HANIWA

HCTR-CO + HEQA03-CI

Current Output MC Cartridge ＋ Current Input Equalizer

HCTR-CO

This MC cartridge is designed
to work as an element of the Current Loop Circuit
formed with a tone arm and the input circuit of HEQA03-CI.
This picks up every detail of the music signal cut on LP disk,
but have never been retrieved up to now.

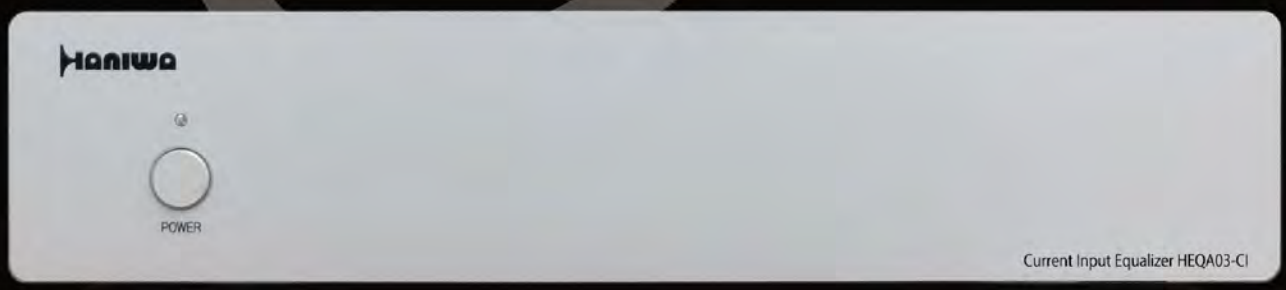
Ultra-low Impedance 0.2Ω

generates the strong current in the **Current Loop Circuit** formed by HCTR-CO and HEQA03-CI. This strong current provides the powerful Electro-Magnetic damping that stabilizes the needle motion, and it assures the precise and accurate tracing of the groove even at very low needle pressure.

Ultra-low Needle Pressure 0.5g

HEQA03-CI

The current output from HCTR-CO is recieved
with its extremely low impedance current input circuit.
After the input current is converted to the voltage signal,
its waveform is refined, and finaly the most precise RIAA decode is applied



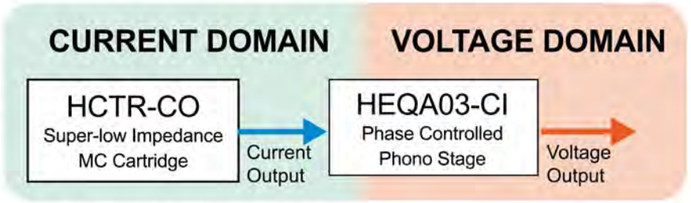
HANIWA Audio

Current Loop Circuit Concept & **Waveform Recovery Circuit** have re-defined the LP Playback System.

The MC cartridge has been recognized as the best device for picking up the delicate sound from LP records. It was also proven that the lower impedance of MC cartridge results in higher sound quality with more detail and dynamics of sound. To the contrary, it has also been revealed that the lower impedance means the lower output voltage.

Recently, several makers have also started targetting toward the sub-Ω. However, they still stick to the idea that MC cartridges output the voltage, but their output voltage is low as well. Several voltage-based symptomatic treatments for this problem are presented, but they are sacrificing the noise immunity, due to the request for the extremely high gain over 40dB.

To the contrary, HANIWA design clearly separates the Current and Voltage Domains, to focuss on the optimization targets in each domains. Based on this basic policy, HANIWA developed a unique MC cartridge HCTR-CO (Current Output) that was designed to output explicitly the current. At the same time, HANIWA also developed a phono stage HEQA03-CI with special current input circuit.

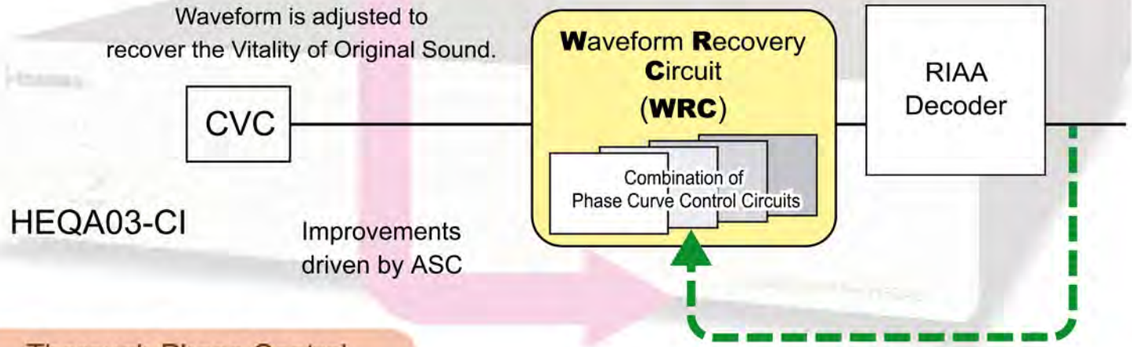


This phono stage bridges the CURRENT DOMAIN, where HANIWA's analog playback system belongs, and the VOLTAGE DOMAIN, where ordinary audio systems are working. Moreover, HEQA03-CI is equipped with a unique circuit that improves the blurred music signal to be as vivid as the LIVE SOUND IN NATURE.

ABSOLUTE SOUND CRITERIA (ASC)

Sound of Nature is the Absolute and Reliable Reference.

- Sound in nature is momentary, and is lost as soon as it is made.
- ***Sharpen the peaks, to recover the vitality and clear positioning of original sound.***



HCTR-CO

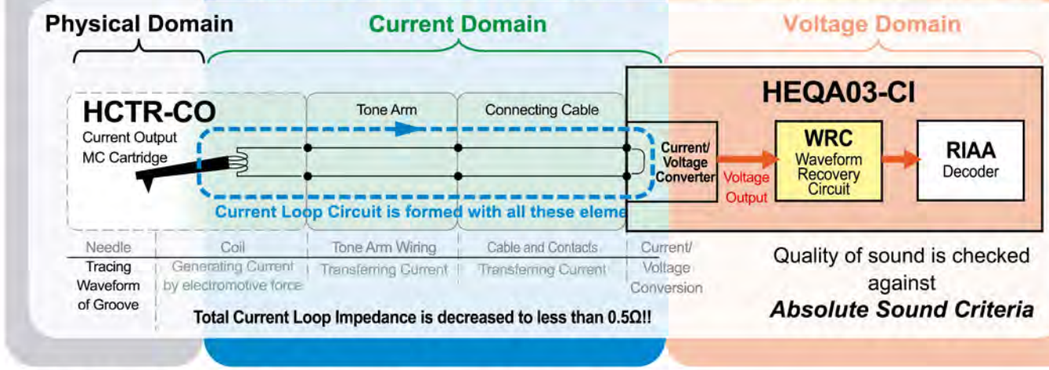
Current Output MC Cartridge

If the cartridge works in the Current Domain, the optimization policy is clear enough. The lower impedance of the cartridge directly means more current in the circuit, and consequently the signal quality gets higher with less noises. With this product concept, HCTR-CO has been developed to have the following features.

- It is the MC cartridge with the world ***lowest impedance of 0.2Ω.***
- The strong current in the current loop circuit generates ***the strong electro-magnetic braking that works as the damper*** that stablizes the cantilever vibration and significantly reduces the influence of remaining SELF-resonance. Accordingly, the tracking performance is improved, allowing the extremely ***low needle pressure of 0.5g***.

Current Loop Circuit consists of HCTR-CO, Tone Arm & HEQA03-CI

Thorough Phase Control is the key for the quality of sound.



CURRENT LOOP CIRCUIT maximizes the merit of Ultra-Low Impedance of HCTR-CO.

In the current domain, it is essential to minimize the impedance of all components in the current signal path that consists of a cartridge, the wiring inside tone arm, contact points of conectors, the cable, and the input circuit of HEQA03-CI. They form a Current Loop Circuit as a whole, and the current in this loop circuit is maximized by minimizing the total loop impedance.

- The maximized current in the Loop Circuit assures less noise and distortion, and higher accuracy.
- With HANIWA ThePlayer, the impedance of the whole Current Loop Circuit becomes as follows.
  0.2Ω (cartridge)+ 0.09Ω (Tone Arm) + 0.02Ω (connector and wiring) + 0.09Ω (input impedance of HEQA03-CI) = 0.40Ω !
- This extremely low loop impedance transferrs the music signal almost loss-less, and with the highest accuracy.

Effect of Waveform Recovery Circuit (WRC)

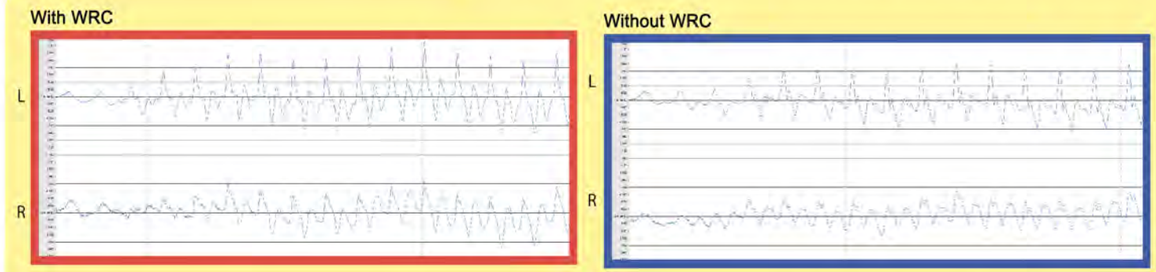
"With WRC" vs "Without WRC : Comparison by Actual Measurement

Sound Source "Art Pepper meets The Rhythm Section"

The two graphs below show the output signal waveforms of "Art Pepper meets The Rhythm Section", under the same controlled setup. The only difference is with or without WRC. On the left is **with WRC**, while on the right is without **WRC**.

With WRC, the peaks are higher and sharper, and they are outstanding in the sound waveform, meaning the sound of sax is more vivid, dynamic and REAL.

By playing back the music with the significant waveform features of each of right and left chennels preserved, including the correct timing relations, the spatial recognition in the brain is clarified and stabilized. Consequently, the live performances are reproduced with reality and the atomosphere of the stage.



New Current Loop Circuit concept is realized in the form of HCTR-CO (Current Output MC Cartridge) and HEQA03-CI (Current Input Phono Stage), and they work together for you to pick up the untapped charm of your cherished LP disks and to listen to them in full, with your own systems.

HANIWA HCTR-CO + HEQA03-CI

Current output MC Cartridge HCTR-CO + Current Input Phono Stage HEQA03-CI

Most of MC cartridges in the market are designed to output voltage. They have high impedanse and inductance to obtain higher voltage output. However, voltage oriented design is destined to the larger output waveform distortion, and higher noise. So, in out ealy stage of development, we decided to decrease the impedance to the limit. As a result, we accomplished the low impedance of 0.2Ω, which is extremely low among other commercially available MC cartridegs.

In order to draw out the best performance from this unique cartridge, it needs a phono stage having equally extreme performances. Natural choice for this unique cartridge, is **Current Input Circuit** that forms a **Current Loop Circuit** together withthe Current Output type Cartridge. In order to maket the Current Loop Circuit work, all the wirings that connect the cartridge and the phono stage should also be low impedance. Concequently, we accomplished the total impedance of lower than 0.5Ω.

There is another big problem to be solved about the Phono Stage. That is, the RIAA decoding focuses only on the amplitude-frequency characteristics, and the phase-frequency characteristics are ignored. If the phase characteristics are ignored, the signal waveform is distorted significantly. This is a fatal defect for the music playback where the complex waveform and its transition should be reproduced for gaining REALITY.

Furthermore, the signal gained by the cartridge has different waveform from the sound of original music performance. The recorded waveform is cut on the disk as wave shape, but the output of MC cartridge is not the sound waveform itself, but it is proportional to the motion of the cartridge needle. That is, it is proportional to the derivative of the original sound waveform. HEQA03-CI has a special circuit named WAVEFORM RECOVERY CIRCUIT, which is placed at right before the RIAA decoder.

As the integration of all above, HANIWA's record playback technologies have been improved drastically.

Specifications

HCTR-CO

Impedance	0.2Ω (at 1kHz)
Inductance	0.1μH (at 1kHz)
Needle Material	Pure Diamond
Needle Shape	Linear Contact 3μm x 30μm
Cantilever	Boron 0.3mmΦ
Recommended Needle pressure	0.8g - 1.2g (for general use) 0.5g - 0.8g (for Haniwa "ThePlayer")
Compliance	2.4 x 10^{-5} cm/dyne (@ Needle Pressure 0.8g)
Weight	8.5g

HCTR-CO

HEQA03-CI

Input	Balance 1ch
Input Impedance	0.09Ω
Output	RCA 1ch (max 500mV)
Phase Deviation	Less than ±1° (20Hz-20kHz)
Waveform Recovery Circuit	Recover the waveform grooved on LP.
Size (WHD)	316 x 75 x 370 mm
Weight	5.5kg

HEQA03-CI (Rear View)

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