion at the speaker input terminal. In addition, the ground and the power supply loop are separated on the negative side in order to neutralize the potential voltage difference between the speaker input terminal and ground. With this connection, distortion from the speaker is reduced at its source before it can enter the music signal flow.

## New Hi-Speed technology creates a new order of sound reproduction quality

The Sigma Drive system consists of many circuit techniques that are closely related, the most important of these being the Hi-Speed power circuit first developed by Kenwood engineers. Hi-Speed it the result of research into sources of dynamic distortion such as transient intermodulation distortion (TIM), a form of audible harmonic distortion originating well above the audible frequency ceiling. A principal cause of TIM is an amplifier that is unable to respond fast enough to the transient dictates of complex, high-energy music signals. An amplifier's "top-speed," or maximum voltage rate of change, is its slew rate, and a limit to slew-rate inhibits the supply of power required, causing TIM. One result is that the "small-signal" musical information that is embedded in the larger, complex signal can fail to appear. For this reason, the high Slew Rate and fast Rise Time designed into the L-08M are important: they clearly indicate superb transient response and the elimination of TIM as a source of audible sound degradation.

**LOSS OF SIGNAL**



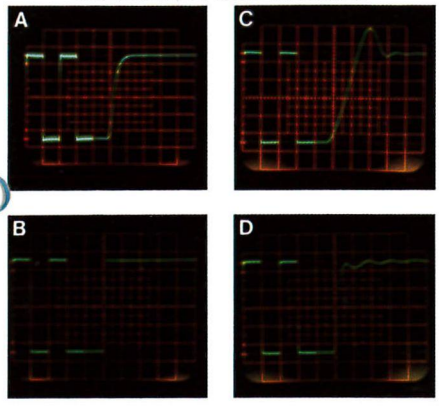

*A: Loss of signal through "slow" amplifier response B: L-08M Hi-Speed response*

## New Hi-Speed design with extended NFB range

The Kenwood New Hi-Speed design goes far beyond the elimination of TIM. It is closely linked to the operating range and effectiveness of the NFB loop, as outlined earlier. It therefore has a lot to do with Damping Factor. In the past, it has been difficult to apply NFB uniformly across the frequency range on account of its inherent oscillation and time-lag characteristics at high frequencies. For this reason, conventional amplifier design usually shows reduced open-loop gain from mid-frequency up, resulting in increased high frequency distortion such as TIM and "overshoot" and "ringing" of output square wave forms (even in amplifiers supposedly with high slew rates) as well as switching and cross-over distortion. Various methods have been devised to overcome these demerits, but the effective design that does not add to circuit complexity (which can lead to further distortion problems) is Kenwood New Hi-Speed. The New Hi-Speed L-08M incorporates an advanced type. vertically symmetrical power circuit consisting of a single-chip dual-FET source-follower input together with single-chip. dual-transistor. differential-input/cascade-output second stage. This design provides the symmetry and outstanding thermal stability that results in a totally flat open-loop gain into the ultra-high frequency range.

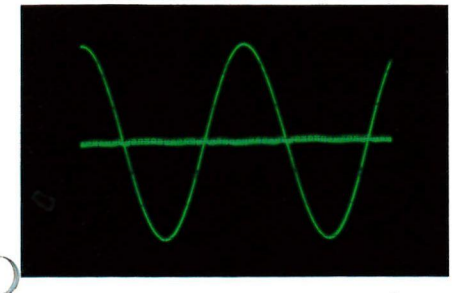
with uniform NFB applied throughout the entire range.

**OVERSHOOT AND RINGING**

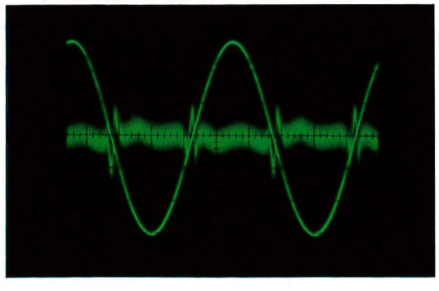



*A: Square wave input B: L-08M Hi-Speed response C: Overshoot D: Ringing*

**ZERO-SWITCHING WAVEFORM: L-08M NEW HI-SPEED DESIGN**



**WAVEFORM DISTORTION: CONVENTIONAL CLASS-B DESIGN**



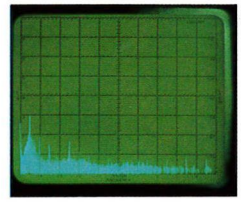
## Equipotential input-output grounding of Sigma Drive

In conventional amplifier design, the ground point of the NFB loop that controls output is used as the input ground. However, as Kenwood engineers have shown, this forms a voltage loop between output and input ground points, resulting in severe deterioration of performance. Since Sigma Drive applies negative-feedback directly from the speaker input terminals to both hot and ground sides, virtually no current flows between output and input ground, impedance remains low and the superb performance of the L-08M is preserved for the benefit of the listener.

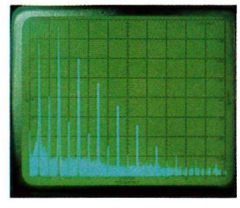
## Non-magnetic structure eliminates further form of distortion

In another area, Kenwood engineers have exposed the presence of magnetic distortion previously buried among overall levels of distortion. In dynamic tests, the oscilloscope showed that magnetic distortion accounts for a great amount of the poor reproduction quality and lack of musical definition perceived by audiophiles. Magnetic distortion results when an electrical loop temporarily activates nearby magnetic materials. Such residual magnetism from previous high-energy signals affects the currently flowing signal, creating odd-order harmonic distortion that is especially unpleasant to the ear. The extraordinarily clean sound reproduced by the L-08M can be partly explained by its non-magnetic structure, including the use of non-magnetic parts and materials at strategic points throughout. One example: the entire frame of the L-08M is made of diecast aluminum.

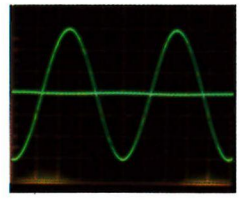
**MAGNETIC DISTORTION**



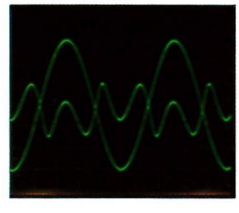
*Spectrum analysis of harmonic distortion, non-magnetic amplifier.*



*Spectrum analysis of harmonic distortion, conventional amplifier.*



*Distortion in print circuit board: non-magnetic chassis.*



*Distortion in same PCB: conventional chassis.*

## Class A pre-driver stage with isolated transformer and power supply

The power supply for the main amplifier where large currents are required, and the power source for voltage amplifying stages requiring constant low-current operation are separated from the transformer. This prevents mutual interference occurring between power and voltage amplifying stages via the power supply system. In addition, the L-08M design electrically isolates the potentially magnetic power transformer from the power supply system to produce no more degrading influence than a physically separated transformer would.

# SPECIFICATIONS

## L-08C

**PERFORMANCE**

| | |
|---|---|
| Input Sensitivity/Impedance/Signal to Noise Ratio (IHF A Curve) | |
| Phono 1 (for MM use) | 2.5mV/33-47 100k ohms/90dB |
| Phono 2 (for MC use) | 0.1mV/100 ohms/70dB |
| Tuner*AUX | 150mV/25k ohms/106dB |
| Tape Play | 150mV/25k ohms/106dB |
| Maximum Input Voltage for Phono 1 | 320mV (RMS), total harmonic distortion 0.0007% at 1kHz |
| Maximum Input Voltage for Phono 2 | 14mV (RMS), total harmonic distortion 0.0007% at 1kHz |
| Frequency Response (RIAA Standard Curve) | |
| Phono 1&2 | ±0.2dB (20Hz–20kHz) |
| Tuner, AUX & Tape Play | DC–850kHz (+0dB, –3dB) |
| Subsonic Filter | 18Hz, 6dB/Octave |
| Transient Response Rise Time | |
| ±0.1V | 0.4μS |
| ±1.0V | 0.4μS |
| ±2.5V | 0.4μS |
| Total Harmonic Distortion | |
| Tuner, AUX & Tape Play | |
| 20Hz–20kHz | 0.0007% at 1V Output |
| 20Hz–20kHz | 0.0007% at 3V Output |
| 20Hz–20kHz | 0.0008% at 10V Output |
| 10Hz–100kHz | 0.0008% at 1V Output |
| Phono 1 (for MM use) | |
| 20Hz–20kHz | 0.0007% at 1V Output (VOLUME at –30dB) |
| Phono 2 (for MC use) | |
| 20Hz–20kHz | 0.0007% at 1V Output (VOLUME at –30dB) |
| Output Voltage & Impedance | 1V/less than 0.03 ohms with Sigma Drive<br>1V/less than 10 ohms without Sigma Drive |
| Maximum Output | 10V |
| Load Impedance | 50k ohms |
| Loudness Control | +3dB, +6dB, +9dB |
| (at VOLUME –30dB) | 30–100Hz, continuously variable |

**GENERAL**

| | |
|---|---|
| Power Requirement | 60Hz 120V (U.S.A. & Canada Model). Model sold elsewhere incorporates switch to accommodate 50/60Hz 110–120V/220–240V |
| Power Consumption | 4A |
| AC Outlet | 1 unswitched, 2 switched |
| Dimension (W×H×D) | 440×74×387mm (17-5/16"×2-15/16"×15-1/4") |
| Weight (Net) | 5.3kg (11.7 lbs) |
| (Gross) | 8.7kg (19.2 lbs) |

## L-08M

**PERFORMANCE**

Power Output

**170 watts minimum power, RMS at 8 ohms from 20Hz to 20kHz with no more than 0.003% total harmonic distortion.**

| | |
|---|---|
| Continuous Power | 170 watts 8 ohms at 1kHz<br>250 watts 4 ohms at 1kHz |
| Dynamic Power Output | 400 watts 4 ohms at 1kHz |
| Total Harmonic Distortion (20Hz–20kHz) | 0.003% at rated power output into 8 ohms<br>0.003% at 1/2 rated power into 8 ohms<br>0.001% at rated power into 8 ohms at 1kHz |
| Intermodulation Distortion (60Hz:7kHz=4:1) | 0.001% at rated power into 8 ohms<br>0.001% at 1 watt into 8 ohms |
| Transient Response | |
| Rise Time | 0.6μS |
| Slew Rate | ±200V/μsec. |
| Frequency Response | DC–600kHz +0, –3.0dB |
| Signal to Noise Ratio (IHF-A Curve) | 116dB |
| Damping Factor | 15,000 at 55Hz |
| Input Sensitivity/ Impedance | 1V/50k ohms |
| Speaker Impedance | Accept 4 ohms to 16 ohms |

**GENERAL**

| | |
|---|---|
| Power Requirement | 60Hz 120V (U.S.A. & Canada model). Model sold elsewhere incorporates switch to accommodate 50/60Hz 110–120V/220–240V |
| Power Consumption | 4.2A |
| AC Outlet | 1 unswitched |
| Dimensions (W×H×D) | 185×235×369mm (7-9/32"×9-1/4"×14-17/32") |
| Weight (Net) | 12.5kg (27.5 lbs) |
| (Gross) | 14.0kg (30.8 lbs) |

Kenwood follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.


A product of

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E318 8107007SA Printed in Japan