HANIWA

PhonoSystem

Here is the Complete LP Playback System
that revives the entire sound of music recorded on disks.

We re-designed all phono system components from the scratch,
to **precisely pick up *All Music Information* from the record groove**.

Please listen to incredible detail of music recorded on disks,
and reveal the delicate performance of each musician.

HANIWA Audio

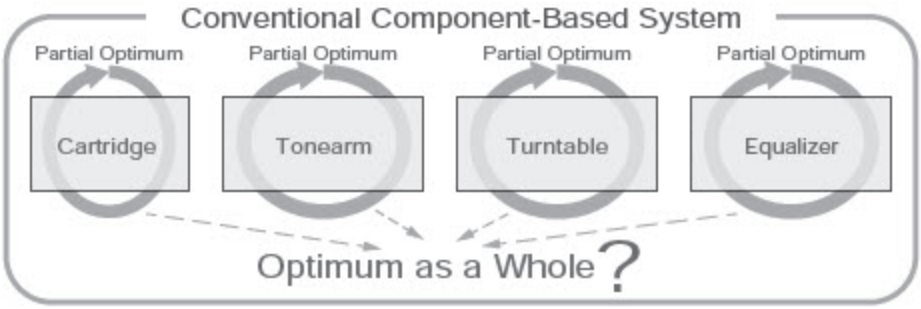
HANIWA PhonoSystem

Raising LP Music Up to Higher Summit

Haniwa challenge started with a simple question.

What is MUSIC ?

--- We wanted to pursue this as engineers.



Audio Systems are composed of components (voltage-based std.), made by various brands. "The comtemporary best" components are recommended by genre and taste.

Conventional PHONO SYSTEMs

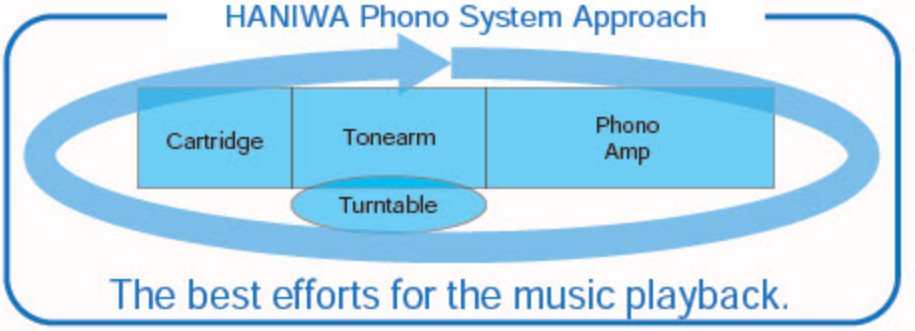
Point of discussion: Static audio analysis, mechanical precision, noise of LP playback, etc.

- Components and Systems are evaluated by their frequency response; the measurement is done using a simple sinusoidal sweep signal along the frequency.
- This frequency response is not sufficient to capture performance of reproduced MUSIC. The phase curve does not present sufficient information about the dynamic expression and timing of actual music performances.
- As for the LP pick-up mechanism, arguments are limited to mechanical precision and balance adustment.
- No arguments are presented about the detail and process of how the sound is picked up from the groove.

HANIWA Phonosystem is not just a collection of components, but it is a complete system for resurrecting the music.

Music is the art of sound that dynamically moving along time.
(timber, picth, strength, tempo, rythm, harmony, layout, etc.)
If this dynamizm is not appropriately played back,
the essense of music is lost.

HANIWA has a unique approach for the audio improvements. We summon up all the available (current and in near future) technologies for making the best phonosystem, free from the detail restrictions of piecewise standard rules.



What is HANIWA Audio? = Optimum Dynamic Response and Noize Reduction

Extreme reduction of cartridge impedance led to the idea of CURRENT LOOP CIRCUIT.

- MC cartridge works as a part of the consolidated CURRENT LOOP CIRCUIT. It is not one of the parts forming a total voltage circuit that is an accumulation of separate components connecgted as the voltage elements.
- The lower the cartridge impedance, the more loop current is generated; the output signal gets stronger and more stabilized.
- As the current in MC coil increases, the more significant magnetic force is generated and it works as the damper aginst the cantilever action. This widens the linear range of the output, assuring the less deformation at the higher output volume.

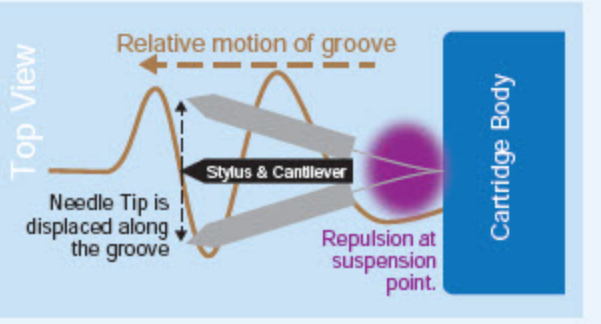
Most of "LP Noises" are mechanical and dynamic.

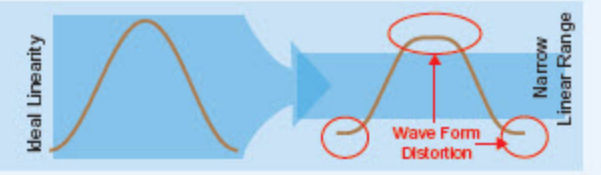
- HANIWA's playback mechanism absorbs the harmful vibration. The conventional mechanism with tight and precise structure cannot prevent the vibration that is the source of noises.

Physics of LP Playback

Close Observation of Cartridge Behavior

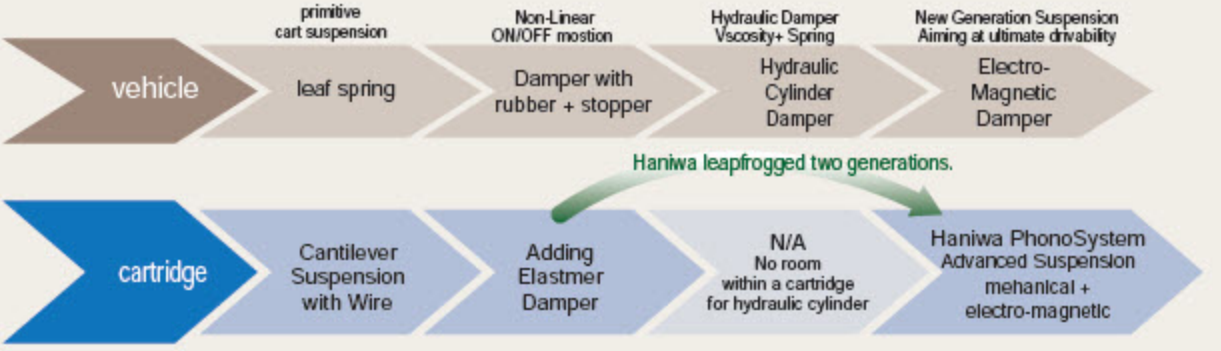
- Needle tip and Cantilever are fixed to the cartridge body with a wire-spring and elastomer buffer.
- As the needle tip moves along the groove shape (=sound wave form) the tip is moved by the groove, and that motion generates a reactive force in the suspension mechanism (elastic force).
- The elastic force is linear to the needle displacement within a limited range, but this range is rather narrow for most MC cartridges.
- Out of this narrow linear range, a repulsive force quickly gets stronger. So, when playbak volume increases, motion of the cantilever is blocked and playback sound is largely distorted.





Suspension Motion of a Cantilever

Analogy to Improvement of Vehicle Suspension Systems



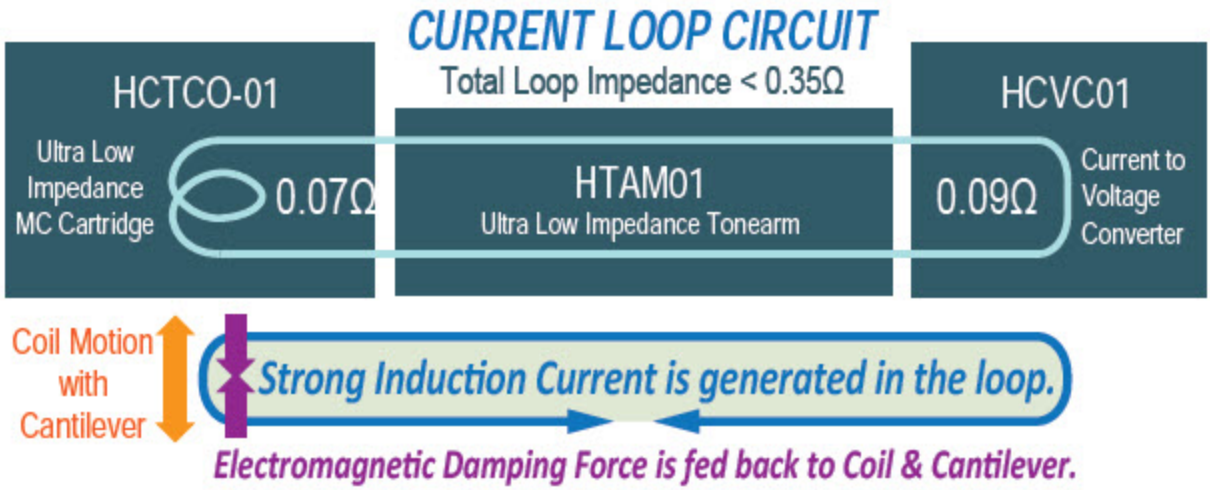
Most of the conventional MC cartridges are using a primitive mechanism of spring and rubber. The progress in automotive suspension technologies are out of their sight. They are not interested in the advanced suspension mechanism of automobile, such as four wheels are keeping contact with road surface to run with full traction against any rough road surfaces, while keeping the cabin in the stable and smooth attitude.

What is Electro/Magnetic Damping?

- HCTCO generates an electro-magnetic damping force, that is proportional to the speed, but is not directly related to displacement. Accordingly, it does not require mechanical braking, such as elastomers used in other cartridges used to avoid non-linear distortion of the music signal outside the linear range.
- This braking force is proportional to speed, meaning it is equivalent to viscous resistance.

Why an Ultra-Low Impedance Cartridge?

- Today, most cartridges are designed as ***Voltage Output Devices***, to be used as components compatible with other equipment standards as set by the audio equipment industry.
- Low impedance MC cartridges are known to have significant merits, such as capturing all detail of sound with high fidelity.
- However, the lower the impedance, the lower the output voltage, and more difficult it is to mitigate the risk of high sensitivity to noise.
- Haniwa made the decision to aim at the ***best PhonoSystem***, not being limited by existing standards.
- **Haniwa treats the MC cartridge as a part of a CURRENT LOOP circuit.** In the CURRENT LOOP circuit, a lower total loop impedance directly results in a stronger signal current in the LOOP.
- At the same time, strong current generated inside the MC induces strong electromagnetic force that is inversely proportional to the motion speed of cantilever. This force has the equivalent characteristics to viscosity that can be used to stabilize cantilever action.
- We have developed a new design of Current Output Cartridges, HCTCO. The first product, HCTCO-01 has an impedance less than 0.1Ω.



Results of Electro-mechanical Design

- A strong LOOP current creates an electromagnetic damping force that acts as viscosity. By combining this damping with a cantilever spring and an elastomer damper, ideal tracking of the groove is realized.
- With this ideal tracking mechanism, HANIWA provides a PhonoSystem with stable and precise groove tracking, even at very low Vertical Tracking Force (VTF) of less than 1.0g.

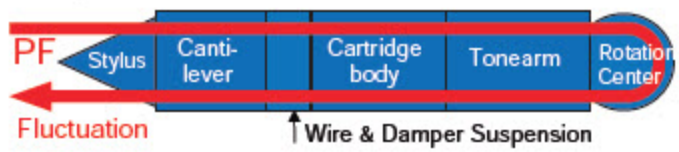
HANIWA Challenge:

Minimizing Dynamic Noise

- While tracing, the groove pulls the stylus tip with friction (PF: Pull Force) This PF is not constant, and changes dynamically according to the sound tone, volume, and groove surface conditions.
- The fluctuation of PF is a source of noise added to the music signal. No efficient way has been found to eliminate this noise, mostly because the sound pick-up mechanism is stiff, and neglects the dynamic nature of this PF fluctuation.
- HANIWA's tonearm is designed on a new concept of Flexible Mechanism, that can prevent this dynamic noise from propagating to the entire tonearm mechanism. The tonearm pivot mechanism is also re-designed to have high damping effect and a stable support of the cartridge.

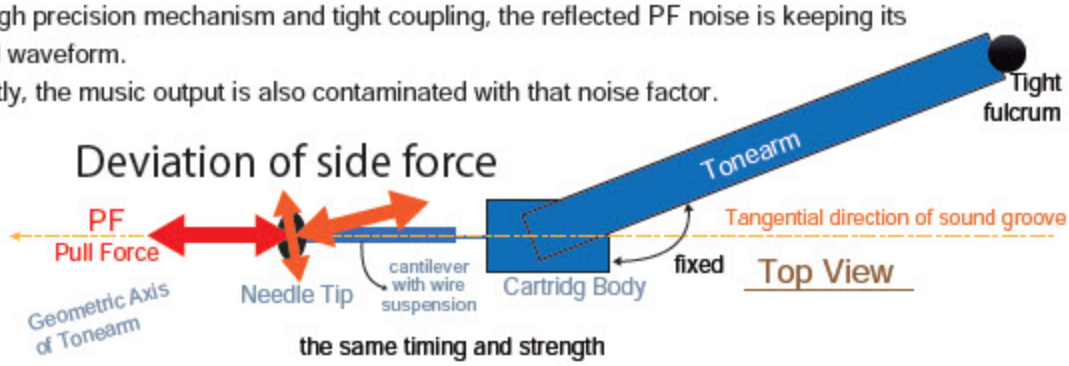
Conventional Tonearms : tight and precise link mechanism

The entire mechanism is tightly set up for PRECISION. A fluctuating PF directly travels to the rotation center, and reflects back to the needle without dissapating.



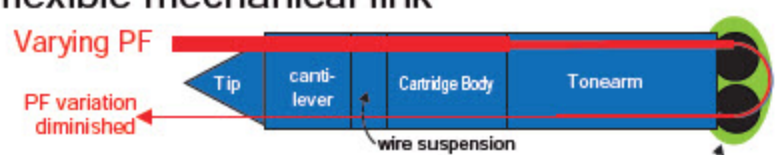
Conventional Precision Tonearm:

- The noise on PF runs to the tight fulcrum, and is reflected back with very small loss.
- Due to the high precision mechanism and tight coupling, the reflected PF noise is keeping its strength and waveform.
- Consequenctly, the music output is also contaminated with that noise factor.



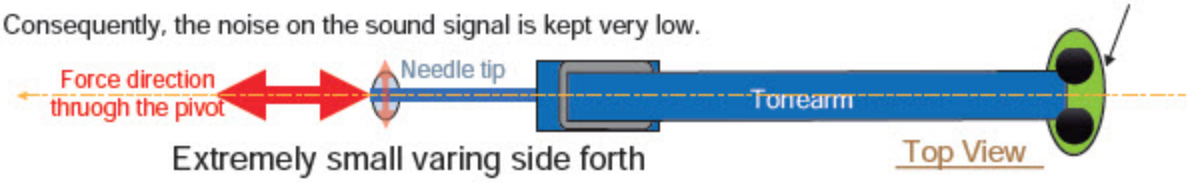
HTAM01 : Tonearm with flexible mechanical link

PF noise, when it is reflected back from the pivot, is greatly diminished through the flexible tonearm mechanism.



HTAM01: Straight Tonearm:

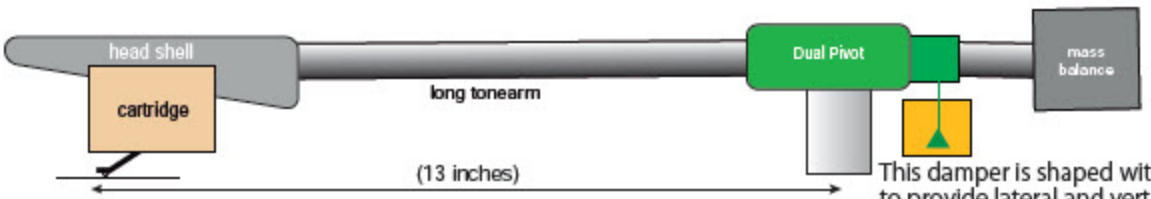
- The fluctuation of PF is diminished greatly through the round trip to the arm rotaion pivot.
- The pivot of this tonearm has special dual flexible structure, with effective damper.
- Consequently, the noise on the sound signal is kept very low.



Minimize Mechanical Noise

Sound is Dynamic.

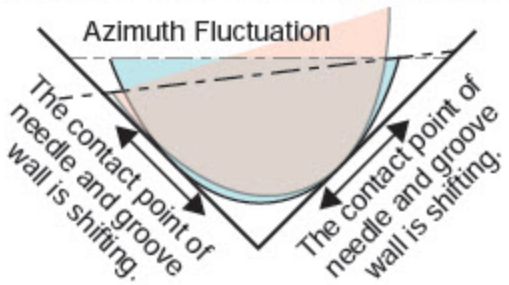
The cartridge body is carried smoothly as the groove is traced slowly from the outer edge to the inner most position, only once per playback. On the other hand, the needle tip has to follow all the changes of the groove shape, and dynamic changes occur from a few Hz to tens of kilo Hz.
HTAM01 is designed to keep the VTF at 0.6g±0.2g, so that it can retrieve the entire sound signal. This VTF is significantly lower when compared with ordinary tonearms.



This damper is shaped with a 3D printer to provide lateral and vertical damping from one mechanism.

- This tonearm has a low axial resonance frequency; lower than the audible range.
- As the vertical noise elements on L & R channels (with opposite phases) are made very small, the extremely low frequency sound that has been burried under the noise in the past is now played back as the ultra low bass sound.

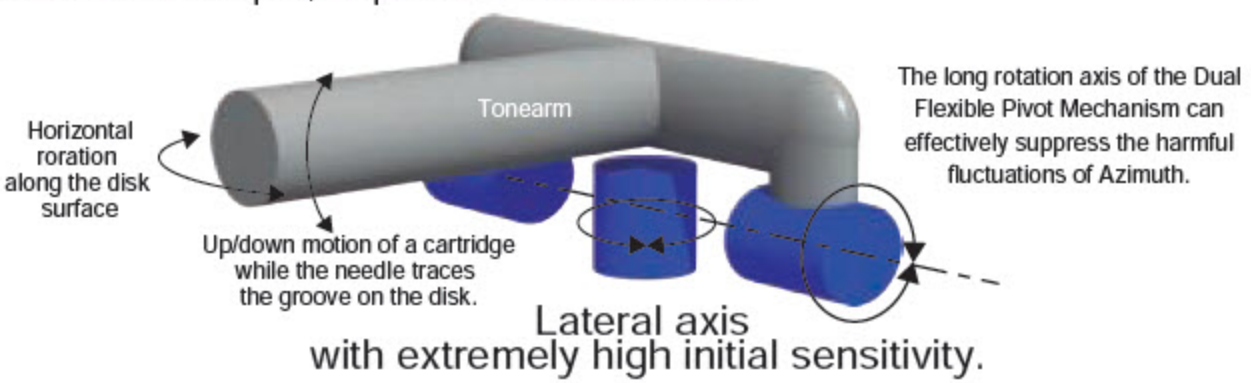
Surface Noise Reduction: Suppressing Azimuth Fluctuation



In most cases, Azimuth Adjustment is done only statically. However, this azimuth varies dynamically while the needle traces the groove. The fluctuation of Azimuth is equivalent to the contact point between the groove surface and the needle tip. This means that the force from the groove surface to the needle is fluctuates, causing noise that is not negligable.

Unique Dual Flexible Pivot Mechanism

- A special pivot mechanism is developed to minimize harmful fluctuations of Azymuth.
- This mechanism has an axial rotation, not a point rotation, pivot for the up/down motion of an arm, to minimize the Azymuth fluctuation.
- For each rotation of the pivot, dampers stabilize the rotation actions.



The long rotation axis of the Dual Flexible Pivot Mechanism can effectively suppress the harmful fluctuations of Azimuth.

Detailed Description of Tonearm Mechanism

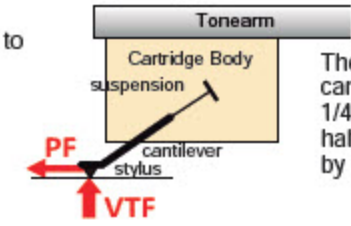
A closer look around the cartridge reveals that the needle and cantilever assembly is not fixed to the cartridge body, but is suspended from the fulcrum on the cartridge body by a steel wire suspemsion.

- a PF (Pull Force) is generated at the stylus tip, due to friction against the groove wall.

  PF = VTF x Friction Coefficient.

  For example, this force is as big as 0.1g for 1.5g of VTF

- A lower VTF directly results in lower noise.

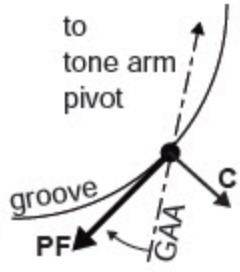


The up/down motion of cantilever is reduced by 1/4 when VTF is reduced by half, as the PF is also reduced by half.

- While tracing, the groove wall pushes back on the stylus tip, and it cancels the lateral force caused by PF.

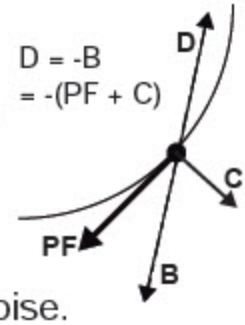
  C = PF x tan(GAA)
  (where GAA stands for Groove-Arm Angle)

- When C fluctuates, the cantilever shakes to cause noise.



- The force toward the tone arm pivot (D) works only in the direction of stylus tip to the tone arm pivot. It is the reverse of B that is a vector sum of PF + C, and B is directed toward the center of the Pivot.

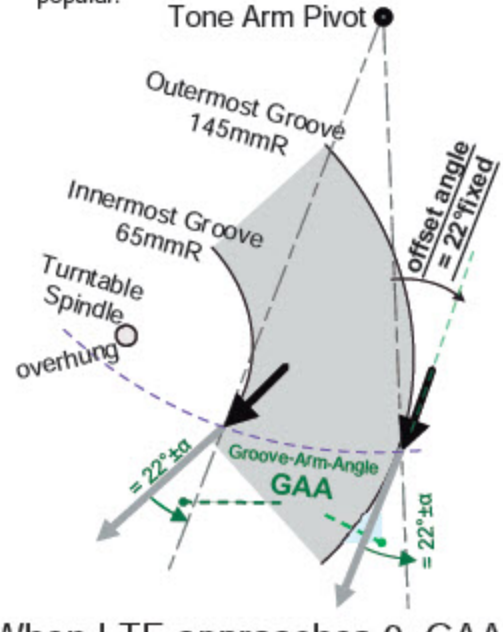
D = -B
= -(PF + C)



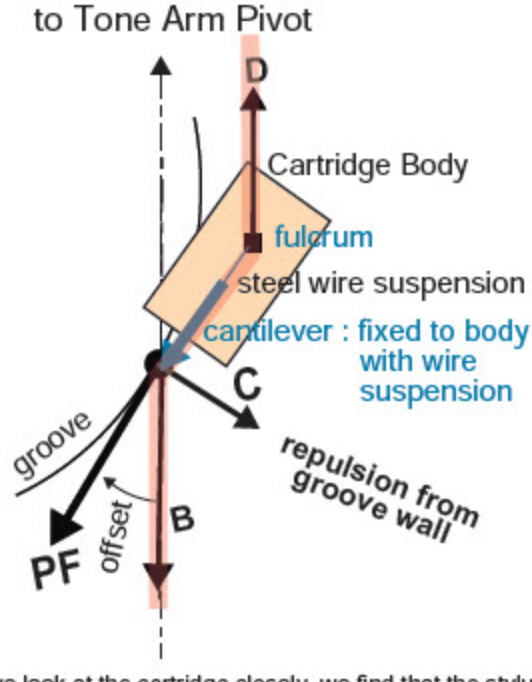
Reduction of VTF is a signifiant factor to reduce noise.

Offset ToneArm: A Fixed Large Offset Angle Causes Significant Noise

It was determined that the angle between the tangent direction of the groove and the direction to the tone arm pivot settles within a few degree of 22. So, designers thought it convenient to cancel LTE by fixing the cartridge on the tone arm tilted by 22 degrees.This is how offset tone arms became popular.



When LTE approaches 0, GAA is large, around 22 degrees. So, the fluctuation of C becomes larger.



If we look at the cartridge closely, we find that the stylus and the cantilever are not fixed to the cartridge body, but anchored to a fulcrum on the cartridge body with the steel wire suspension.

As shown above, this means that the fluctuation of PF finally turns to B, and because of the distance between the stylus tip and the fulcrum, B and D can not simply balance each other, but they twist or shake the cantilever, causing significant noise and distortion.

Reliable Wiring to realize a Current Loop Circuit

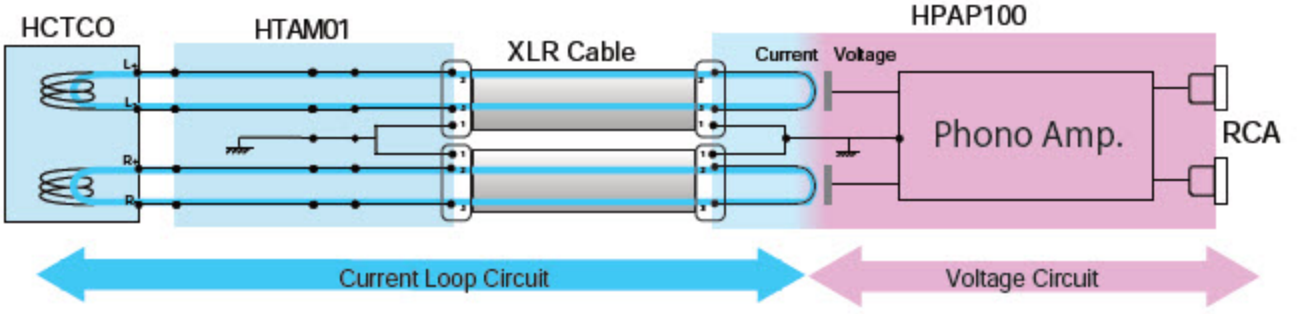
Generaly speaking, building a Current Circuit System demands special attention. This is the reason other brands avoid it for ordinary audio equipment. However, we chose it to realize the ultimate performance from an MC cartridge. We believed that it should exceed the limit of "voltage-based component audio" .

Our belief that "a current circuit system can realize the highest fidelity of LP playback." drives us toward the mission of presenting it to enthusiastic music lovers.

With that said, here we present the complete phono system set (= cartridge + Tonearm + Phono Amp.). This set is designed to provide a secure means to easily connect a Haniwa Phono System to widely used audio systems and securing them for stable operation. This Phono System Kit includes an ultra-lowe impedance cable set for assuring a reliable, high performance connection.

Please enjoy the refreshed sound of your favorite LPs, by adding this kit as a front end of your own audio system.

HANIWA Phono System: Connection Diagram



HANIWA PhonoSystem

HTAM01

HCTCO-01

HCTCO-01

Current Output MC Cartridge

Low impedance cartridges are appreciated for its high quality of sound, while it is also known for its low voltage output. Haniwa took a different approach to this problem by recognizing the MC cartridge as the current output device.

The lower impedance means the stronger current in the circuit, that assures the higher quality of the signal with lower noize ratio. HCTCO-01 also encourages the improvement of whole phono system.

- Its impedance is less than 0.1Ω; the world lowest.
- By using 3D CAD, the layout and structure design of the current generator part and housing part are optimized. The housing part is made of precise casting.

By this new manufacturing technology, the sound

Impedance	0.07Ω (DCR)
VTF (for HTAM01)	0.6 ± 0.2g for HTAM01
Weight	14.0g
Note	Current Output Cartridge

HTAM01

Tonearm with High Noise Immunity

This tonearm is designed as a component of CURRENT LOOP CIRCUIT, as well as the mechanical link structure covering from the cartridge through the turntable, with special consideration of reducing the internal impedance; such as the use of thick wire for the internal circuit.

As an element of the mechanical link, special care is taken to reduce the vibration that may be the source of noise. A unique mechanism, "Dual Flexible Pivot", is used for the tonearm pivot together with the anisotropic damper, to reduce harmful mechanical noise. This is based on our own tonearm design approach that is one step further than the conventional design based on the simple belief of "high precision only".

"Flexible with damping" is fundamental design

Impedance	DCR 0.12Ω (Total Circuit)
Output	Balanced with XLR

Precision machining of the rotor top surface

HTRT01

HPAP100

Phono Amp.

HAMP100 does not follow typlical conventional standards of MC cartridge input.
It was designed to realize best performance with current output cartridge HCTCO-01.
To accept current signal, the input impedance of HPAP100 is extremely low as 0.09 Ω
The current loop circuit is configured together with
HCTCO-01 + HTAM01 + XLR cables + input circuit of HPAP100.
The total impedance of this current loop circuit is lower than 0.4Ω(*)
(*) HCTCO-01(0.07Ω) + HTAM01 (0.12Ω) + XLR cable (0.06Ω) + HPAP100 (0.09Ω)=

Cartridge Type	Ultra Low Impedance MC Output impedance: <0.2Ω
Input	XLR Impedance : 0.09Ω (DCR) gain : 0 ~ -12dB

Output	RCA (max 300mV) RIAA dev. = +/- 0.5dB (10Hz - 40kHz) Mute: -20dB
Size (WHD)	426 x 94 x 405 mm
Weight	11kg

HTRT01

Turntable

This turntable is carefully designed and manufactured to minimize the source of vibration. The rotor is manufactured from the massive diecast of special Aluminum alloy that is dense and heavy and effective in damping harmful vibrations. This rotor is machined to a precise shape designed through practical experiments and objective of holding the disk stable with minimum distortion. Conventional simple geometry was not enough.

The top surface of our rotor does not have a simple geometric flat face, but is precisely machined to have the shape, determined through experiment and close mechanical analysis. With a massive center weight, LP disks is pressed on this shaped rotor surface without a gap. And the LP Disk and the rotor become a single virtually unified mass. This achieves an extraordinarily low noise level, unmatched by any previous design.

The HANIWA PhonoSystem Is Available in two configurations to add on to your own favorite audio system.

Please find how incredibly your entire LP music library is revived.

SET A : Standard Add-On PhonoSystem

HCTCO-01 + HTAM01 + HPAP100 + Cable Set

SET A provides a complete front-end ready to be add to your existing audio system. By using the provided cable set, it adds a unique Current Loop Circuit that works with your current turntable. No other product in the industry will resurrect your LP library with amazing quality of freshness.

Current Loop Circuit

SET B : Haniwa PhonoSystem (Full Set)

SET A + Turntable HTRT01 + Base Unit

The SET B is a complete PhonoSystem package, with Turntable and a Base Unit added to SET A. This set adds the complete HANIWA PhonoSystem to your own favorite Audio System.

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