

BALANCE

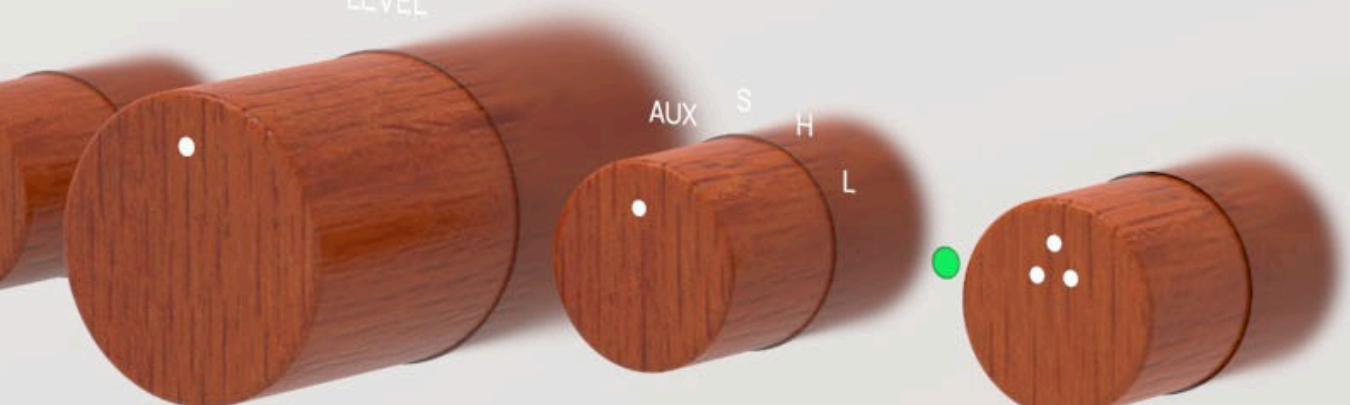
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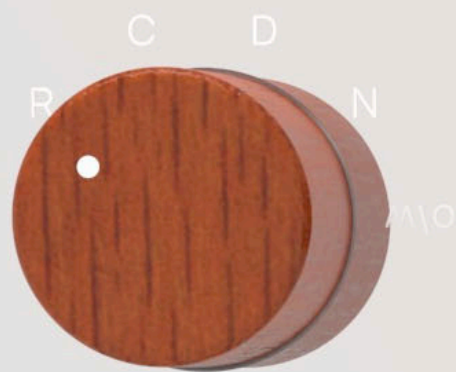
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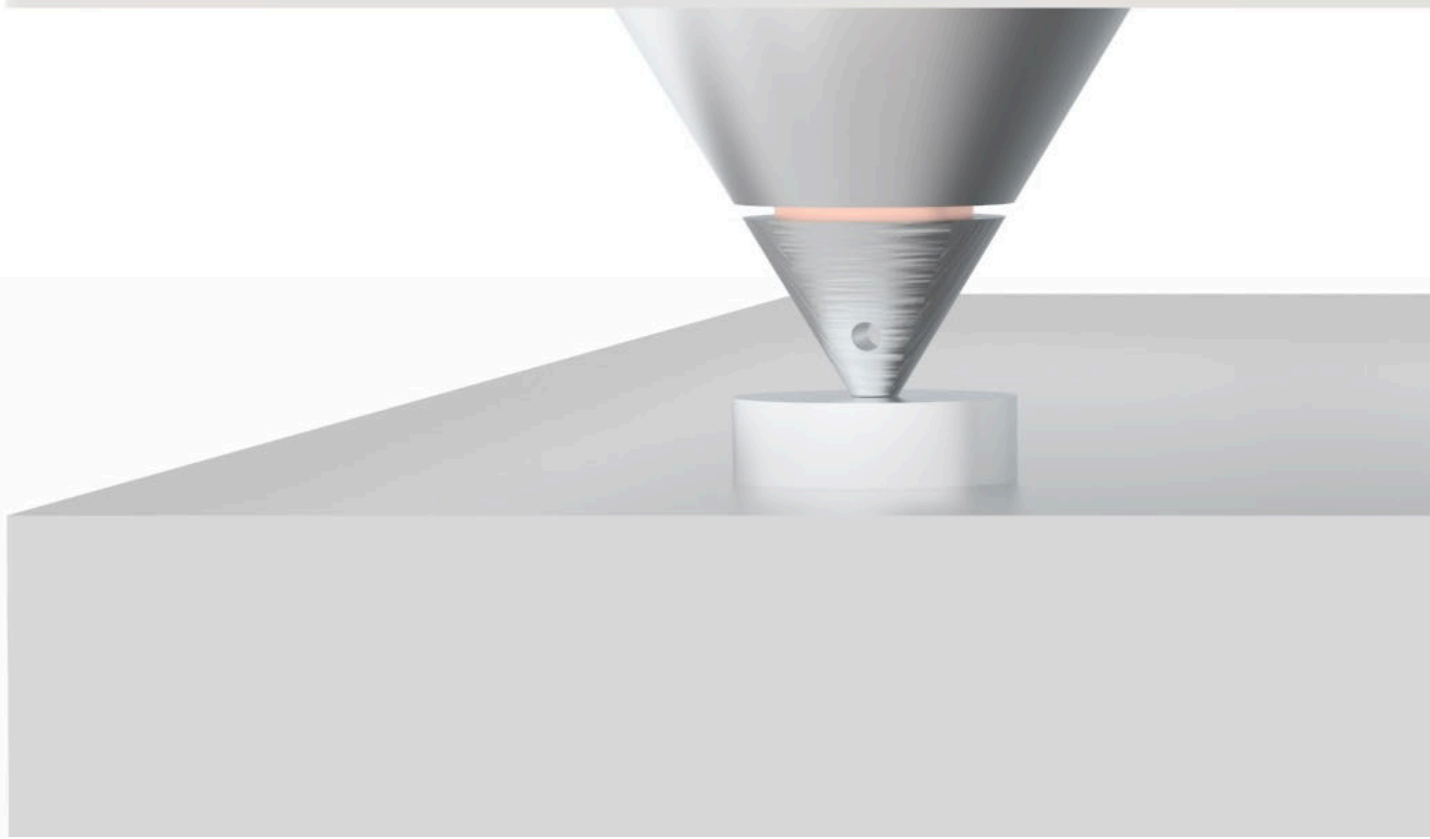
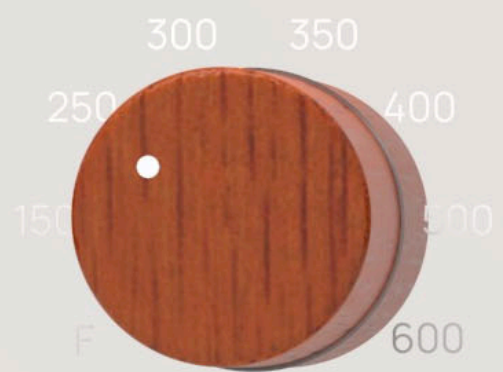
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# TURN-OVER



With  
BASS-SHELF









## Phono Equalizer Preamplifier

# R1 reference



Newly developed "Current Transfer Configuration" opens the way to the heights of extremely delicate, cloudless and pure record playback.

- **The world's first balanced current input + EQ + current output = fully balanced configuration**
  - Balanced current input for MC
  - Balanced CR Equalizer
  - Balanced current output
- **Compatible with SP/LP/EP (Shellac/Vinyl) and other equalizers**
  - LP/EP: RIAA, TELDEC, NAB, Columbia, Decca, etc.
  - SP: IEC N78, Decca78, American78, European78, CCIR78, etc.
- **Five-ply stabilized power supply**
  - The signal amplification system with a final stage high gain and one-on-one configuration. The ultimate voltage stabilization is done by eliminating decoupling capacitors.
- **Entire overall design concept eliminating digital circuits**
  - Controls in front dial operation create an ultimate low noise level by eliminating any digital circuits including clocks in microcomputers such as crystal oscillators.

# Design



# Design



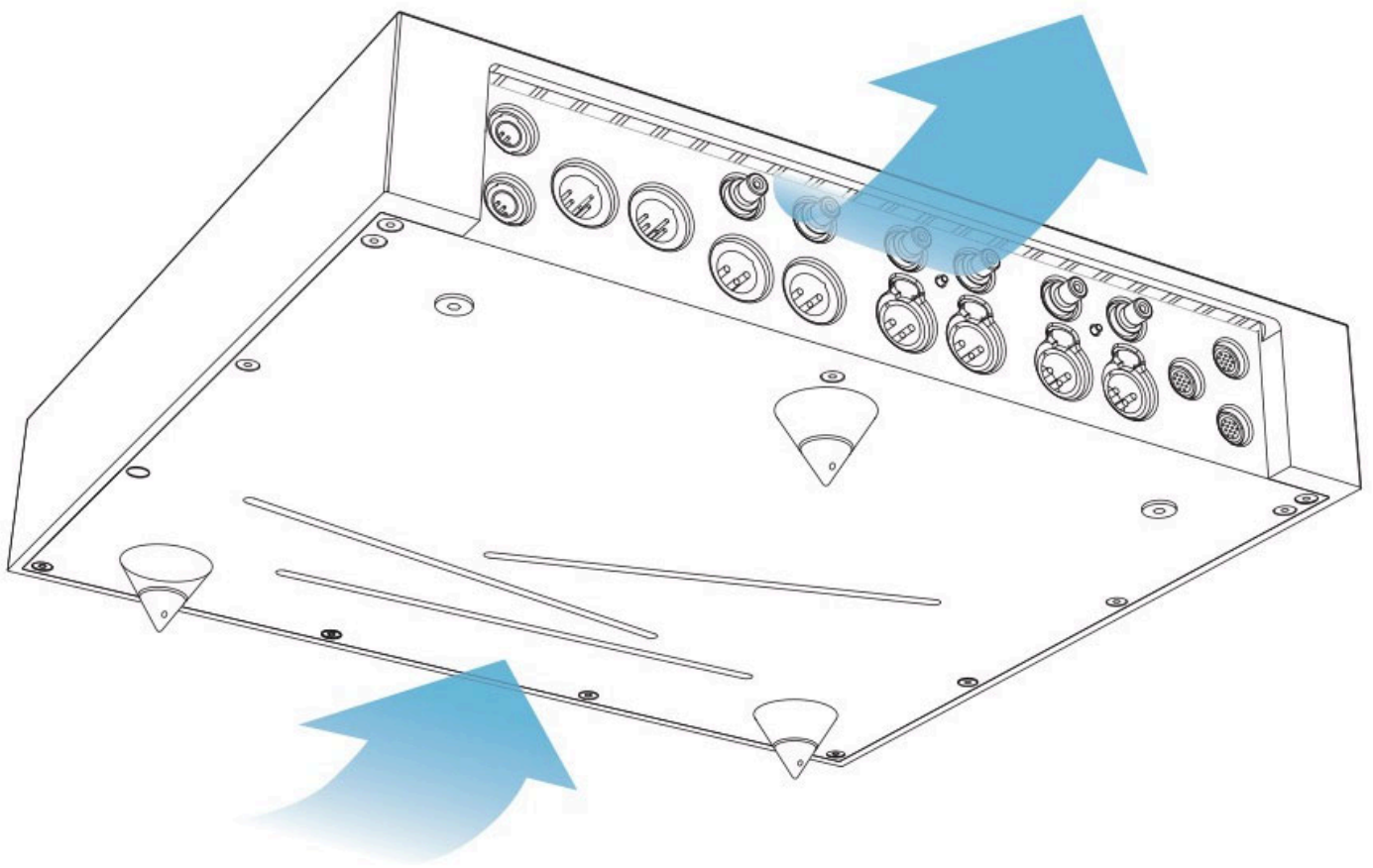
## Robust and ultra-heavy chassis design

Multiple metal materials such as stainless steel, aluminum and copper are richly used in a great thickness and curved with exquisite craftsmanship.

The high-end "R1 reference" model is curved out of a stainless monobloc steel into a clamshell body.



# Design



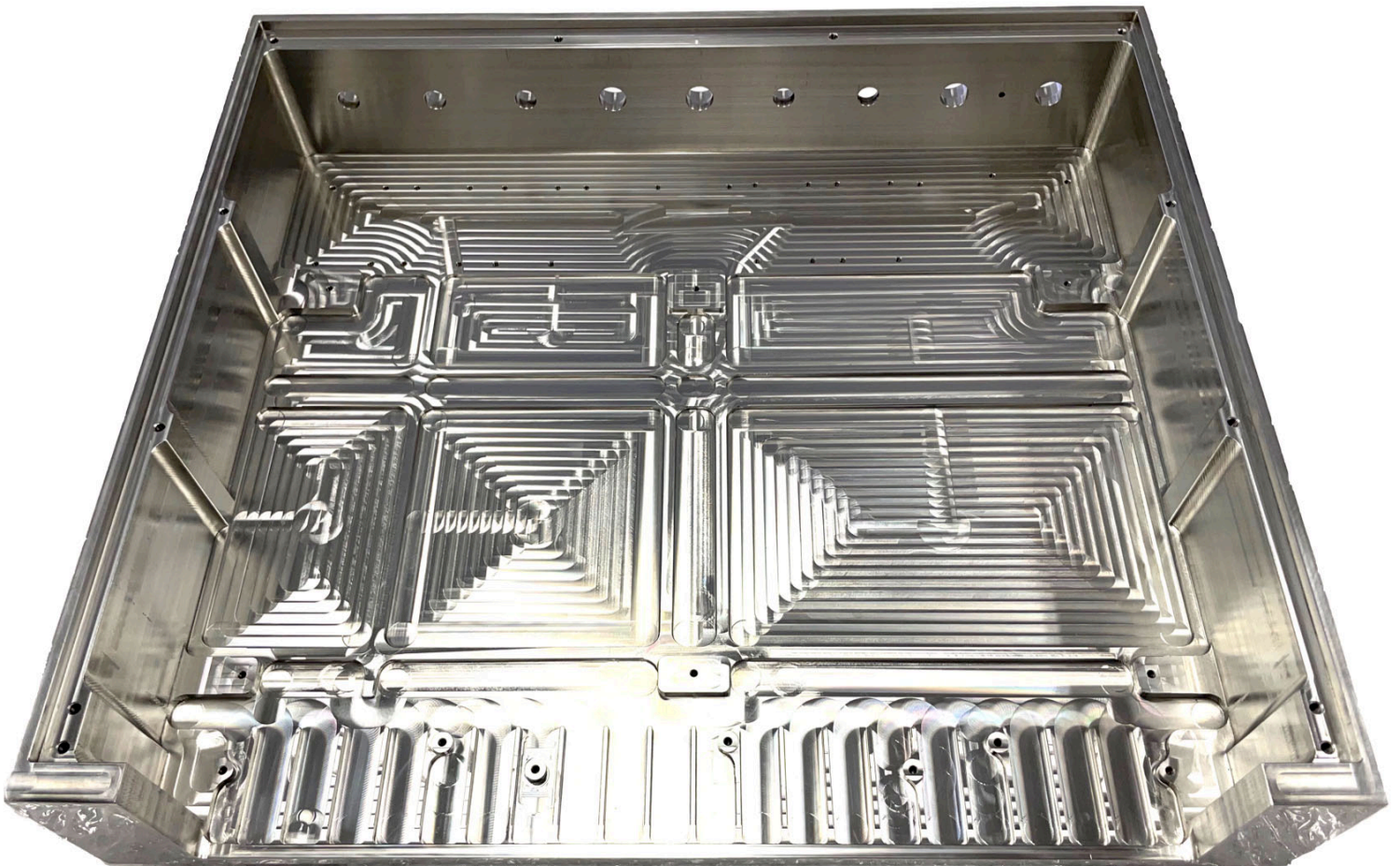
## Air Flow Design

The bottom plate supports an airflow that minimizes the intrusion of sound by exhausting heats to the rear through an asymmetrical cutting slit.

# Design



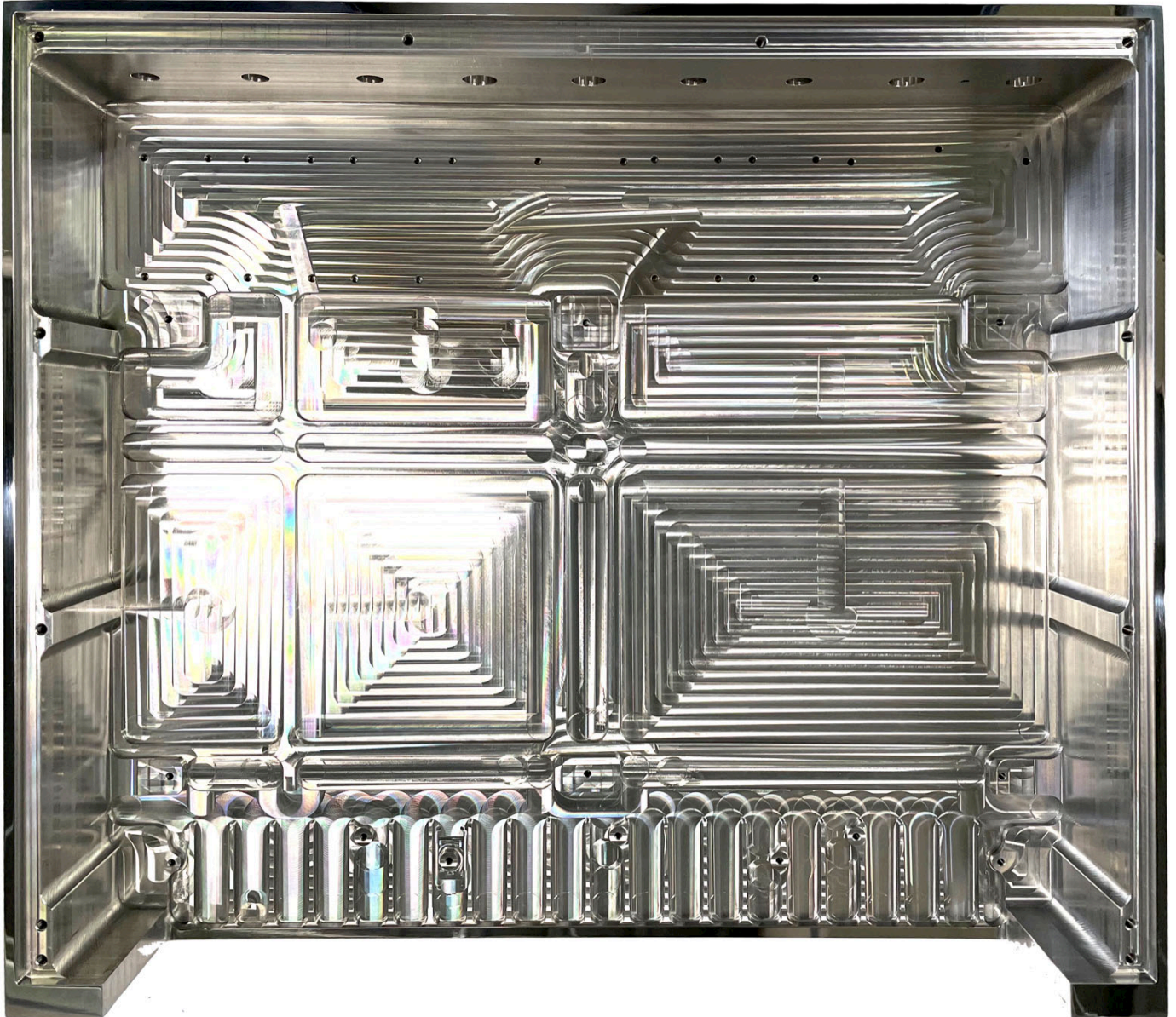
# Design



## Robust and ultra-heavy chassis design

The top-of-the-line model "R1 reference" is made from a stainless steel monobloc clamshell from a stainless steel monobloc.

# Design



## Robust and ultra-heavy chassis design

The high-end "R1 reference" model is curved out of a stainless monobloc steel into a clamshell body

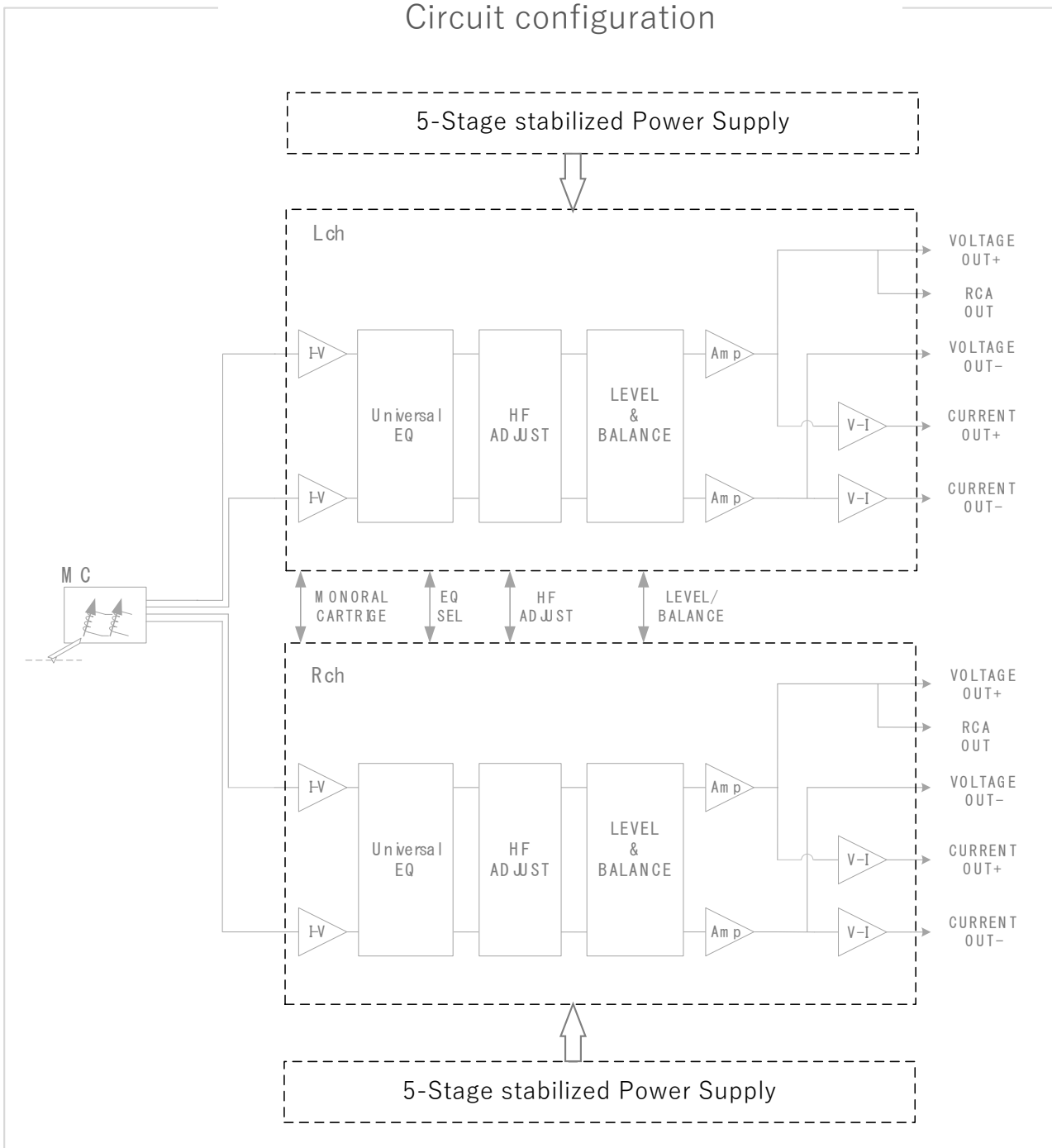
# Core Technology

## Patent Applied Technology and Circuit Structure

### Patent Applied Technology

- The world's first "Current Drive" signal amplifier circuit for feedback type
- Power supply drive that eliminates the habit of capacitors by eliminating the bypass capacitor in the amplification stage

### Universal Phono Equalizer Amplifier Circuit configuration



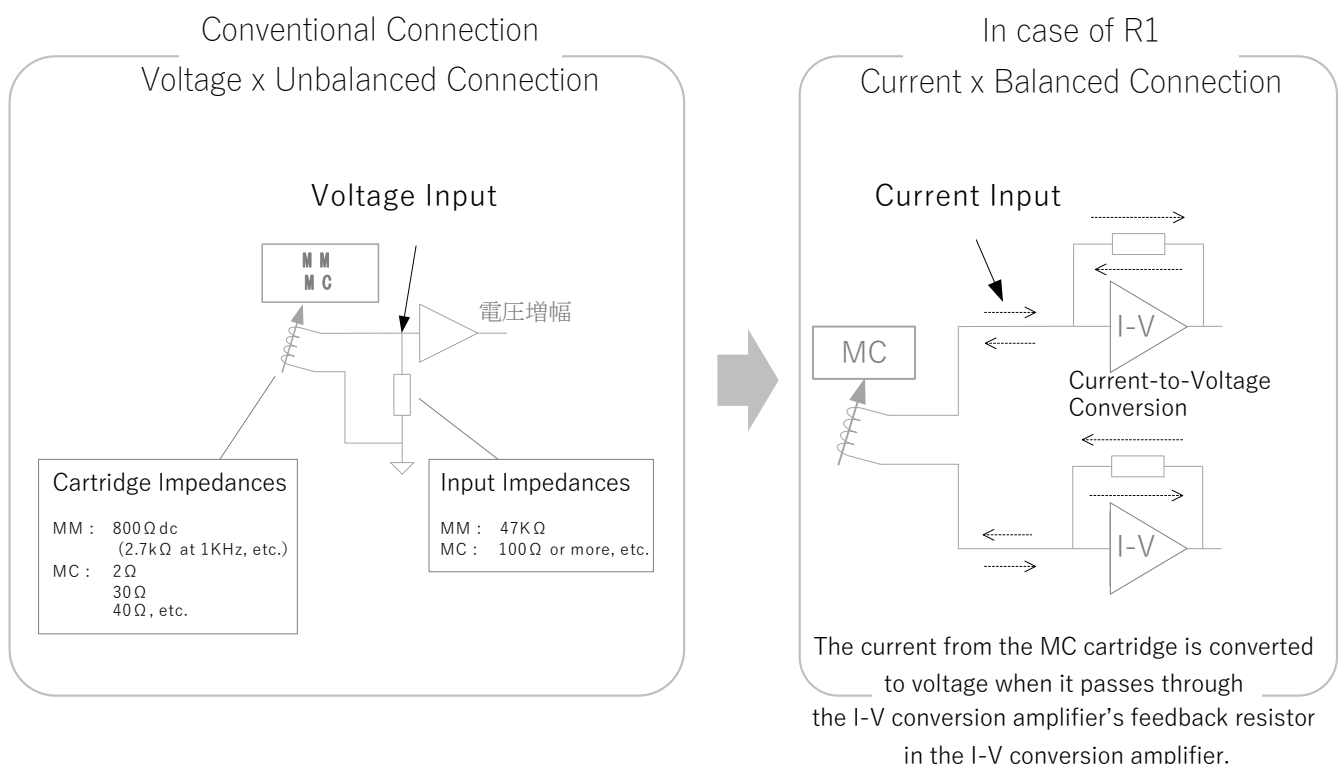
# Core Technology

## Current Input

In principle, phono cartridges have the same motor structure as a speaker with coils and magnets. The MC cartridge acts as a generator where the force transmitted from the stylus moves the coil in the magnetic field, causing an electric current to flow through the coil. This theory is based on the famous Fleming's right-hand rule, which describes the relationship between force, magnetic field and current. Our focus is that the energy generated from the Phono cartridge works the same as an output in an electric current.

In the past, since the impedance of cartridges are different depending on models, the impedance matching was ignored in the transmission process. The signals were converted into voltage signals depending on the load resistance, or input resistance in the amplifier side. The same applies to the use of a step-up transformer, which was also dependant to the individual characteristics of the transformer's coil and core material balances.

Therefore, the equalizer input complies with Fleming's rule and uses an I-V conversion amplifier that treats the cartridge output as a current signal, realizing an unprecedentedly straightforward transmission that does not get affected by the different characteristics of connecting cables. Although there were other manufacturers challenged in this concept, this model uses a unique I-V conversion amplifier with a feedback circuit instead of a passive circuit. It uses an I-V conversion amplifier with a feedback circuit to complete amplification with lower distortion than a passive circuit.



# Core Technology

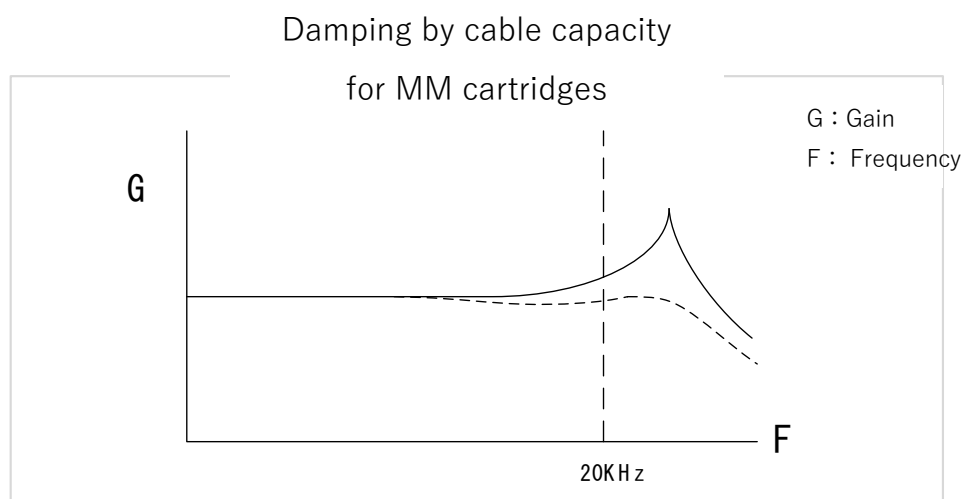
## Current Input (continued)

Considering the practical noise level of the current input stage, it is necessary to reduce the noise to less than half of that of the lowest noise OP amplifier available today. The R1 I-V conversion amplifier achieves noise reduction by using a differential circuit with multiple low-noise Dual transistors connected in parallel.  $n$  transistors connected in parallel will result in a noise level of  $1/\sqrt{n}$ , and the R1 has 8 transistors connected in parallel, resulting in a noise reduction of about  $1/2.8 = -9\text{dB}$ , or half (-6dB). In other words, the noise level in R1 is reduced by more than 9dB.

Also, since the cartridge has a balanced output, we chose the current input for balancing. For the connection cable, we recommend a twisted pair double shielded cable that is resistant to common mode noise, which is the same as a category 7 LAN cable structure. Conventional phono cables are usually around 1.2m long to account for cable capacity, but under properly shielded balanced transmission condition, extra-long cables are no more necessary. In addition, an ideal transmission of microphonics avoids any noises occurred in physical forces and vibrations such as moving or tapping the cables.

In general, we have achieved an unprecedented ideal current transmission in the configuration from the cartridge to the EQ amplifier input. This circuit is applicable to MC cartridges with an impedance of a few ohms to two to three hundred ohms without a built-in step-up transformer. The model does not apply to MC and MM cartridges with built-in step-up transformers.

As a reference, MM cartridges are designed to have equalizer amplifier input with  $47\text{K}\Omega$  load. Also, there is peaking at 20KHz and above, and the capacitance of the connecting cable is used as a damping capacitor to suppress the peaking. In other words, since the connecting cable is used as a part of the circuit, the choice of cables is limited.



# Core Technology

## MONORAL CARTRIDGE · HF ADJUST

### • MONORAL CARTRIDGE

Mono cartridges are connected differently from stereo cartridges, but this unit will switch to a dedicated connection inside the R1 by selecting the mono cartridge mode.

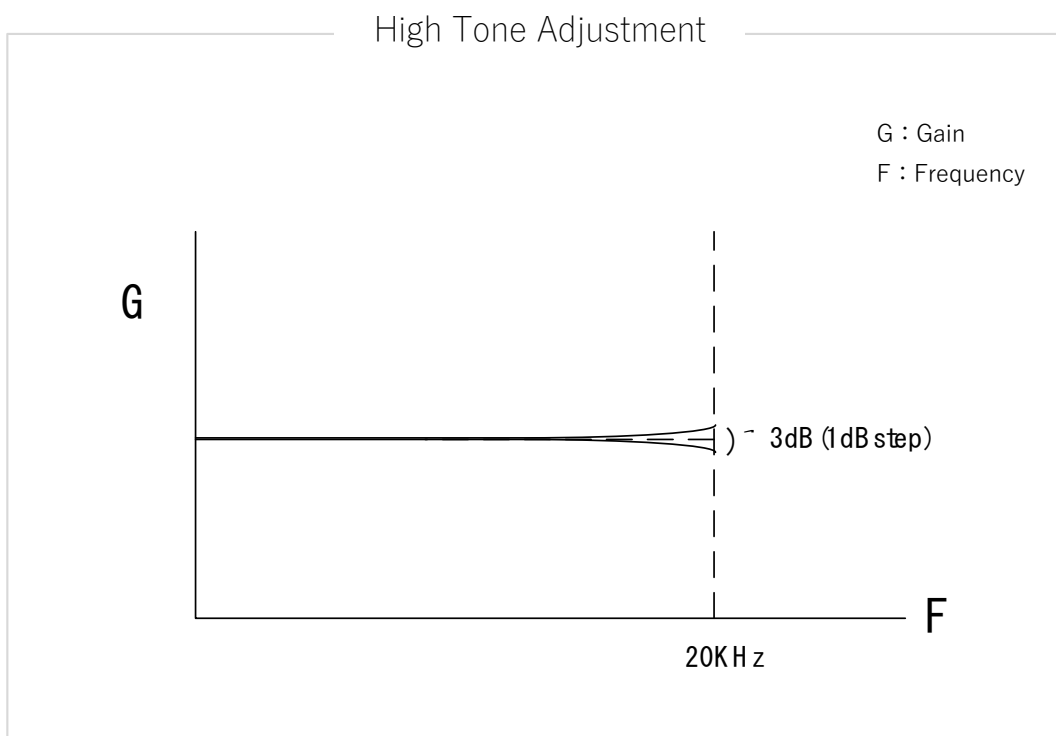
The wiring in the shell is the same as the conventional L and R parallel connection.

### • HF ADJUST

The frequency response of MC cartridges, especially in the high frequency range, is characterized by the cartridge's catalog specs. Some cartridge manufacturers offer you a characteristic chart at the time of purchase.

In the chart, for example at the 20kHz level, the cartridge marks a range slightly higher or lower than the actual 20kHz compared to lower frequency levels. We investigated that this range is within  $\pm 3\text{dB}$  in general.

HF ADJUST is a new function unique to this unit that adjusts the frequency response at the high frequency range.





# Core Technology

## Equalizer Curves

With Edison's invention in 1877 and Berliner's invention of the disc in 1887, recording technology has progressed from direct blowing to electric blowing, which from the 1920s. Since then, record technology has experienced many changes, including technological improvements of cutting machines, more understandings on materials, the introduction of military and radio broadcasting technologies, and the standardization of RIAA curves via researches done by record and electric companies.

There are many analog records that have been manufactured during this long history of music recording, and they play an important role as cultural assets and witnesses to the 20<sup>th</sup> Century history. Even in the case of SP playback, which is often considered as an inferior to bandwidth, there are many masterpieces. From 1950s onwards, many LP masterpieces such as Furtwängler are continued being recut.

Although these records naturally have scratch noise, we still can enjoy these inevitable recordings even in nowadays. Playback sounds are unable to be created by digital recordings.

Pure analog sound is clearly different from PCM recorded digital sounds. Many people describe analog records as having more enthusiastic sounds than CDs, and that is why there are many musicophiles who prefer analog recordings nowadays. Once an analog master is converted to PCM (including high-resolution), it is converted to a digital-specific playback sound when played back on a CD or digital distribution. Therefore, we believe that the master for recording should be analog or DSD if possible.

1952, the RIAA (Recording Industry Association of America) adopted the new RCA method, and the RIAA curve was officially established in 1954. Since then, most labels have used the RIAA, but some have continued to use their own curves or use them in conjunction with the RIAA. It is not clear, but it is said to have been until 1965 or the 1970s. It is also true that SP records that clearly differed from the RIAA curve were manufactured in Japan until 1963.

In this way, records manufactured with curves other than the RIAA curve cannot be reproduced correctly unless they are played back with an equalizer curve with inverse characteristics tailored to each curve. With respect to our predecessors, the R1 is equipped with as many playback curves as possible in order to reproduce as much of our precious heritage as possible without compromising the quality of the analog playback sound.

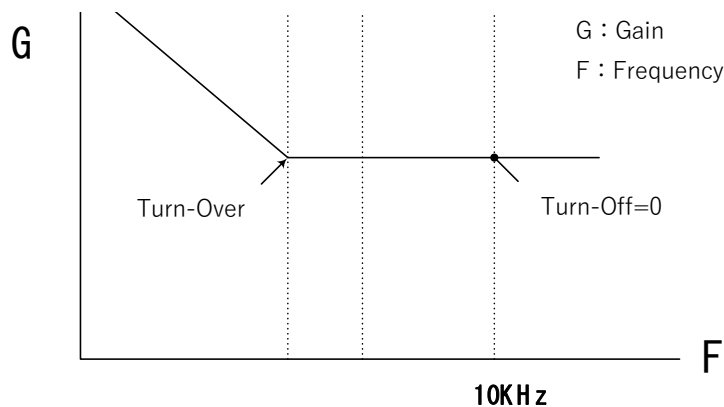
# Core Technology

## Equalizer Curves (continued)

The following figure shows the types of equalizer curves and their corresponding curve names. Originally, the gain change is drawn with curves, but to clarify the change point, we chose to use straight lines.

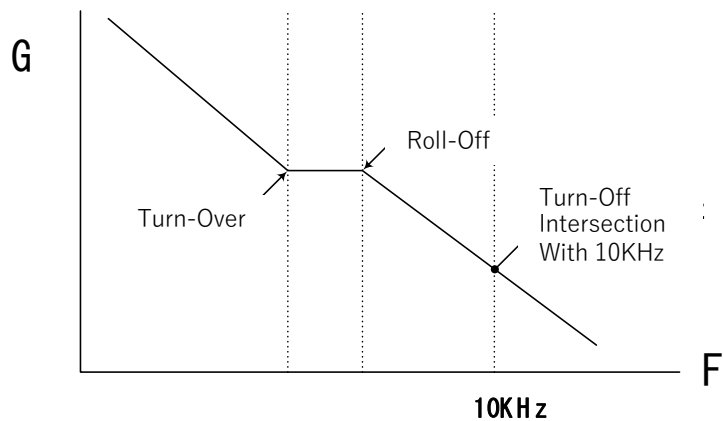
### Transition of the playback equalizer (EQ) curve

#### ( I ) The early days of SP records (Shellac records)



Normal Groove =SP Records  
EQ Curve Name :  
European78  
300-FLAT  
500-FLAT  
American78  
EMI, His Masters Voice etc.

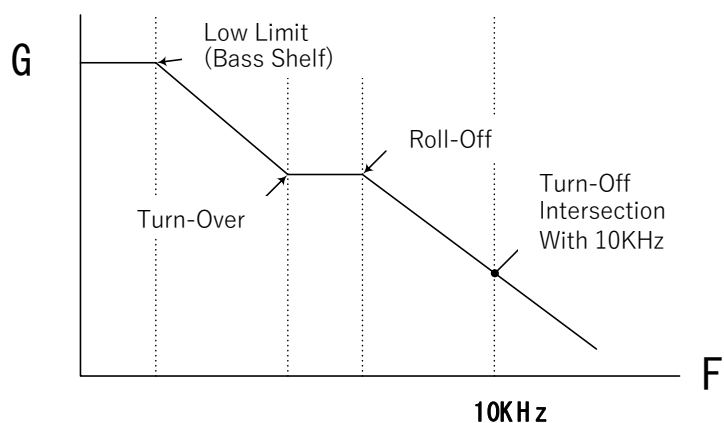
#### ( II ) Improvement of sound quality of SP records and the advent of the LP record (Vinyl record)



Normal Groove =SP Records  
Columbia78  
FFRR78, London ffr78  
CCIR78 etc.

Micro Groove =LP、 EP  
NAB  
AES  
RCA Old Orthophonic  
RCA 45 (45rpm)

#### ( III ) Development of LP Records and Convergence to the RIAA



Normal Groove =SP Records  
IEC N78

Micro Groove =LP、 EP  
Columbia LP  
NAB, NARTB(1949)  
Decca LP  
London LP  
RCA New Orthophonic=RIAA  
TELDEC, D.G.G  
RIAA

# Core Technology

## CR type equalizer

There are three conventional types of equalizers: the CR type, which consists of a filter with only a capacitor C and a resistor R; the NF type, which consists of an amplifier feedback circuit with filter constants of C and R; the CR-NF type, which combines the first two; and finally the LCR type, which combines C and R with an inductor L. The NF type has an advantage over the noise, but as mentioned above, it is more difficult to suppress distortion evenly across frequencies because the feedback amount itself depends on frequency. NF type has lower noise levels, but as mentioned above, the amount of feedback itself depends on the frequency, making it more difficult to suppress distortion evenly across frequencies.

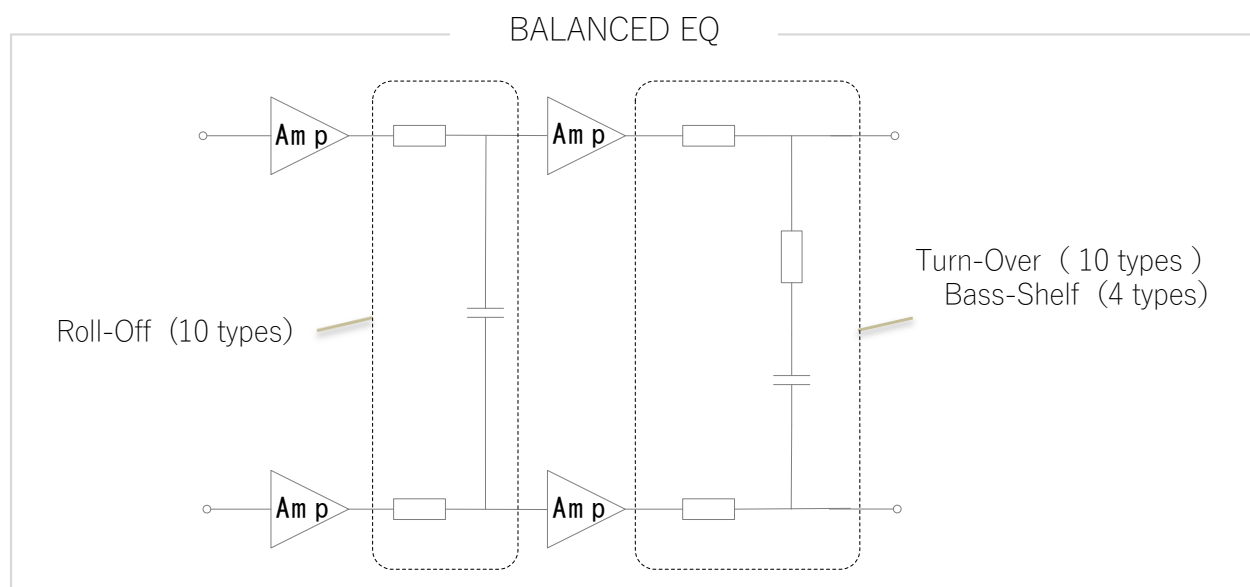
The CR-NF type solves more of these problems, but not perfectly.

In the LCR type, it is difficult to select an inductor that is both optimal for its sound quality and a realistic component size.

The CR type does not have these disadvantages, and it is easy to use with various equalizers because there are many general-purpose parts and it is easy to compare and select the sound quality. In old days, the CR type is considered to have a lot of noise problems. However, since it is easy to make and has advantage in sound quality, so it has been used often since the days of vacuum tubes.

The CR type equalizer of R1 corresponds to the filter which changes the gain at three frequencies called Bass Shelf, Turnover, and Roll-off, but in order to correspond to various equalizer curves, it is configured to be able to switch between different combinations of C and R. In order to support various equalizer curves, we made a configuration switch that makes able to adjust to different combinations of C and R. Since semiconductor switches can easily affect the sound quality, relay contacts are used to minimize the effect on sound quality.

In addition, the order of the above three filter stages has been reviewed to minimize noise degradation in an unprecedented order. The equalizer circuit has achieved a balanced configuration, which is rare.

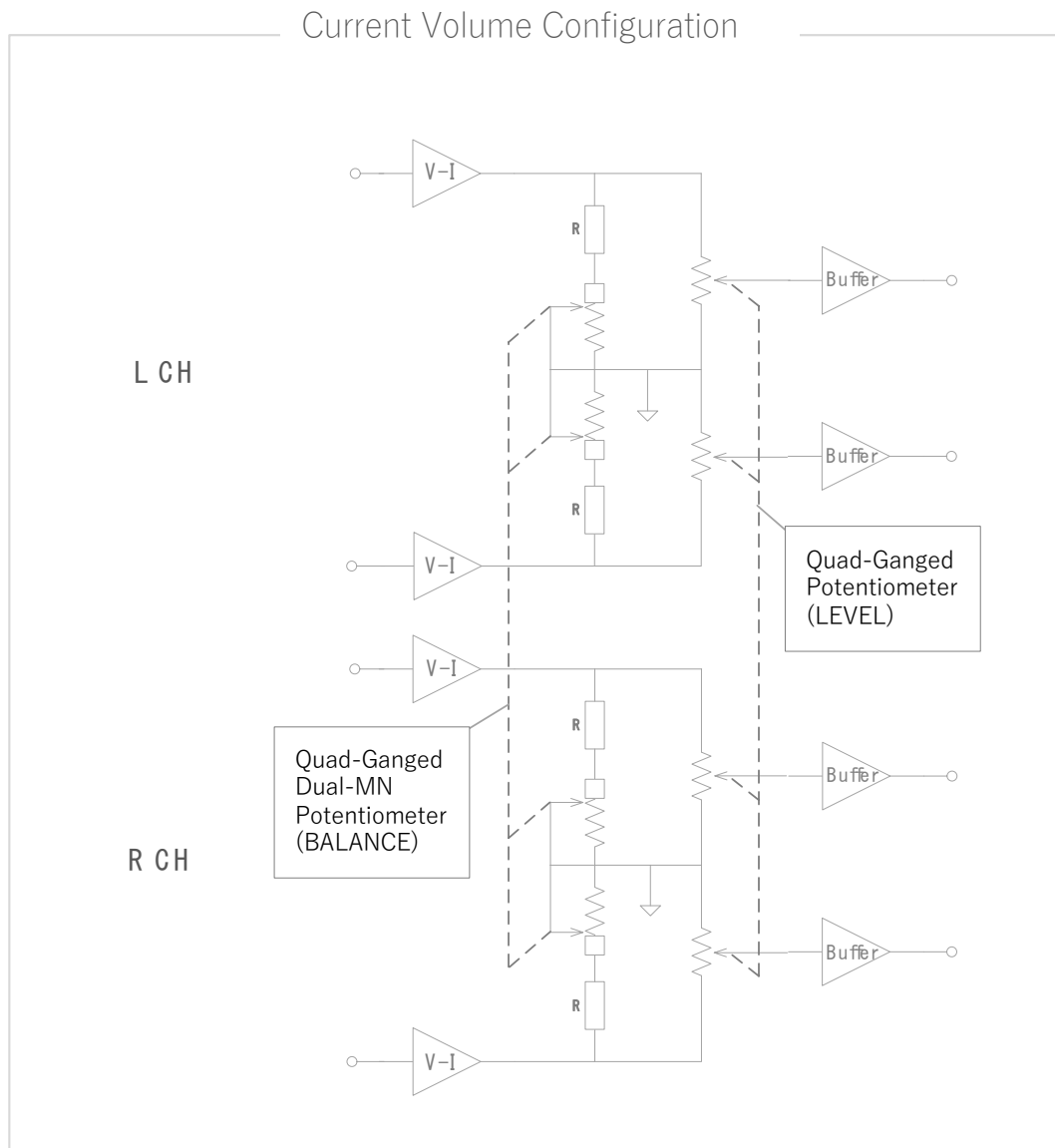


# Core Technology

## Current Volume

A current drive circuit is used to load the volume, thus realizing a current volume. Moreover, the configuration of the balanced volume in the circuit and the balanced connection is unique. This has the same effect as the current transmission described in the next section and has made it possible to realize a volume controller that is not affected by inductance components in the wiring to the volume and the volume. In addition, each volume is a quadruple type.

Also, from our researches, there are not so many differences in L/R levels between cartridges and amplifiers and the balance adjustment range is limited to a maximum of  $\pm 3\text{dB}$  with a rotation of  $\pm 150$  degrees.



# Core Technology

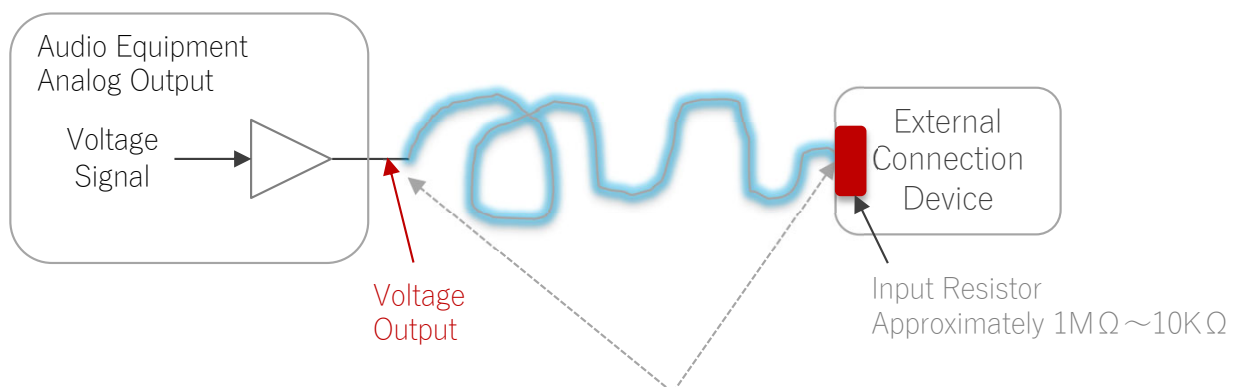
## Current Transmission

Our purpose and mission in current transmission is quite simple: "to transmit the correct magnitude of the signal to the next device".

Transmission between most audio equipment uses voltage transmission, where the audio signal is connected as a voltage. The impedance on the output side is sufficiently low, and the impedance on the receiving side is sufficiently high (about  $10\text{K}\Omega$  to  $1\text{M}\Omega$ ) to convey the magnitude of the voltage signal.

### • Problems with conventional "Voltage Transmission"

1. Affected by the connecting cable = Many people have experienced the problem of sound quality differences due to cables.
  - The resistance of the connecting cable becomes a part of the load of the amplifier.
  - It is connected in series with the receiving input resistance and shares the output voltage with the cable resistance.
  - Some energy is consumed by the connecting cable.
  - The connecting cable has capacitance and inductance components.
  - The energy consumed by the connecting cable is not constant with respect to frequency.  
= The energy consumption of the connecting cable is not constant with frequency.
  - Susceptible to physical vibration
2. Input resistance changes the sound quality.
  - Sound quality also varies depending on the input resistance of the connected device (resistor structure, accuracy, and characteristics).



Same voltage?

Affected by transmission paths due to cables, etc.  
Roughly the same but slightly different voltage transmission  
It is more natural to think that it varies.

# Core Technology

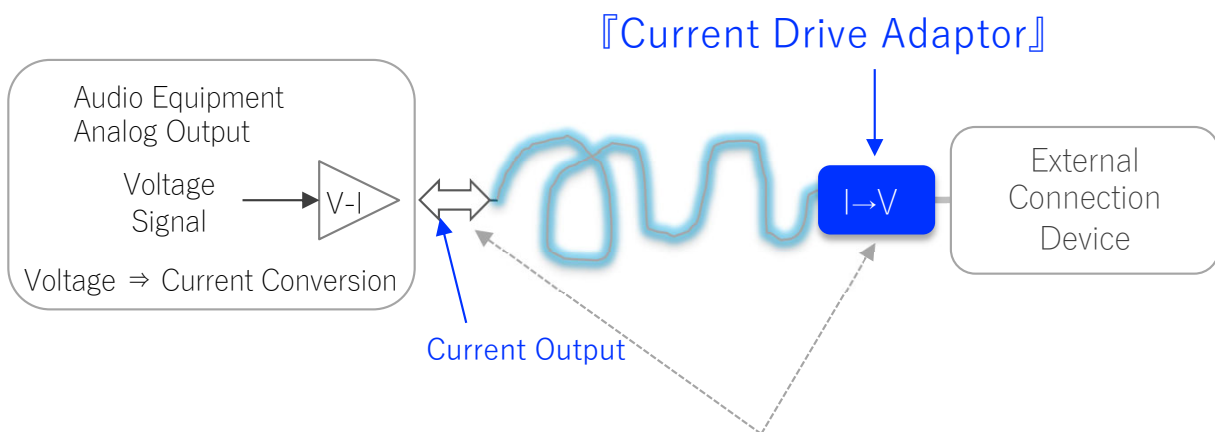
## Current Transmission (continued)

- The "Current Transmission" Advantage

Therefore, "current transmission" is strongly recommended as a transmission method that is not affected by cables, which is one of the problems of "voltage transmission" mentioned above. As shown in the figure below, the current signal can be delivered as it is without being affected by the characteristics or length of the cable to the input of the external device (power amplifier, etc.) that transmits the signal, as long as there is no disconnection.

The current output side uses a V-I (voltage-current) conversion circuit that outputs a current proportional to the original voltage signal. Ideally, a current input amplifier with the opposite I-V conversion function should be installed at the input of the receiver of the current output (such as a power amplifier). However, since most audio equipment today uses voltage input with high input resistance, it is possible to use the Line input as a conventional voltage input by connecting a terminator (termination resistor) of about  $1K\Omega$  to the input.

By using a special ultra-precise resistor and placing the Current Drive Adaptor, a termination resistor for current transmission, at the input of the connected device, the current signal is converted to a voltage, and the original signal can be transmitted as it is, with the same functionality as before.



### Identical Current

- No influence of transmission path by cables, etc.
- Realizes current transmission faithful to the input signal
- Converts to faithful voltage signals in the vicinity of the device

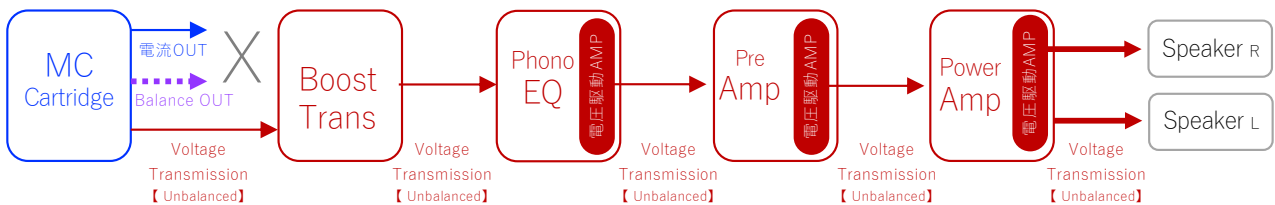
# Core Technology

## Current Transfer Configuration

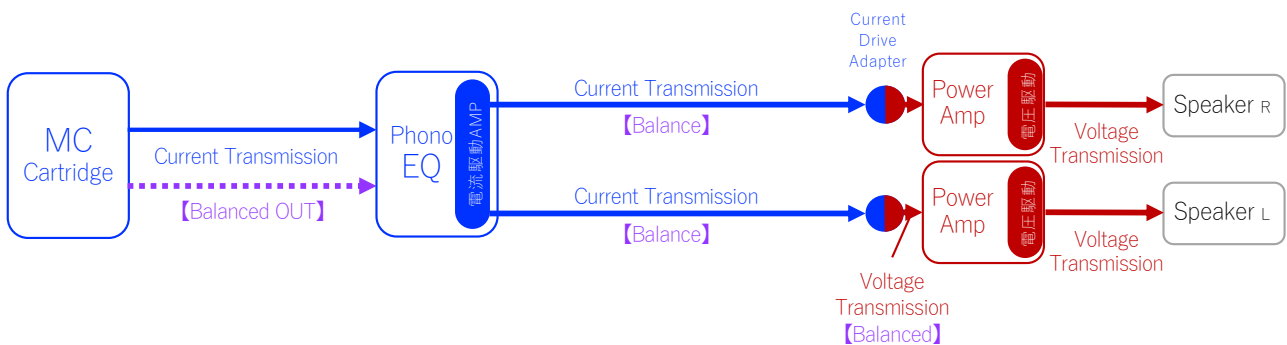
New configuration of the entire analog audio system with "Current Transmission"

By utilizing "current transmission" for both the signal from the MC cartridge and the output signal from the phono equalizer, we were able to achieve the ultimate high resolution and overwhelming driving force, which is a different dimension from the old "voltage transmission" method, as well as a sense of transparency that is contradictory to it.

### System configuration using conventional "Voltage Transmission"



### System configuration with new "Current Transmission"



# Core Technology

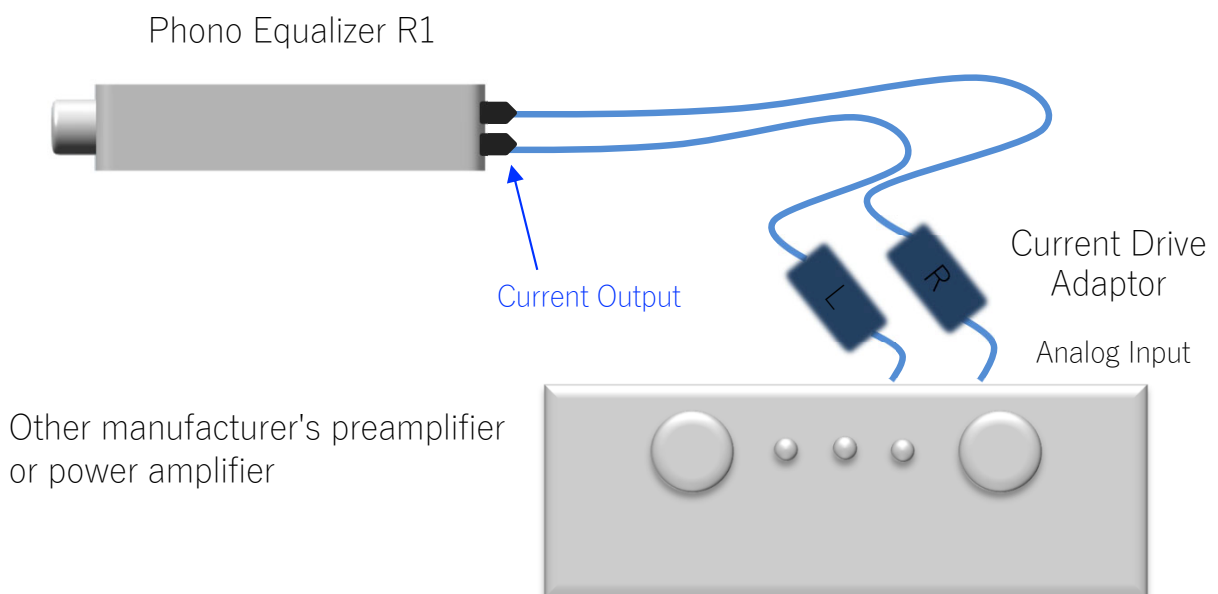
## “Current Drive Adapter” option

R1 has reached a level where the difference in sound can be recognized even with a termination resistor. For this reason, we developed a special termination resistor "Current Drive Adapter" with ultra-precision resistors for current transmission.

Termination resistor "Current Drive Adaptor"  
(cable included ※ Exterior may differ from the photos )



By placing the Current Drive Adapter, a termination resistor for current transmission, at the input of the connected device, the current signal is converted to a precise voltage by the precision resistor.





# Core Technology

## Five-ply Stabilized Power Supply

### The role of the power supply and the problems arisen so far

The role of the power supply is to provide a stable supply of energy to the amplifier and to serve as an operating standard.

The power supply voltage in actual equipment is occurred by:

1. Noise and voltage fluctuations caused by factors from the AC side
2. Noise and voltage fluctuations in the power supply circuit and components themselves
3. Voltage fluctuation due to load (amplifier load)

The first three of these factors affect the operation of the amplifier, which in turn affects the sound quality and causes problems.

Conventional technology (selection and combination of circuits and components) can suppress the noise and voltage fluctuations in 1 and 2. In the case of 3, we can observe a slight synchronization between inputs and voltage fluctuations due to the amplifier operation, especially in the low-mid range.

A device is composed of a number of amplification stages, and the individual amplifiers in each amplification stage will fluctuate their own voltage as they operate, and this voltage fluctuation will affect themselves and all other amplifiers. This causes mutual interference (crosstalk) between the multiple amplifiers that make up the circuit of the entire device, which muddies the sound and adversely affects its rise, sound image localization, and reverberation. A three-terminal regulator, which is often used as a stabilizing power supply, cannot achieve sufficient stabilization. In short, although everyone is aware of the importance of stabilizing the power supply for conventional amplifiers, the only reason for this is that the performance of the stabilized power supply does not keep pace with the operation of the amplifier to which it is supplied due to insufficient stabilization. Even in battery-powered systems, where the effects of 1 and 2 are (minimal), the shape of the battery makes it difficult to minimize the wiring distance to the power terminals of each amplifier, and the effects of wiring impedance remain. This also means that there is a limit to the wiring patterns that can be devised in a conventional power supply circuit configuration.

We already have technology and experience of four-ply stabilized power supply in our former E1 and in this model, a powerful stabilized power supply has been added to the power input section, making it a five-ply system and further improving sound quality. The added stabilized power supply uses the latest revolutionary E-Mode GaN power transistor, which is several times faster and higher gain than even SiC, which is a hot topic today, and achieves wide bandwidth and low impedance in the high current range.

In addition to stabilizing the voltage, the power supply circuits from the first to the fourth stage are responsible for converting the operating voltage to various amplifiers according to the purpose of use.

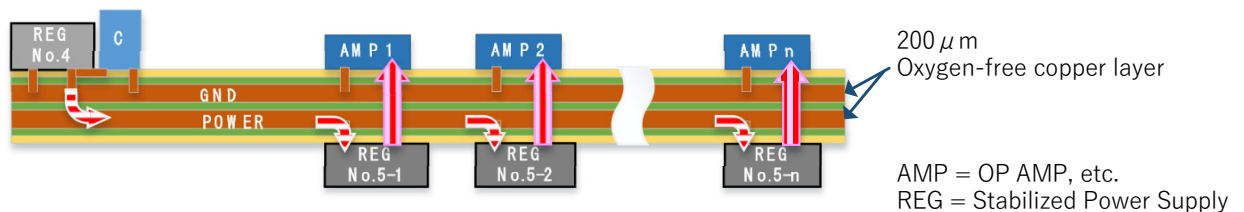
# Core Technology

## Five-ply Stabilized Power Supply (Continued)

### “Capacitor Elimination” in the final stage high-speed drive power circuit

The power supply circuit in the final stage plays an important role. The stabilized power supply circuit used has wider bandwidth characteristics than the amplifier to which it is supplied and is capable of controlling the operation of the signal amplification and suppressing fluctuations with a gain that is approximately 100 times higher than that of a 3-terminal regulator. The concept of placing a power supply circuit (amplifier) that has better characteristics than the signal amplifier is completely new. This configuration successfully eliminates the need for bypass capacitors, which have always been used to ensure the operational stability of amplifiers, and it also eliminates the coloration of the sound caused by capacitors. (Patented)

The bypass capacitor connected to the output of the stabilized power supply ironically acts as a capacitive load on the stabilized power supply, narrowing the open-loop gain, which is the ability to suppress fluctuations, and the elementary characteristics of the frequency band.



### One on One Direct Power Configuration

Each stabilized power supply and amplifier are mounted on the opposite side of the board from the amplifier in a one-on-one configuration for the ultimate layout that connects to the AMP power supply terminals in the shortest possible time. Crosstalk to other channels and other stage amplifiers is ultimately eliminated.

The copper foil thickness between the 4th and 5th stage power supplies is 200 $\mu$ m, which is unconventionally thick for a power supply and GND layer, and the low impedance wiring ensures the operation of the 5th stage power supply.

In addition, the 5th stage power supply operates based on the highest level of low noise voltage reference with a temperature deviation of less than 1ppm/ $^{\circ}$ C. It is truly the ultimate.

### Effects of the newly developed “Five-ply stabilized power supply”

The realization of a solid operating reference and a power supply with almost no fluctuations as a source of energy has made it possible to reproduce sound with its original grain, sound image, and sense of power, while maintaining the original rise, resolution, and separation of the recorded signal.

# Core Technology

Entire overall design concept eliminating digital circuits

In order to extract the pure analog signal from the minute and delicate cartridge output, the ultimate low noise control has been thoroughly designed by eliminating digital circuits.

Normally, various switching switches are located on the front panel.

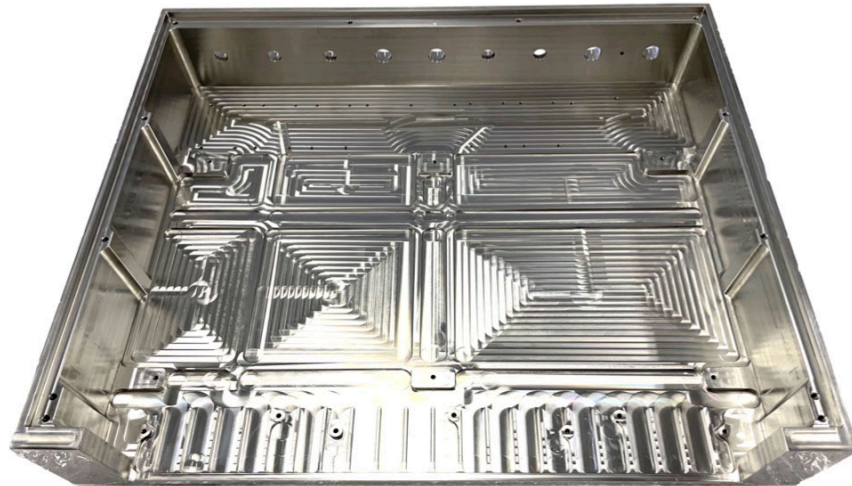
In most cases, it is easy to install a microcomputer-like circuit because the control of the internal circuits by operating the dials requires a clock such as a crystal oscillator that ticks the operation sequence.

However, a low-noise, high-gain amplifier is essential for extracting the pure analog signal from the minute and delicate cartridge output.

In order to prevent the introduction of extra digital clock noise, the ultimate solution is not to use a digital circuit with a clock from the beginning. This is achieved by eliminating all microcomputers and other components from the control circuitry of this unit.

# Core Technology

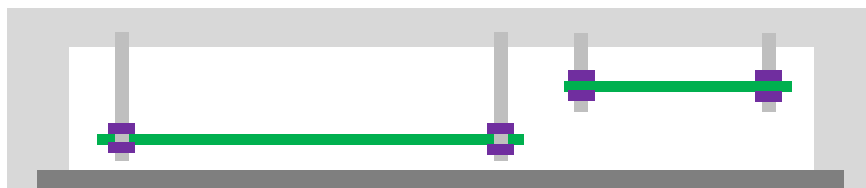
## Enclosure & Structure



### Monobloc Chassis

The upper enclosure shell is a one-piece block structure machined from stainless steel.

The upper enclosure shell is an integrated block structure machined from stainless steel. The bottom surface is made of 4mm thick stainless steel plate with different resonance points.



Cross section from the front

### Floating structure & Hybrid Cone Spikes

A newly developed floating mechanism that asymmetrically positions the circuit board, components, and wiring from the top of the enclosure.

The hybrid cone spike feet included with the R1 reference are made of the hybrid cone spike leg included with the R1 reference is a hybrid structure with a hierarchical arrangement of stainless steel, duralumin, copper and other alloys with different resonance points.

The R1 reference's hybrid cone spike leg has a hierarchical arrangement of stainless steel, duralumin, copper, and alloys with different resonance points.

# Core Technology

## Afterword

### Analog Records and PCM

Recording and playback of analog records has been going on for a long time, even before we were born. It is the very essential to the development of audio.

Through the efforts of our predecessors, the technology has developed and matured, incorporating new technologies as they became available. The advent of the CDs had a great impact on analog records, but many people have pointed out that the difference in sound quality between the CD and digital audio (including today's high-resolution audio) since the CD was first introduced.

While everyone agrees that analog records are inferior in terms of noise and handling, there is a difference in sound quality, especially in the hi-hat; the rise and fall of the sound, and the feeling of air.

PCM recordings or analog sources remastered with PCM can be recognized as a digital sound quality regardless of whether it is analog or high-resolution. However, in the case of DSD, I believe that the sound quality is still close to analog. I feel sorry to the recording companies but I believe there are many audience who don't really appreciate analog records with PCM mastering.

### New Technology

The technology for playing analog records has already been developed. What is the point of developing a new product and introducing it to the market?

The answer is “yes”.

Most analog equipment can be assembled to function and produce sound by imitating the past. However, there are times when the technology of the last 10 years or so can do something new that it could not do 20-30 years ago.

Semiconductor and material technologies have walked through revolutionary progress. I am convinced that by reviewing the specifications from various angles such as circuitry, components, materials, configuration based on the laws, principles, and characteristics of the past, we can create a completely new device that has never been seen before.

The R1 has already undergone individual circuit studies and sound quality comparisons with various components. It took us more than 14 years to complete the R1 by focusing on listening and not getting carried away by the technology.

We hope that many people will appreciate our sound of old, but completely new possibility of analog records.

中山邦男

Kunio Nakayama

# Spirit and Soul for Creation

The world's highest level of uncompromising, uncompromising attention to detail.  
To the heights of extremely delicate, cloudless and pure record reproduction.

By returning to the origin where music was created,  
we convey the fresh and raw spirit of musicians to future generations.

This is the masterwork of Kunio Nakayama, a lover of music,  
who has spent more than 14 years developing it.



The basic premise of the circuit configuration, based on ideal principles, without following unfounded conventions. [The world's first current input] x [current output] x [fully balanced configuration], based on ideal principles, was developed without compromising the basic research time. We have spent more than 14 years studying and pursuing this idea.

The sound quality of each individual component is assessed before the circuit configuration. The accumulation of daily development and sound quality tuning, without being thrown off by conventions, has led to numerous discoveries and inventions. This has led to a number of discoveries and inventions, and conveys the excitement of music reproduction that transcends time and space that only analog records can provide.

## Profile of Kunio Nakayama

Since 1985, Kunio Nakayama has been engaged in the development of mixed-signal technologies, including analog and logic circuits, AD/DA, PLL, servo, RF, and optical control, as well as optical and vacuum deposition technologies in his previous positions of Sony Corporation.

As commercial development products, he has consistently developed optical laser Disc products from signal processing of optical laser, such as Laser Disc, High Definition LD, CD, DVD, PlayStation, SA-CD and Blu-ray.

Basic research has included the development of signal generators for master recording, laser equipment for master recording, master playback and CD standard playback equipment for each DISC format, as well as the formulation of evaluation standards and the development of reflective film deposition technology.

Most of the formats we have been involved with are so-called pre-recorded discs, which are sold with pre-recorded content.

He is the creator of the Blue Spec CD(TM), and almost all of the world's Blu-Ray Discs are still used to record movies and music using the laser equipment he developed.

Phono Equalizer Preamplifier  
R1 reference Specification

Product Name	Phono Equalizer Preamplifier "R1 reference"
Model Name	R1R
Inputs	MC Phono Input : mini CON-12 (KEUTRIK) 3 inputs Analog Input : XLR 2ch Baaa (or RCA switching) 2 inputs
Outputs	Analog audio output (Voltage Output) : XLR 2ch Balanced Output / RCA 2ch Output Analog audio output (Current Output) : XLR (5Pin) 2ch Balanced Output for 2 systems
Output Level  ※ See special note for measurement conditions.	Balanced voltage output for normative signal playback : 0VU ; 1.228Vrms(±1.736Vp-p), RCA output is 1/2 of balanced output 6VU ; 2.456Vrms(±3.473Vp-p), RCA output is 1/2 of balanced output Current output during standard signal playback : 0VU : 1.228mArms(±1.73mA <sub>p-p</sub> ) 及び 6VU : 2.456mArms(±3.473mA <sub>p-p</sub> )
Equalizer Curve	LP/EP : RIAA、TELDEC、NAB、Columbia、Decca etc. SP : Decca78、American78、European78、CCIR78 etc.
Frequency Response	RIAA : 20Hz~20kHz( within ±0.5dB) Deviation of other curves is within ±0.5dB from each standard curve within the expected bandwidth.
Power Supply Voltage	Power supply unit input : AC100-230V (50/60Hz) 、 Amplifier unit input : DC +15V
Power Consumption	TBD Standard 30W (Standby: 1.5W or less)
Dimensions/Weight	TBD Amplifier unit ; 408(W) × 361(D) × 70(H)mm appx. 28K / Power Unit ; 408(W) × 361(D) × 70(H)mm appx (Not including protruding parts such as volume and insulator legs)
Accessories	Dedicated DC power supply unit (DC15V, 2 outputs for L and R separately) Dedicated phono cable: Twisted pair double shielded structure, DIN5P-miniCON (NEUTRIK) Hybrid Corn Spike Insulator User's Manual Warranty
Country of manufacture	Japan
Special Notes	1. Compatible cartridges are MC (or MC equivalent) only. MM cartridges are not supported. 2. This unit is only compatible with DIN 5Pin output arm and player, not with RCA output. 3.  * Measurement condition: Reference record JVC TRS-1001 Band1 0VU 1KHz Reference cartridge; Ortofon SPU Classic G MkII  Note: When connecting the CURRENT OUTPUT of this unit to a power amplifier, be sure to pass through the supplied CURRENT DRIVE ADAPTER before connecting to the input of the power amplifier.

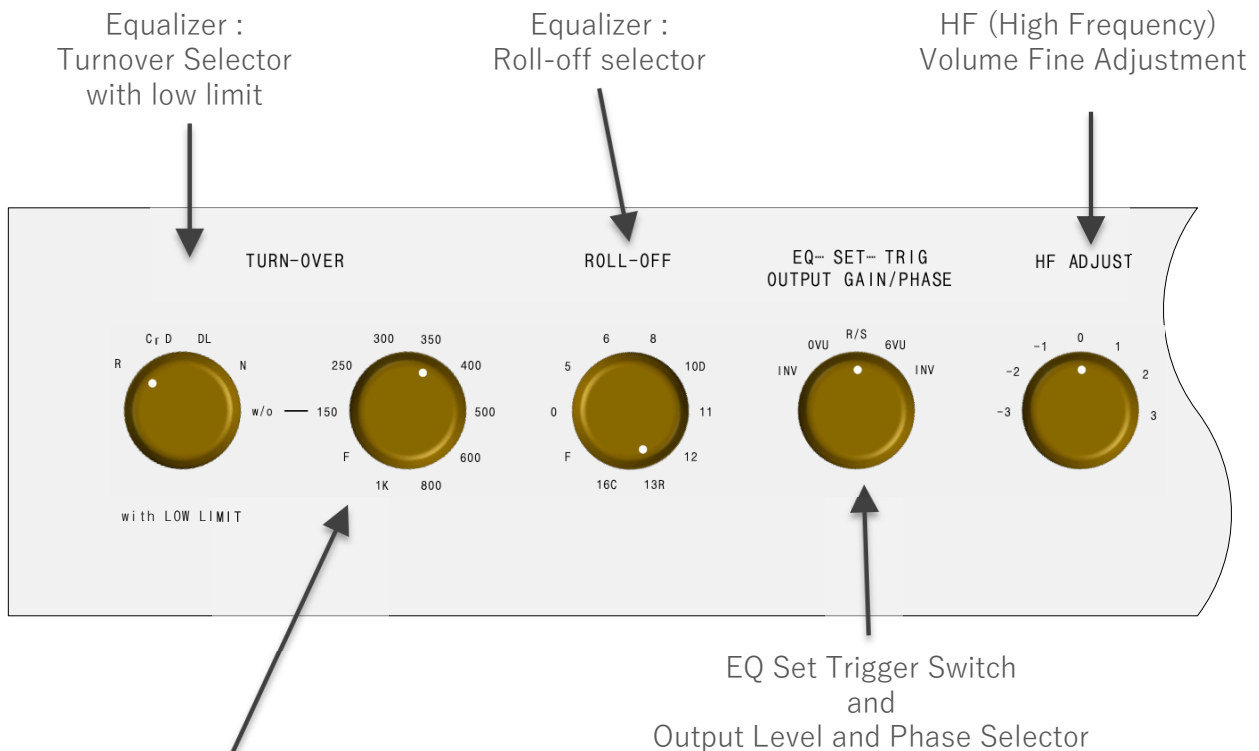
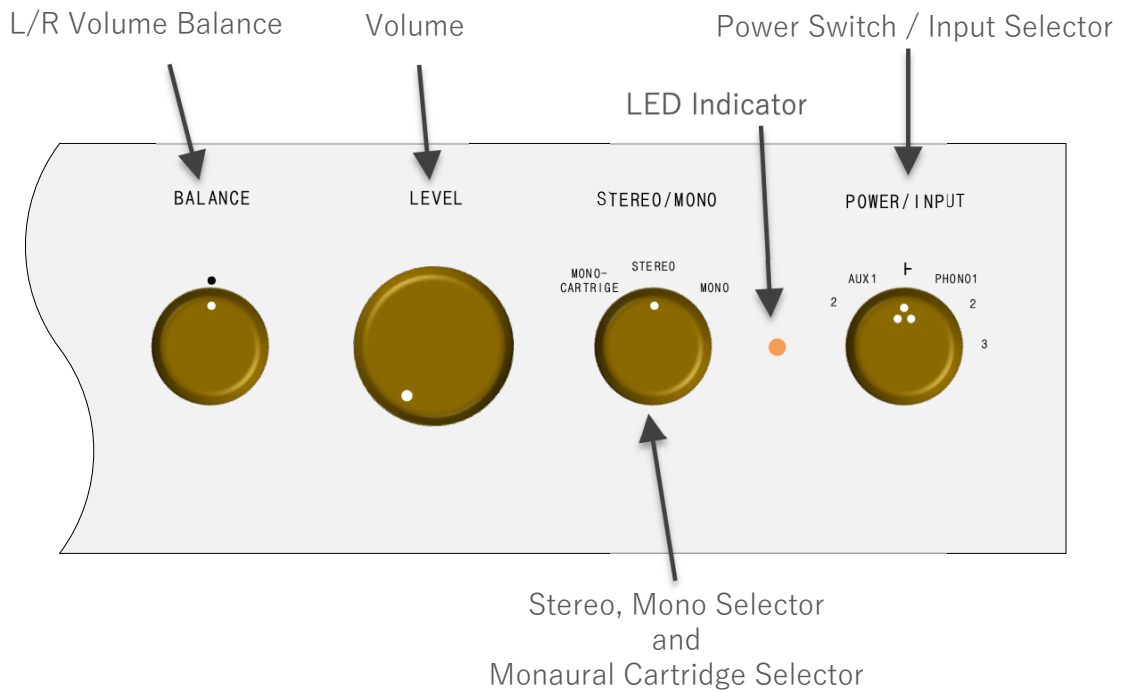
※ The actual product may differ in detailed specifications, color, etc.  
※ Please note that specifications, appearance, finish, etc. are subject to change without notice for product improvement.

Made in Japan by RE · LEAF Inc.

RE · LEAF株式会社  
<http://www.releaf.co.jp/>  
audio@releaf.co.jp

# Name of Each Part

## 1. Front Panel (Displayed in left-right split)

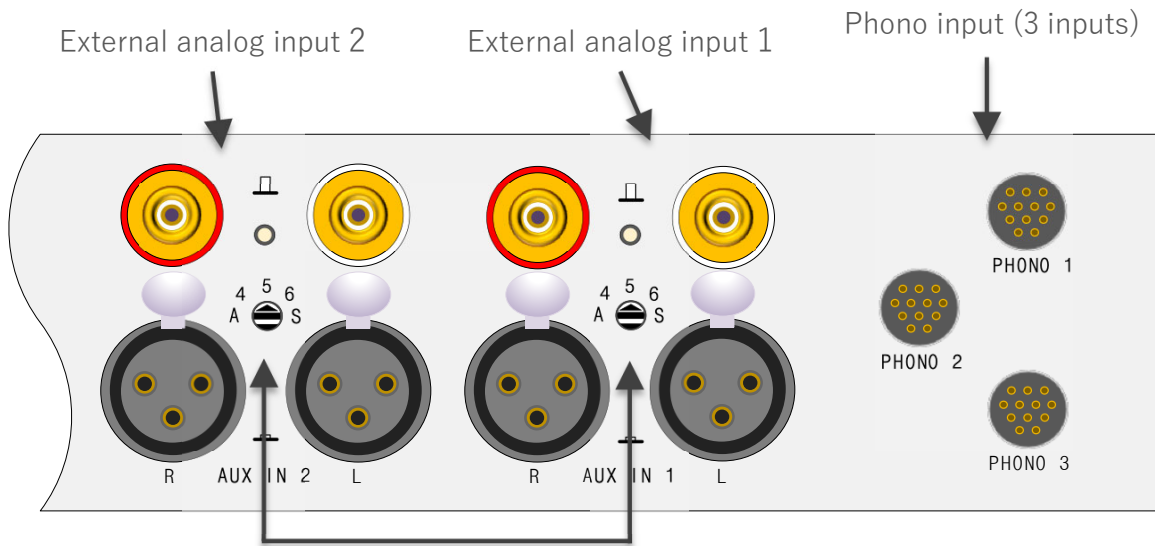


Equalizer : Turnover selector  
It is effective only when the turnover selector with low limit is selected w/o (with out).

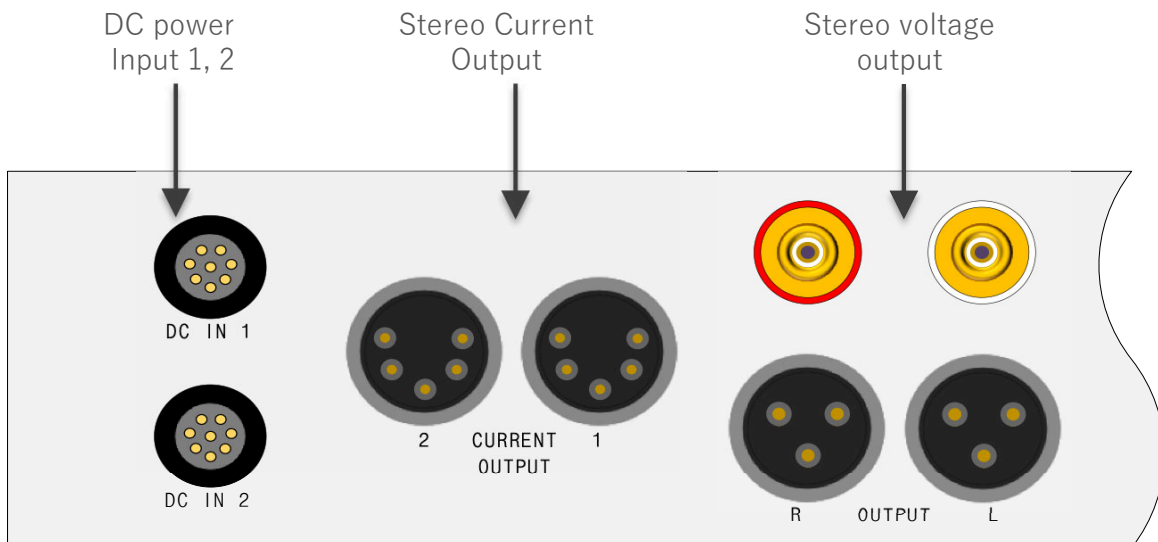


# Name of Each Part

## 2. Rear Panel (Displayed in left-right split)



Unbalanced (RCA) and Balanced (XLR) switching  
and  
Input gain switching



# Functions and Connections

Refer to the previous section "Name of Each part".

## 1. Power switch and input selector

0: Standby (power off)

PHONO1~3: Select each PHONO input and power on at the same time.

AUX1, 2: Select each external analog input and power on at the same time.

## 2. LED indicators

Unlit: MAIN POWER (on rear panel of power supply unit) off

Orange: Standby (power off)

White: Power on

## 3. Stereo, mono selector and mono cartridge selector

STEREO: Stereo playback

MONO: Monaural playback of Lch + Rch

MONO-CARTRIDGE: Select this position when using a monaural cartridge for SP or LP playback. Select this position when using a mono cartridge for SP playback or LP playback. Only the Lch signal line is used for the signal from the DIN5Pin of the player and arm. There is no problem even if L and R channels are connected in parallel in the cartridge or shell (Y-shaped connection, etc.).

Note: When a monaural cartridge is connected, selecting the STEREO or MONO position (when the PHONO input with a monaural cartridge is selected with the input selector) may cause noise. It is recommended that you select the MONO-CARTRIDGE position before connecting (selecting) a mono cartridge.

## 4. Volume control

This is the volume control volume. Turn all the way to the left for minimum, all the way to the right for maximum. The rotation angle is 300 degrees.

## 5. L/R Volume Balance

This is the volume balance adjustment volume for the left and right channels.

The rotation angle is  $\pm 150$  degrees from the center click (the top of the scale).

Full left (-150 degrees): Lch; max. +3dB (0dB for Rch)

Full right +150 degrees to Rch; +3dB max (0dB for Lch)

HF (High Frequency) Volume Fine Tuning

## 6. The HF (High Frequency) volume

Fine adjustment of High up and High down from midrange to high range gradually. The range of  $\pm 3$ dB at 20KHz can be adjusted in 1dB steps. The main purpose is to compensate for the characteristics of the cartridge.

## 7. EQ set trigger switch and output level/phase selector

R/S: This is the trigger for switching between the three equalizer settings on the left side of the panel.

If you change the equalizer setting, it will not be reflected immediately, but it will be reset to the R/S position and the equalizer setting will be reflected (set) when you change to another position (0VU or 6VU).

0VU: Standard 0VU, output in normal phase.

0VU side INV: Standard 0VU, output in reverse phase (phase inversion).

6VU: The output is +6dB (2 times) larger than standard 0VU in the normal phase.

6VU side INV: +6dB (2 times) larger than standard 0VU and output in reverse phase (phase inversion).

# Functions and Connections

## 8. Equalizer

At least two of the three dial selector switches need to be set for proper playback. In the case of an equalizer with Low Limit, such as the RIAA curve, the dial selector on the left side of the panel selects the Low Limit and the Turn-Over frequency according to the curve.

- R : RIAA curve / Low Limit ; 50Hz, Turn-Over ; 500Hz
- C, D : Columbia curve, Decca (other than London label) curve / Low Limit ; 100Hz, Turn-Over ; 500Hz
- DL : Decca (mainly London label) curve / Low Limit ; 125Hz, Turn-Over ; 500Hz
- N : IEC standard for Normal Groove (SP records) / Low Limit ; 50Hz, Turn-Over ; 350Hz

w/o: With out Low Limit, that is, when there is no Low Limit and only the turnover frequency is selected, 10 different frequencies can be selected by the second selector from the leftmost position on the panel. The unit for each number is [Hz],

F means Flat. When the R, C/D, or DL position is selected, the selection is invalid in any of the 10 positions.

The third from the left on the panel is the roll-off. This is the gain at 10KHz (less than 0dB, i.e., a negative value) when 1KHz is set as the 0dB standard according to the conventional practice, and furthermore, the minus sign is removed and the decimal point is truncated or rounded off. The typical curve settings are as follows.

- RIAA curve: Roll-Off: 13 (written as 13R)
- Columbia curve: Roll-Off; 16 (indicated as 16C)
- Decca curve: Roll-Off; 10 (notated as 10D)

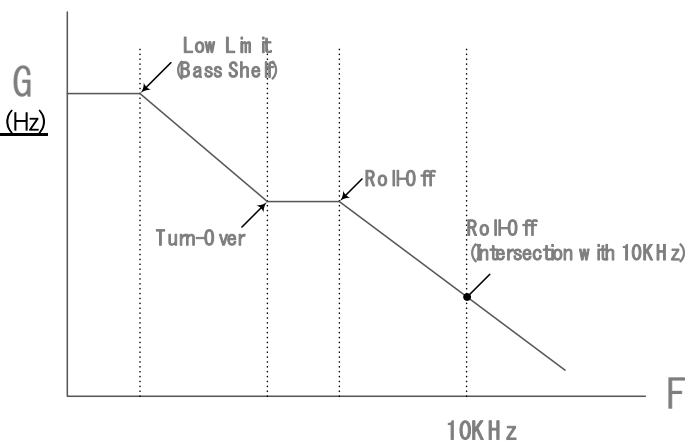
So, for example, in the case of the RIAA curve, you need to set the two dials on the left and right sides of the three dials. For other detailed settings, please refer to the following setting table for reference only. Once you have set the equalizer, you need to return it to the R/S position as explained in section 3 "EQ Set Trigger Switch".

### LowLimit Frequency (Hz)

R:50  
C · D:100  
DL:125

### Turn-Over Frequency (Hz)

150  
250  
300  
350  
400  
500  
600  
800  
1K  
F:FLAT



### Roll-Off Frequency (Hz)

0:FLAT(10KHz LPF)  
5:6120  
6:5900  
8:4400  
10D:3183  
11:2800  
12:2500  
13R:2122  
16C:1592  
F:FLAT(15KHz LPF)

## 8. Equalizer

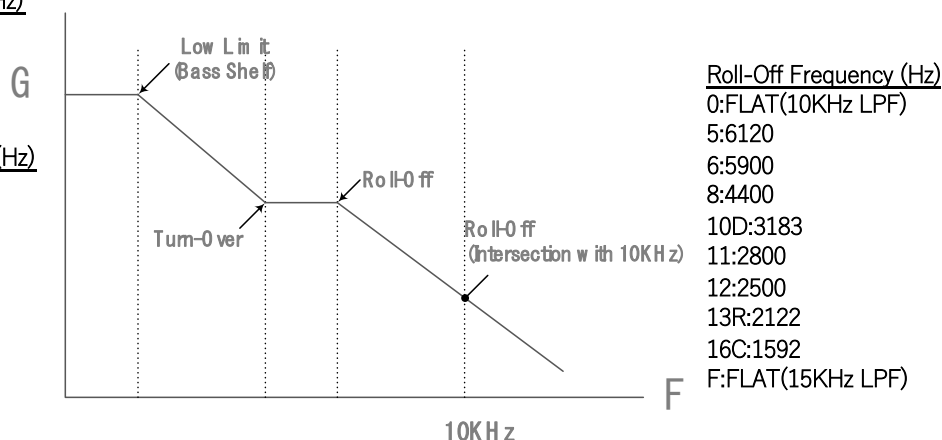
For other detailed settings, please refer to the following setting table for reference only. Once you have set the equalizer, you need to return it to the R/S position as explained in section 3 "EQ Set Trigger Switch".

### Low Limit Frequency (Hz)

R:50  
C : D:100  
DL:125

### Turn-Over Frequency (Hz)

150  
250  
300  
350  
400  
500  
600  
800  
1K  
F:FLAT



### Roll-Off Frequency (Hz)

0:FLAT(10KHz LPF)  
5:6120  
6:5900  
8:4400  
10D:3183  
11:2800  
12:2500  
13R:2122  
16C:1592  
F:FLAT(15KHz LPF)

Groove	Curve Name	Equalizations				Dial settings		
		Frequency (Hz)			Gain (dB)	Turn-Over		
		Low-Limit	Turn-Over	Roll-Off		10KHz cutw ith	Low-Limit w/o	Low-Limit
Micro-Groove 33 1/2, 45 rpm	RIAA	50	500	2122	-13.7	R	N/A	13R
	Columbia (LP)	100	500	1592	-15.5	C b D	N/A	16C
	Decca LONDON (LP)	125	500	3183	-10.9	D	N/A	10D
	DGG (TELDEC 1955-)	50	500	3183	-10.9	R	N/A	10D
	NAB (1942-)	50	500	1592	-15.6	R	N/A	16C
	NAB, NARTB (1949-)	50	500	1592	-15.6	R	N/A	16C
	AES (1951-)		400	2500	-12.3	w/o	400	12
	RCA 45 (45 rpm)		600	2500	-12.0	w/o	600	12
	RCA Old (LP)		500	2500	-12.6	w/o	500	12
	Decca LP variation British	100	500	2800	-10.9	C b D	N/A	11
	Decca LP variation USA	100	500	3183	-10.9	C b D	N/A	10D
	Decca LP variation USA		400	2500	-12.0	w/o	400	12
	Decca LP variation USA	100	500	1592	-16.0	C b D	N/A	16C
	Normal-Groove 78 rpm	ECN 78	50	354	3183	-10.5	N	N/A
CGR 78			354	3183	-10.5	w/o	350	10D
EMI (His Masters Voice)			350		0.0	w/o	350	0
Decca 78 (FRR 78, London frr 78)		150		6120	-5.6	w/o	150	5
European 78			250		0.0	w/o	250	0
300-FLAT (Bumlein)			300		0.0	w/o	300	0
500-FLAT			500		0.0	w/o	500	0
American 78 variation-6			250	5900	-6.0	w/o	250	6
American 78 variation-8			250	4400	-8.0	w/o	250	8
Columbia 78			300	1592	-16.0	w/o	300	16C

### < Supplementary Information >

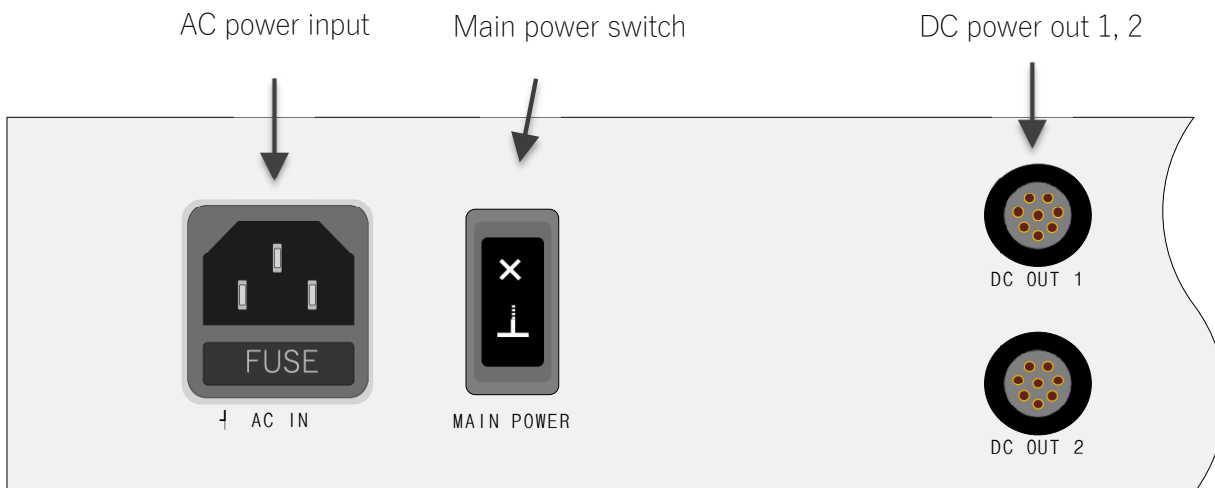
The above table is based on a variety of information, but there is no reliable proof of the age of LP records and SP records other than the RIAA curve. Record companies have been newly born and merged repeatedly, and many labels have appeared. I believe that there is no person (or persons) or material in the world who can make all of this accurate and clear. When you get a record, most of the time the equalizer curve is not clearly indicated with numerical values.

You may want to use this unit's functions to find a setting that makes sense to your own ears.

Also, in the age of old vinyl records, the whole equipment was not able to record and play back in flat frequency as we do today, so the equipment characteristics other than the equalizer curve contributed greatly to the sound quality. With this in mind, depending on the record, it is recommended to connect a retro power amplifier with a narrow bandwidth, such as a vacuum tube amplifier or speakers of that time, to enjoy the atmosphere of that time.

# Power Supply Unit

Name of the rear panel surface



Function and connection of each part (from far right)

## 1. DC power output 1, 2

There is a stabilized 15VDC line and a DC power supply line for the control system. 15VDC is supplied to each L and R channel independently.

DC 15V is supplied to the L and R channels independently. DC OUT 1 is connected to DC IN 1 on the amplifier side, and DC OUT 2 is connected to DC IN 2 on the amplifier side.

## 2. Main Power Switch

This switch is used to open and close the AC input line. The main power switch is independent of the amplifier's power switch.

The main power switch is independent of the power switch of the amplifier, and must be turned on before operating the amplifier. If the main power switch is turned off, all operations will be stopped and noise may be output from the amplifier.

Turn off the amplifier switch first, and then turn on the main power switch. 3.

## 3. AC Power Input

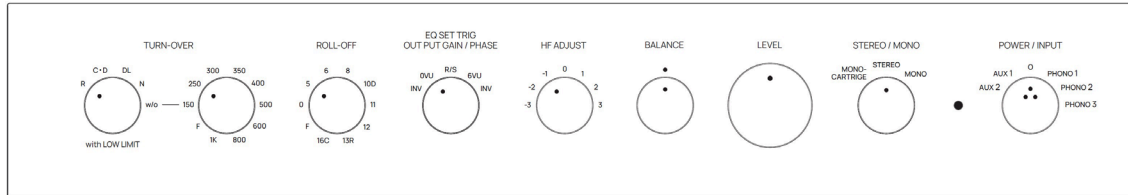
The receptacle side of the AC power cord complies with IEC-60320-C13.

AC100V to AC240V. Two fuses are built in. When replacing the fuses, remove the fuse holders using a flat head screwdriver.

When replacing the fuses, use a flat head screwdriver to remove the fuse holders.

# Product Lineup

## R1 reference / R1



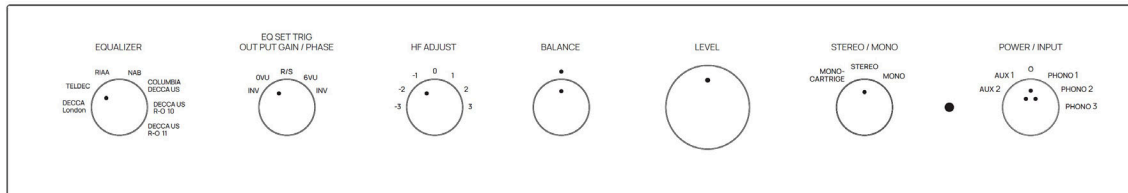
### R1 reference

- Ultimate Reference Model
- Top-of-the-line components including boards, circuits, wiring, enclosures, and insulators
- Stainless steel enclosure for better physical and electrical shielding
- Power supply unit in separate enclosure (stacked on two levels)
- Current carrying cable and two types of Current Adaptors included

### R1

- Duralumin enclosure with high physical and electrical shielding effectiveness
- Power supply unit in separate enclosure (stacked on two levels)
- Current carrying cable and one Current Adaptor included

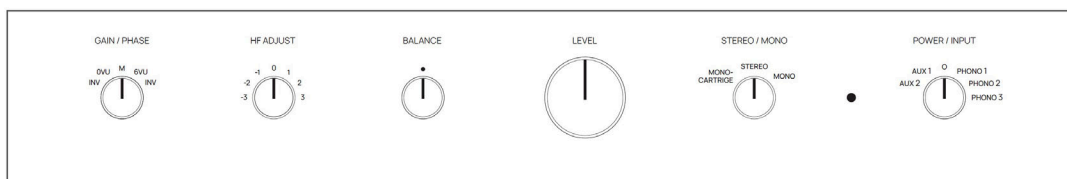
## R3



### R3

- Specifications except for SP record support in the equalizer function.
- External power supply adaptor (power supply unit in a separate enclosure is a paid option)

## R3 studio



### R5 studio

- Professional Studio Model
- Enclosure for professional studio use
- Supports only standard RIAA curves

# R1 reference



- Ultimate Reference Model
- Top-of-the-line components including boards, circuits, wiring, enclosures, and insulators
- Stainless steel enclosure for better physical and electrical shielding
- Power supply unit in separate enclosure (stacked on two levels)
- Current carrying cable and two types of Current Adaptors included

# R1



- Duralumin enclosure with high physical and electrical shielding effectiveness
- Power supply unit in separate enclosure (stacked on two levels)
- Current carrying cable and one Current Adaptor included



# R3



- Specifications except for SP record support in the equalizer function.
- External power supply adaptor  
(power supply unit in a separate enclosure is a paid option)

# R5 studio



- Professional Studio Model
- Enclosure for professional studio use
- Supports only standard RIAA curves