Roland

QUAD-CAPTURE

USB 2.0 Audio Interface

Technology Overview

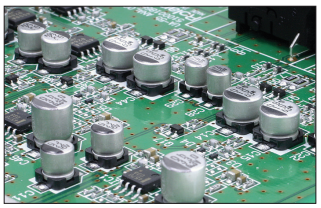
Rear Panel

- USB 2.0 audio interface with four inputs, four outputs, and MIDI
- Exceptional sound quality, with recording and playback at rates up to 192 kHz (digital I/O supported up to 96 kHz)
- Two high-performance mic preamps (VS Preamps) with phantom power
- AUTO-SENS feature automatically sets perfect input levels with a single button press
- Professional-grade audio specs in a USB bus-powered device
- State-of-the-art VS Streaming driver ensures ultra-low latency and stability
- Lightweight and compact with a rugged aluminum body

Features VS Preamps for the finest audio quality

Above all else, the true value of an audio interface lies in its sound quality. QUAD-CAPTURE's analog input stage is equipped with two VS Preamps; also found in Roland's OCTA-CAPTURE audio interface, these preamps have received rave reviews from users around the world. Designed for high-performance, they're based on the Class A mic preamps featured in Roland's V-Mixer series of commercial consoles and the V-STUDIO 700 high-end DAW system. VS Preamps offer exceptional purity and clarity of sound, reflected in their amazing input-equivalent noise level of -123 dBu, among the best in this class of audio interfaces. These allow users to capture the subtlest tonal nuances of acoustic instruments. Additionally, thanks to the maximum input level of +8 dBu, users can easily capture dynamic, difficult-to-record instruments such as percussion and bass without distortion.

VS PREAMP

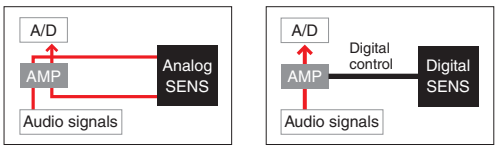


*** What is a Class A circuitry?**

Amplifier circuitries are classified A, B, C, or D depending on how the amplifying elements (transistors and/or vacuum tubes) function. Amplifiers that operate at 100% at all times using ample voltage and current flow are defined as Class A amps, and are characterized by pure sound with ultra-low distortion.

Simple analog circuitry for pure, clean sound

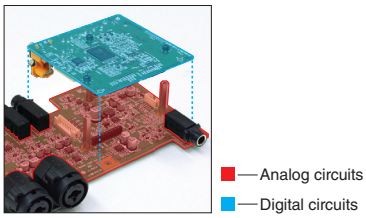
In order to achieve excellent audio quality, designers must simplify a circuit's design as much as possible to prevent sound deterioration from undesirable signal-path routing. To this end, QUAD-CAPTURE's design has eliminated as much analog circuitry as possible for controlling parameters such as input level, impedance, phase reversal, and metering, as well as low-cut filters and compressors. All of these parameters are controlled digitally with the built-in DSP, reducing the amount of analog circuitry not related to sound and therefore ensuring the cleanest signal path possible.



Typical designs　QUAD-CAPTURE

Meticulous circuit design eliminates noise and crosstalk

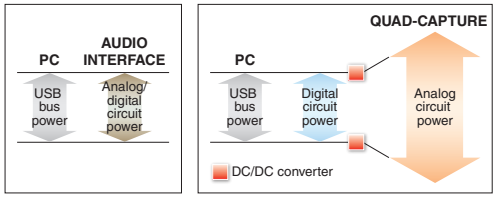
In QUAD-CAPTURE, we've completely segregated analog and digital circuitry on the circuit-board level. We've also provided different power supplies for each board, ensuring that the boards' parts operate in a stable manner to minimize the noise and crosstalk that can result from interference between circuits. Needless to say, all wirings between boards has been kept as short as possible as well. Through this great attention to detail, we've achieved a signal-to-noise ratio of 104 dB for the two analog input channels, exceptional specs that approach that of high-end outboard gear. This unique circuit design is a major factor contributing to QUAD-CAPTURE's high-quality sound.



Low-noise/wide-range power supply ensures both high-quality sound and stable operation

QUAD-CAPTURE runs on USB bus power from the host computer at all times, so you can use a simple, single-cable connection and avoid dealing with a cumbersome AC adaptor. It's also equipped with a low-noise/wide-range power supply that resolves power instabilities, negating an unavoidable drawback of USB bus power. QUAD-CAPTURE gives users pro performance even in mobile environments, as it runs its various circuits at stable voltages under all conditions. Additionally, the power supply's efficiency has been improved by 20 % over previous products, and its supply capacity has been increased as well. As a result, even with the typical limitations of USB bus powered, QUAD-CAPTURE delivers ultra-steady operation and professional specs, including +4 dBu balanced analog inputs and outputs and a high-gain +10 dBu headphone output.

Schematic of QUAD-CAPTURE's low-noise/wide-range power supply



Typical designs　QUAD–CAPTURE

The QUAD-CAPTURE's dedicated DC/DC converter delivers optimum power to all circuitry via standard USB (5 V) connections. Voltage is supplied to the digital circuit and optimally increased at the DC/DC converter to produce extremely stable power for the analog circuit. This is not possible directly connecting to USB bus power. By optimizing the power supply and increasing its range and stability, we've reduced noise levels to achieve superior audio quality.

See input levels at a glance via bright LED level meters

Each channel on QUAD-CAPTURE has a 13-segment LED level meter that surrounds the SENS knob used for setting its input level. The highly luminous LED meters allow users to easily observe input levels from a distance, while a peak hold feature provides additional assistance for setting appropriate levels.

LED level meters

AUTO-SENS automatically sets perfect input levels

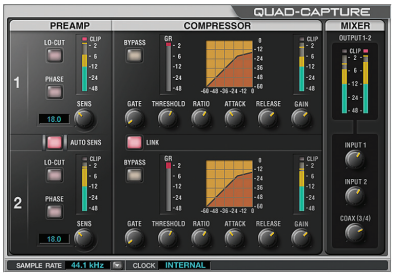
Setting optimum recording levels is an indispensable part of capturing high-quality recordings. If input levels are too high, the sound will distort; if levels are too low, you lose the advantage of the excellent resolution afforded by digital recording, and the sound suffers from signal-to-noise ratio deterioration. To solve these issues, QUAD-CAPTURE is equipped with a unique "AUTO-SENS" function that automatically sets the appropriate input level. AUTO-SENS is simple to use for beginners and pros alike: just press the AUTO-SENS button, supply sound input for a short amount of time, and the built-in DSP analyzes the volume and sets the optimum input level. AUTO-SENS is also accessible via a software-based control panel, so you can control it remotely from your computer. This handy feature makes for quick and easy setup during recording sessions.

■ AUTO-SENS button

High-performance 40-bit DSP onboard for a wide range of quality processing

QUAD-CAPTURE comes with a high-performance DSP. The DSP internally secures the dedicated memory area specially for the 40-bit-processed data, allowing you to perform a broad range of advanced sound processing with avoiding saturation of signal flow. Its core process is an integrated four-channel digital mixer, which has a direct monitoring feature that lets you monitor the input audio without routing it through your DAW program, achieving very low latency. It also comes with an internal "Loopback" routing feature that's optimum for applications such as stream broadcasting, as well as digital compressors for applying a variety of dynamic processes at the input stage. All of those data processes are performed inside DSP and resulting extremely high-quality sound, without tasking your computer. The various parameters on the digital mixer and compressors can be controlled from the dedicated software control panel, allowing you to easily tweak them from your computer.

■ Control panel



Each channel features a digital compressor, phase inversion, and a low-cut filter. You can control their parameters using the control panel's graphical interface.

VS Streaming achieves extreme low-latency recording

QUAD-CAPTURE embodies the ideal vision of next-generation audio interfaces, and Roland's latest "VS Streaming" audio-streaming technology is another feature that underscores its exceptional advantage. QUAD-CAPTURE incorporates a high-performance crystal master clock, providing a fundamental solution to "jitter" (time-based fluctuations of the clock) that causes latency and other issues. By syncing the digital circuitry, driver, and DAW program to this clock, jitter is reduced to a minimum, allowing the flow of audio data to be controlled by constant amounts. This results in an optimized buffer size, achieving latencies as low as 48 samples at 44.1/48 kHz, or approximately one millisecond with an ASIO driver. VS Streaming is a technological marriage between hardware and driver, achieving low latency, clear sound quality, and rock-solid performance that has been long sought-after in the field of music production, yet previously unobtainable. VS Streaming is Roland's innovative audio-streaming technology that achieves super-low latency, excellent sound quality, and high performance by syncing the entire system (driver and hardware) to a high-precision dedicated clock.

VS STREAMING

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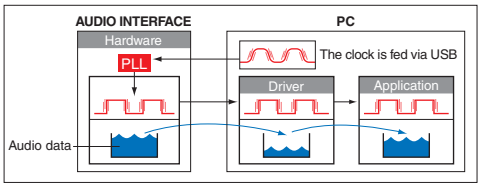
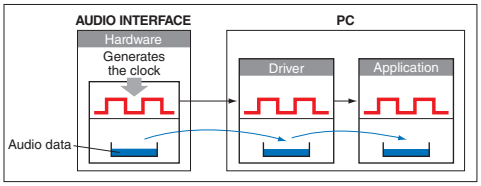
■ Typical designs

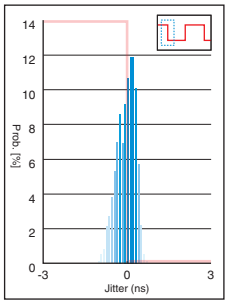


All components (audio interface, driver, DAW, etc.) sync with the clock generated on the PC. Clocks generated on PCs are inherently not very precise, as they are affected by the PC's performance and operating conditions. This results in jitter (time-based fluctuations of the clock), which in turn destabilizes the flow of audio data, resulting in latency and unclear sound.

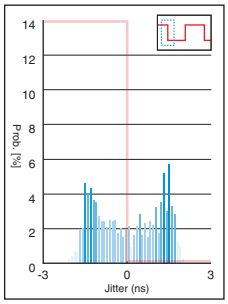
■ QUAD-CAPTURE



All components are synced to the high-performance crystal on QUAD-CAPTURE instead of the clock generated on the PC. This reduces jitter and results in rock-solid performance that is not affected by PC performance or operating conditions. Controlling jitter ensures a stable flow of audio data, and the buffer size can be optimized to reduce latency to a minimum.



■ QUAD–CAPTURE



■ Typical designs

■ Comparison of jitter

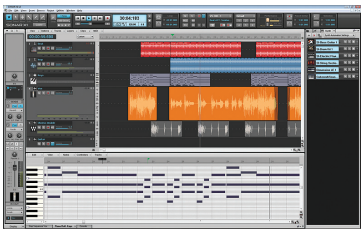
The horizontal axis of the graph shows the reference value for measurements, with 0 nanoseconds (ns) at the center to show the degree of jitter (clock fluctuation) on the scales to the left and right. The vertical axis shows numerical values of the probabilities (as percentages) that jitter can occur under normal use. Based on this comparison with typical designs, these probabilities for QUAD-CAPTURE are most pronounced in the 0 ns area, which is an indication that it delivers extremely low jitter.

Roland

Extensive specs that go well beyond class benchmarks
Supports a wide range of applications, from music production to live performances

- Headphone monitoring is essential during recording, and also for making final checks during mixing and mastering. In QUAD-CAPTURE's headphone circuit, we've increased the typical output level by +10 dBu and improved the entire circuit for excellent sound quality. This allows you to monitor the audio precisely and with adequate volume, even during live recordings where the ambient sound level may be very high.
- A ground lift switch is included, a critical feature for avoiding ground loops in live applications.
- With its compact aluminum body, QUAD-CAPTURE is rugged, lightweight, and highly portable for any mobile recording application.
- The built-in 16-channel MIDI I/O allows you to connect a keyboard, controller, or other external MIDI device.
- Included with QUAD-CAPTURE is SONAR LE, a program based on SONAR X1, the latest pro DAW software from Cakewalk. With its intuitive and easy-to-understand user interface and powerful recording/mixing features, SONAR LE gives you everything you need to begin producing music on a Windows-based computer.
- VS Streaming drivers are available for both Windows and Mac operating systems, so you can use QUAD-CAPTURE with a wide range of popular DAW programs.

Ground Lift Switch


SONAR LE

Specifications

- **Number of Audio Record/Playback Channels** [Sampling Frequency = 96 kHz, 48 kHz, 44.1 kHz] Recording: 4 channels, Playback: 4 channels, [Sampling Frequency = 192 kHz] Recording: 2 channels, Playback: 2 channels
- **Signal Processing** PC interface: 24-bit, AD/DA Conversion: 24-bit, Internal: 40-bit
- **Sampling Frequency** AD/DA Conversion: 192 kHz, 96 kHz, 48 kHz, 44.1 kHz, DIGITAL (IN/OUT): 96 kHz, 48 kHz, 44.1 kHz
- **Nominal Input Level** Input jacks 1–2 (XLR type): -60 to -6 dBu, Input jacks 1–2 (1/4-inch TRS phone type): -50 to +4 dBu
- **Nominal Output Level** OUTPUT 1–2: +0 dBu (balanced)
- **Headroom** 14 dB
- **Input Impedance** Input jacks 1–2 (XLR type): 4.8 k ohms (balanced), Input jacks 1–2 (1/4-inch TRS phone type): 15 k ohms (balanced)
- **Output Impedance** OUTPUT 1–2: 2 k ohms (balanced), PHONES: 47 ohms
- **Frequency Response** 192.0 kHz: 20 Hz to 90 kHz (+0/-8 dB), 20 Hz to 60 kHz (+0/-2 dB), 96.0 kHz: 20 Hz to 40 kHz (+0/-2 dB), 48.0 kHz: 20 Hz to 22 kHz (+0/-2 dB), 44.1 kHz: 20 Hz to 20 kHz (+0/-2 dB)
- **Residual Noise Level** INPUT 1–2→MAIN OUT: -95 dBu typ. (GAIN: min., 600 ohms terminated, IHF-A)
  * Internal Direct Monitor Mixer setting: Input channel fader: Unity
- **Dynamic Range** AD block: INPUT 1–2: 104 dB typ. (GAIN: min.), DA block: OUTPUT 1–2: 109 dB typ.
- **Connectors** Input jacks 1–2 (XLR type / 1/4-inch TRS phone type), XLR type (balanced / phantom power: DC 48 V, 6 mA Max) * Current value per channel. 1/4-inch TRS phone type (balanced), Coaxial Input connector, Coaxial Output connector, Headphone jack (Stereo 1/4-inch phone type), Output jacks 1–2 (1/4-inch TRS phone type (balanced)), MIDI connectors (In, Out), USB connector
- **Interface** Hi-Speed USB, Digital input/output: Coaxial type (Conforms to IEC60958 consumer format.), MIDI input/output
- **Power Supply** USB Bus Power
- **Current Draw** 480 mA
- **Dimensions** 184.6 (W) x 133.9 (D) x 44.3 (H) mm, 7-5/16 (W) x 5-5/16 (D) x 1-3/4 (H) inches
- **Weight** 0.57 kg / 1 lbs 5 oz
- **Accessories** Owner's Manual, Cakewalk SONAR LE DVD-ROM (for Windows), Driver CD-ROM, USB cable

* 0 dBu = 0.775 Vrms

System Reqirements

Windows

- **OS** Microsoft® Windows® 7 / Windows Vista® SP1 or later / Windows® XP Home / Windows® XP Professional SP2 or later
- **Computer** Windows compatible PC equipped with a USB 2.0 port
- **CPU/Clock** Intel® Core™2 Processor 1.6 GHz or higher
- **Memory (RAM)** 1 GB or more (2 GB or more is recommended)

* This product does not support Windows XP Media Center Edition or XP Professional x64.

Mac

- **OS** Mac OS X v10.4.11 or later
- **Computer** Apple Mac series with on-board USB 2.0 port
- **CPU/Clock** Intel® Core™ Processor
- **Memory (RAM)** 1 GB or more (2 GB or more is recommended)

* Mac computers running Microsoft Windows are not supported.
* If this product does not work correctly when connected to a USB 3.0 port, you will need to connect it to a USB 2.0 port.
* This product cannot be used with a USB 3.0 controller that does not support USB 2.0 devices.
* Even if connected to a USB 3.0 port, this product will operate as a USB 2.0 device; the performance of the product will not change.

* To use at 192 kHz, Intel® Core™2 Processor/2 GHz or higher and built-in 7200 rpm or faster hard drive are required.
* In the interest of product improvement, the specifications and/or appearance of this unit are subject to change without prior notice.

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