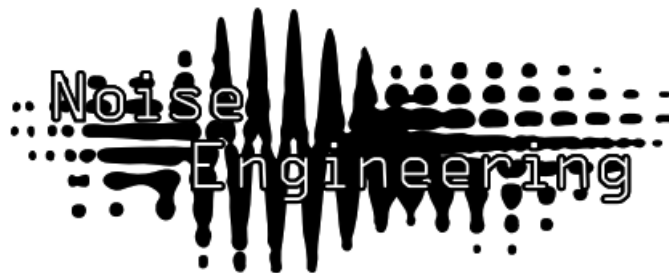




Noise Engineering Lapsus Os Instruction Manual

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Noise Engineering
Lapsus Os

Quad-channel attenuverter/attenuator and offset with faders

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Overview

Type	Attenuverter/Offset
Size	10HP Eurorack
Depth	.8 Inches
Power	2×5 Eurorack
+12V	60 mA
-12V	50 mA

Lapsus Os is a four-channel attenuator/attenuverter and offset. Designed with performance in mind, each channel can be set to either attenuate or attenuate/invert an incoming signal, adjust the offset of an incoming signal, or with nothing patched to its input, generate a $\sim 0-5\text{v}$ or $\pm 5\text{v}$ offset. Switches on the back of the module invert the fader behavior, allowing for the module to be mounted in either direction, for further customization and ease of use.

Etymology

Lapsus — from Latin lapsus: ‘sliding’ Os — from latin os ‘bones’ “Translation: Dancing Corpse”

Input & output voltages

Inputs: $\pm 10\text{v}$

Outputs:

Without voltage applied

Unipolar: $\sim 0-5\text{v}$

Bipolar: $\pm 5\text{v}$

With voltage applied

Unipolar: $\sim 0-10\text{v}$

Bipolar: $\pm 10\text{v}$

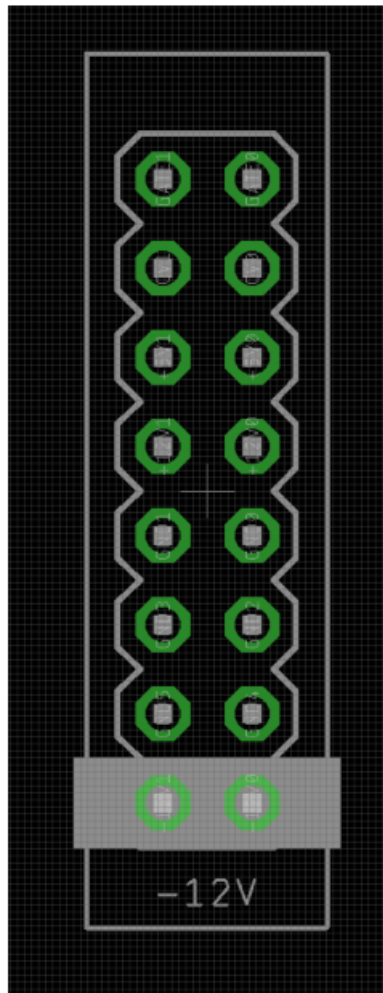
Power

To power your Noise Engineering module, turn off your case. Plug one end of your ribbon cable into your power board so that the red stripe on the ribbon cable is aligned to the side that says -12v and each pin on the power header is plugged into the connector on the ribbon. Make sure no pins are overhanging the connector! If they are, unplug it and realign it.

Line up the red stripe on the ribbon cable so that it matches the white stripe and/or -12v indication on the board and plug in the connector.

Screw your module into your case BEFORE powering on the module. You risk bumping the module's PCB against something metallic and damaging it if it's not properly secured when powered on. You should be good to go if you followed these instructions. Now go make some noise!

A final note. Some modules have other headers — they may have a different number of pins or may say NOT POWER. In general, unless a manual tells you otherwise, DO NOT CONNECT THOSE TO POWER.



Warranty

Noise Engineering backs all our products with a product warranty: we guarantee our products to be free from manufacturing defects (materials or workmanship) for one year from the date a new module is purchased from Noise Engineering or an authorized retailer (receipt or invoice required). The cost of shipping to Noise Engineering is paid by the user. Modules requiring warranty repair will either be repaired or replaced at Noise Engineering's discretion. If you believe you have a product that has a defect that is out of warranty, please contact us and we will work with you.

This warranty does not cover damage due to improper handling, storage, use, or abuse, modifications, or improper power or other voltage application.

All returns must be coordinated through Noise Engineering; returns without a Return Authorization will be refused and returned to the sender.

Please contact us for the current rate and more information for repairs for modules that are not covered by our warranty.

Interface

Faders 1-4: The main controls of LO. The LEDs in the faders show the CV that is being passed through. When in attenuverter mode, the LED will be off at 0, allowing each fader to easily be set near 0.

Uni/Bi Switches 1-4: In the Unipolar position (left), the corresponding channel attenuates the input signal. In the Bipolar position (right), the upper half of the corresponding channel fader attenuates the input signal, the lower half of the fader inverts and attenuates the signal.

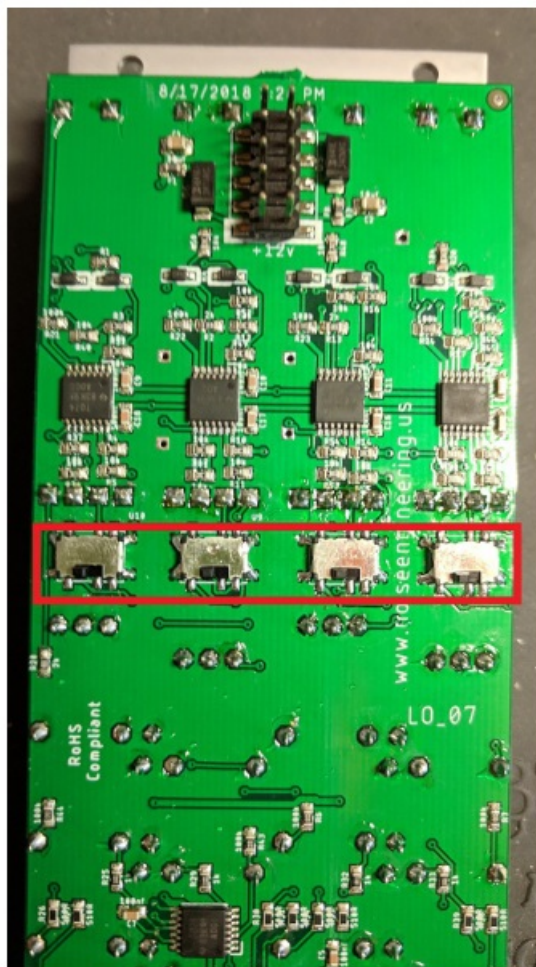
Offset inputs 1-4 (+): Sending a signal to these inputs adds an offset to the input, controlled by the fader and the mode switch.

Attenuating/attenuating inputs 1-4 (x): Sending a signal to these inputs attenuates/inverts the signal, depending on the position of the channel fader and switch.

Outputs: Each channel has a pair of identical outputs. If nothing is sent to either input of a channel, an offset will

be generated and output here, useful for controlling parameters on other modules with a single fader.

Rear-board switches: Below, in red. Inverts the corresponding channel, allowing for creative mounting in either direction. Note that each channel must be switched independently to fully reverse the functionality.



Patch Tutorial

Patch 1: Set a channel switch to the left position and patch the outputs to CV inputs on another module (for instance, Loquelic Iteritas). The fader becomes an easy-to-use controller for those parameters. Patch the rest of the LO channels to other parameters in your system to create an expressive and intuitive interface.

Patch 2: Patch a CV signal (such as an LFO) into the attenuating input of a channel.

Set the channel switch to the right position, and patch the output to a bipolar CV input in your system. Tweak the fader to attenuate and dial in the perfect amount of modulation on the fly.

Patch 3: In a case with four voices route each LO channel to the decay control for each voice. Use for centralized control over voicing.

Design Notes

This module was simply a module Stephen wanted for his case for playing live. He wanted a simple centralized control panel that could map neighboring sliders to the knobs throughout the case so that they could be played simultaneously. The original LO was remarkably simple, but a few versions in, we decided that rather than four outputs per channel, we could add inputs that would give all sorts of crazy control. We agreed it should be reversible early on but it wasn't until we got it in the hands of Markus Cancilla who immediately pointed out that Uni/Bi switches should be a mid panel. On that version, they were at the top, and completely in the way. It was so obvious! Markus was hired shortly after giving us that feedback...

Documents / Resources

Noise Engineering
Lapsus Os



Overview

Input	10V
Output	10V
Power	10W
Frequency	10Hz
Bandwidth	10Hz
Gain	10dB
Offset	10V
Resolution	10bits
Accuracy	10%
Linearity	10%
Stability	10%
Repeatability	10%
Drift	10%
Temperature	10°C
Humidity	10%
Pressure	10kPa
Altitude	10m
Speed	10m/s
Acceleration	10g
Angular Velocity	10deg/s
Angular Acceleration	10deg/s²
Force	10N
Mass	10kg
Volume	10L
Area	10m²
Length	10m
Time	10s
Angle	10deg
Frequency	10Hz
Wavelength	10m
Speed of Light	10m/s
Gravitational Constant	10m³/kg·s²
Boltzmann Constant	10J/K
Planck Constant	10J·s
Elementary Charge	10C
Faraday Constant	10C/mol
Gas Constant	10J/mol·K
Universal Gas Constant	10J/mol·K
Avogadro Constant	10/mol
Stefan-Boltzmann Constant	10W/m²·K⁴
Rydberg Constant	10m⁻¹
Fine Structure Constant	10
Bohr Radius	10m
Bohr Energy	10eV
Rydberg Energy	10eV
Ionization Energy	10eV
Electron Mass	10kg
Proton Mass	10kg
Neutron Mass	10kg
Photon Mass	10kg
Neutrino Mass	10kg
Graviton Mass	10kg
Gluon Mass	10kg
Quark Mass	10kg
Lepton Mass	10kg
Photon Energy	10J
Electron Energy	10J
Proton Energy	10J
Neutron Energy	10J
Neutrino Energy	10J
Graviton Energy	10J
Gluon Energy	10J
Quark Energy	10J
Lepton Energy	10J
Photon Momentum	10kg·m/s
Electron Momentum	10kg·m/s
Proton Momentum	10kg·m/s
Neutron Momentum	10kg·m/s
Neutrino Momentum	10kg·m/s
Graviton Momentum	10kg·m/s
Gluon Momentum	10kg·m/s
Quark Momentum	10kg·m/s
Lepton Momentum	10kg·m/s
Photon Angular Momentum	10kg·m²/s
Electron Angular Momentum	10kg·m²/s
Proton Angular Momentum	10kg·m²/s
Neutron Angular Momentum	10kg·m²/s
Neutrino Angular Momentum	10kg·m²/s
Graviton Angular Momentum	10kg·m²/s
Gluon Angular Momentum	10kg·m²/s
Quark Angular Momentum	10kg·m²/s
Lepton Angular Momentum	10kg·m²/s
Photon Spin	10
Electron Spin	10
Proton Spin	10
Neutron Spin	10
Neutrino Spin	10
Graviton Spin	10
Gluon Spin	10
Quark Spin	10
Lepton Spin	10
Photon Parity	10
Electron Parity	10
Proton Parity	10
Neutron Parity	10
Neutrino Parity	10
Graviton Parity	10
Gluon Parity	10
Quark Parity	10
Lepton Parity	10
Photon Charge	10C
Electron Charge	10C
Proton Charge	10C
Neutron Charge	10C
Neutrino Charge	10C
Graviton Charge	10C
Gluon Charge	10C
Quark Charge	10C
Lepton Charge	10C
Photon Color	10
Electron Color	10
Proton Color	10
Neutron Color	10
Neutrino Color	10
Graviton Color	10
Gluon Color	10
Quark Color	10
Lepton Color	10
Photon Flavor	10
Electron Flavor	10
Proton Flavor	10
Neutron Flavor	10
Neutrino Flavor	10
Graviton Flavor	10
Gluon Flavor	10
Quark Flavor	10
Lepton Flavor	10
Photon Mass	10kg
Electron Mass	10kg
Proton Mass	10kg
Neutron Mass	10kg
Neutrino Mass	10kg
Graviton Mass	10kg
Gluon Mass	10kg
Quark Mass	10kg
Lepton Mass	10kg
Photon Lifetime	10s
Electron Lifetime	10s
Proton Lifetime	10s
Neutron Lifetime	10s
Neutrino Lifetime	10s
Graviton Lifetime	10s
Gluon Lifetime	10s
Quark Lifetime	10s
Lepton Lifetime	10s
Photon Decay Rate	10/s
Electron Decay Rate	10/s
Proton Decay Rate	10/s
Neutron Decay Rate	10/s
Neutrino Decay Rate	10/s
Graviton Decay Rate	10/s
Gluon Decay Rate	10/s
Quark Decay Rate	10/s
Lepton Decay Rate	10/s
Photon Production Rate	10/s
Electron Production Rate	10/s
Proton Production Rate	10/s
Neutron Production Rate	10/s
Neutrino Production Rate	10/s
Graviton Production Rate	10/s
Gluon Production Rate	10/s
Quark Production Rate	10/s
Lepton Production Rate	10/s
Photon Cross Section	10m²
Electron Cross Section	10m²
Proton Cross Section	10m²
Neutron Cross Section	10m²
Neutrino Cross Section	10m²
Graviton Cross Section	10m²
Gluon Cross Section	10m²
Quark Cross Section	10m²
Lepton Cross Section	10m²
Photon Mean Free Path	10m
Electron Mean Free Path	10m
Proton Mean Free Path	10m
Neutron Mean Free Path	10m
Neutrino Mean Free Path	10m
Graviton Mean Free Path	10m
Gluon Mean Free Path	10m
Quark Mean Free Path	10m
Lepton Mean Free Path	10m
Photon Diffusion Coefficient	10m²/s
Electron Diffusion Coefficient	10m²/s
Proton Diffusion Coefficient	10m²/s
Neutron Diffusion Coefficient	10m²/s
Neutrino Diffusion Coefficient	10m²/s
Graviton Diffusion Coefficient	10m²/s
Gluon Diffusion Coefficient	10m²/s
Quark Diffusion Coefficient	10m²/s
Lepton Diffusion Coefficient	10m²/s
Photon Thermal Conductivity	10W/m·K
Electron Thermal Conductivity	10W/m·K
Proton Thermal Conductivity	10W/m·K
Neutron Thermal Conductivity	10W/m·K
Neutrino Thermal Conductivity	10W/m·K
Graviton Thermal Conductivity	10W/m·K
Gluon Thermal Conductivity	10W/m·K
Quark Thermal Conductivity	10W/m·K
Lepton Thermal Conductivity	10W/m·K
Photon Viscosity	10Pa·s
Electron Viscosity	10Pa·s
Proton Viscosity	10Pa·s
Neutron Viscosity	10Pa·s
Neutrino Viscosity	10Pa·s
Graviton Viscosity	10Pa·s
Gluon Viscosity	10Pa·s
Quark Viscosity	10Pa·s
Lepton Viscosity	10Pa·s
Photon Speed of Sound	10m/s
Electron Speed of Sound	10m/s
Proton Speed of Sound	10m/s
Neutron Speed of Sound	10m/s
Neutrino Speed of Sound	10m/s
Graviton Speed of Sound	10m/s
Gluon Speed of Sound	10m/s
Quark Speed of Sound	10m/s
Lepton Speed of Sound	10m/s
Photon Compressibility	10Pa/Pa
Electron Compressibility	10Pa/Pa
Proton Compressibility	10Pa/Pa
Neutron Compressibility	10Pa/Pa
Neutrino Compressibility	10Pa/Pa
Graviton Compressibility	10Pa/Pa
Gluon Compressibility	10Pa/Pa
Quark Compressibility	10Pa/Pa
Lepton Compressibility	10Pa/Pa
Photon Bulk Modulus	10Pa
Electron Bulk Modulus	10Pa
Proton Bulk Modulus	10Pa
Neutron Bulk Modulus	10Pa
Neutrino Bulk Modulus	10Pa
Graviton Bulk Modulus	10Pa
Gluon Bulk Modulus	10Pa
Quark Bulk Modulus	10Pa
Lepton Bulk Modulus	10Pa
Photon Surface Tension	10N/m
Electron Surface Tension	10N/m
Proton Surface Tension	10N/m
Neutron Surface Tension	10N/m
Neutrino Surface Tension	10N/m
Graviton Surface Tension	10N/m
Gluon Surface Tension	10N/m
Quark Surface Tension	10N/m
Lepton Surface Tension	10N/m
Photon Surface Energy	10J/m²
Electron Surface Energy	10J/m²
Proton Surface Energy	10J/m²
Neutron Surface Energy	10J/m²
Neutrino Surface Energy	10J/m²
Graviton Surface Energy	10J/m²
Gluon Surface Energy	10J/m²
Quark Surface Energy	10J/m²
Lepton Surface Energy	10J/m²
Photon Surface Viscosity	10Pa·s
Electron Surface Viscosity	10Pa·s
Proton Surface Viscosity	10Pa·s
Neutron Surface Viscosity	10Pa·s
Neutrino Surface Viscosity	10Pa·s
Graviton Surface Viscosity	10Pa·s
Gluon Surface Viscosity	10Pa·s
Quark Surface Viscosity	10Pa·s
Lepton Surface Viscosity	10Pa·s
Photon Surface Elasticity	10Pa
Electron Surface Elasticity	10Pa
Proton Surface Elasticity	10Pa
Neutron Surface Elasticity	10Pa
Neutrino Surface Elasticity	10Pa
Graviton Surface Elasticity	10Pa
Gluon Surface Elasticity	10Pa
Quark Surface Elasticity	10Pa
Lepton Surface Elasticity	10Pa
Photon Surface Permeability	10Pa·s
Electron Surface Permeability	10Pa·s
Proton Surface Permeability	10Pa·s
Neutron Surface Permeability	10Pa·s
Neutrino Surface Permeability	10Pa·s
Graviton Surface Permeability	10Pa·s
Gluon Surface Permeability	10Pa·s
Quark Surface Permeability	10Pa·s
Lepton Surface Permeability	10Pa·s
Photon Surface Conductivity	10S/m
Electron Surface Conductivity	10S/m
Proton Surface Conductivity	10S/m
Neutron Surface Conductivity	10S/m
Neutrino Surface Conductivity	10S/m
Graviton Surface Conductivity	10S/m
Gluon Surface Conductivity	10S/m
Quark Surface Conductivity	10S/m
Lepton Surface Conductivity	10S/m
Photon Surface Resistance	10Ω·m
Electron Surface Resistance	10Ω·m
Proton Surface Resistance	10Ω·m
Neutron Surface Resistance	10Ω·m
Neutrino Surface Resistance	10Ω·m
Graviton Surface Resistance	10Ω·m
Gluon Surface Resistance	10Ω·m
Quark Surface Resistance	10Ω·m
Lepton Surface Resistance	10Ω·m
Photon Surface Capacitance	10F/m
Electron Surface Capacitance	10F/m
Proton Surface Capacitance	10F/m
Neutron Surface Capacitance	10F/m
Neutrino Surface Capacitance	10F/m
Graviton Surface Capacitance	10F/m
Gluon Surface Capacitance	10F/m
Quark Surface Capacitance	10F/m
Lepton Surface Capacitance	10F/m
Photon Surface Inductance	10H/m
Electron Surface Inductance	10H/m
Proton Surface Inductance	10H/m
Neutron Surface Inductance	10H/m
Neutrino Surface Inductance	10H/m
Graviton Surface Inductance	10H/m
Gluon Surface Inductance	10H/m
Quark Surface Inductance	10H/m
Lepton Surface Inductance	10H/m
Photon Surface Impedance	10Ω
Electron Surface Impedance	10Ω
Proton Surface Impedance	10Ω
Neutron Surface Impedance	10Ω
Neutrino Surface Impedance	10Ω
Graviton Surface Impedance	10Ω
Gluon Surface Impedance	10Ω
Quark Surface Impedance	10Ω
Lepton Surface Impedance	10Ω
Photon Surface Reactance	10Ω
Electron Surface Reactance	10Ω
Proton Surface Reactance	10Ω
Neutron Surface Reactance	10Ω
Neutrino Surface Reactance	10Ω
Graviton Surface Reactance	10Ω
Gluon Surface Reactance	10Ω
Quark Surface Reactance	10Ω
Lepton Surface Reactance	10Ω
Photon Surface Susceptance	10S
Electron Surface Susceptance	10S
Proton Surface Susceptance	10S
Neutron Surface Susceptance	10S
Neutrino Surface Susceptance	10S
Graviton Surface Susceptance	10S
Gluon Surface Susceptance	10S
Quark Surface Susceptance	10S
Lepton Surface Susceptance	10S
Photon Surface Admittance	10S
Electron Surface Admittance	10S
Proton Surface Admittance	10S
Neutron Surface Admittance	10S
Neutrino Surface Admittance	10S
Graviton Surface Admittance	10S
Gluon Surface Admittance	10S
Quark Surface Admittance	10S
Lepton Surface Admittance	10S
Photon Surface Loss Tangent	10
Electron Surface Loss Tangent	10
Proton Surface Loss Tangent	10
Neutron Surface Loss Tangent	10
Neutrino Surface Loss Tangent	10
Graviton Surface Loss Tangent	10
Gluon Surface Loss Tangent	10
Quark Surface Loss Tangent	10
Lepton Surface Loss Tangent	10
Photon Surface Quality Factor	10
Electron Surface Quality Factor	10
Proton Surface Quality Factor	10
Neutron Surface Quality Factor	10
Neutrino Surface Quality Factor	10
Graviton Surface Quality Factor	10
Gluon Surface Quality Factor	10
Quark Surface Quality Factor	10
Lepton Surface Quality Factor	10
Photon Surface Loss Factor	10
Electron Surface Loss Factor	10
Proton Surface Loss Factor	10
Neutron Surface Loss Factor	10
Neutrino Surface Loss Factor	10
Graviton Surface Loss Factor	10
Gluon Surface Loss Factor	10
Quark Surface Loss Factor	10
Lepton Surface Loss Factor	10
Photon Surface Attenuation Coefficient	10/m
Electron Surface Attenuation Coefficient	10/m
Proton Surface Attenuation Coefficient	10/m
Neutron Surface Attenuation Coefficient	10/m
Neutrino Surface Attenuation Coefficient	10/m
Graviton Surface Attenuation Coefficient	10/m
Gluon Surface Attenuation Coefficient	10/m
Quark Surface Attenuation Coefficient	10/m
Lepton Surface Attenuation Coefficient	10/m
Photon Surface Absorption Coefficient	10/m
Electron Surface Absorption Coefficient	10/m
Proton Surface Absorption Coefficient	10/m
Neutron Surface Absorption Coefficient	10/m
Neutrino Surface Absorption Coefficient	10/m
Graviton Surface Absorption Coefficient	10/m
Gluon Surface Absorption Coefficient	10/m
Quark Surface Absorption Coefficient	10/m
Lepton Surface Absorption Coefficient	10/m
Photon Surface Emission Coefficient	10/m
Electron Surface Emission Coefficient	10/m
Proton Surface Emission Coefficient	10/m
Neutron Surface Emission Coefficient	10/m
Neutrino Surface Emission Coefficient	10/m
Graviton Surface Emission Coefficient	10/m
Gluon Surface Emission Coefficient	10/m
Quark Surface Emission Coefficient	10/m
Lepton Surface Emission Coefficient	10/m
Photon Surface Scattering Coefficient	10/m
Electron Surface Scattering Coefficient	10/m
Proton Surface Scattering Coefficient	10/m
Neutron Surface Scattering Coefficient	10/m
Neutrino Surface Scattering Coefficient	10/m
Graviton Surface Scattering Coefficient	10/m
Gluon Surface Scattering Coefficient	10/m
Quark Surface Scattering Coefficient	10/m
Lepton Surface Scattering Coefficient	10/m
Photon Surface Diffusion Coefficient	10m²/s
Electron Surface Diffusion Coefficient	10m²/s
Proton Surface Diffusion Coefficient	10m²/s
Neutron Surface Diffusion Coefficient	10m²/s
Neutrino Surface Diffusion Coefficient	10m²/s
Graviton Surface Diffusion Coefficient	10m²/s
Gluon Surface Diffusion Coefficient	10m²/s
Quark Surface Diffusion Coefficient	10m²/s
Lepton Surface Diffusion Coefficient	10m²/s
Photon Surface Relaxation Time	10s
Electron Surface Relaxation Time	10s
Proton Surface Relaxation Time	10s
Neutron Surface Relaxation Time	10s
Neutrino Surface Relaxation Time	10s
Graviton Surface Relaxation Time	10s
Gluon Surface Relaxation Time	10s
Quark Surface Relaxation Time	10s
Lepton Surface Relaxation Time	10s
Photon Surface Recombination Rate	10/s
Electron Surface Recombination Rate	10/s
Proton Surface Recombination Rate	10/s
Neutron Surface Recombination Rate	10/s
Neutrino Surface Recombination Rate	10/s
Graviton Surface Recombination Rate	10/s
Gluon Surface Recombination Rate	10/s
Quark Surface Recombination Rate	10/s
Lepton Surface Recombination Rate	10/s
Photon Surface Ionization Rate	10/s
Electron Surface Ionization Rate	10/s
Proton Surface Ionization Rate	10/s
Neutron Surface Ionization Rate	10/s
Neutrino Surface Ionization Rate	10/s
Graviton Surface Ionization Rate	10/s
Gluon Surface Ionization Rate	10/s
Quark Surface Ionization Rate	10/s
Lepton Surface Ionization Rate	10/s
Photon Surface Fusion Rate	10/s
Electron Surface Fusion Rate	10/s
Proton Surface Fusion Rate	10/s
Neutron Surface Fusion Rate	10/s
Neutrino Surface Fusion Rate	10/s
Graviton Surface Fusion Rate	10/s
Gluon Surface Fusion Rate	10/s
Quark Surface Fusion Rate	10/s
Lepton Surface Fusion Rate	10/s
Photon Surface Fission Rate	10/s
Electron Surface Fission Rate	10/s
Proton Surface Fission Rate	10/s
Neutron Surface Fission Rate	10/s
Neutrino Surface Fission Rate	10/s
Graviton Surface Fission Rate	10/s
Gluon Surface Fission Rate	10/s
Quark Surface Fission Rate	10/s
Lepton Surface Fission Rate	10/s
Photon Surface Decay Rate	10/s
Electron Surface Decay Rate	10/s
Proton Surface Decay Rate	10/s
Neutron Surface Decay Rate	10/s
Neutrino Surface Decay Rate	10/s
Graviton Surface Decay Rate	10/s
Gluon Surface Decay Rate	10/s
Quark Surface Decay Rate	10/s
Lepton Surface Decay Rate	10/s
Photon Surface Production Rate	10/s
Electron Surface Production Rate	10/s
Proton Surface Production Rate	10/s
Neutron Surface Production Rate	10/s
Neutrino Surface Production Rate	10/s
Graviton Surface Production Rate	10/s
Gluon Surface Production Rate	10/s
Quark Surface Production Rate	10/s
Lepton Surface Production Rate	10/s
Photon Surface Annihilation Rate	10/s
Electron Surface Annihilation Rate	10/s
Proton Surface Annihilation Rate	10/s
Neutron Surface Annihilation Rate	10/s
Neutrino Surface Annihilation Rate	10/s
Graviton Surface Annihilation Rate	10/s
Gluon Surface Annihilation Rate	10/s
Quark Surface Annihilation Rate	10/s
Lepton Surface Annihilation Rate	10/s
Photon Surface Creation Rate	10/s
Electron Surface Creation Rate	10/s
Proton Surface Creation Rate	10/s
Neutron Surface Creation Rate	10/s
Neutrino Surface Creation Rate	10/s
Graviton Surface Creation Rate	10/s
Gluon Surface Creation Rate	10/s
Quark Surface Creation Rate	10/s
Lepton Surface Creation Rate	10/s
Photon Surface Destruction Rate	10/s
Electron Surface Destruction Rate	10/s
Proton Surface Destruction Rate	10/s
Neutron Surface Destruction Rate	10/s
Neutrino Surface Destruction Rate	10/s
Graviton Surface Destruction Rate	10/s
Gluon Surface Destruction Rate	10/s
Quark Surface Destruction Rate	10/s
Lepton Surface Destruction Rate	10/s
Photon Surface Transformation Rate	10/s
Electron Surface Transformation Rate	10/s
Proton Surface Transformation Rate	10/s
Neutron Surface Transformation Rate	10/s
Neutrino Surface Transformation Rate	10/s
Graviton Surface Transformation Rate	10/s
Gluon Surface Transformation Rate	10/s
Quark Surface Transformation Rate	10/s
Lepton Surface Transformation Rate	10/s
Photon Surface Conversion Rate	10/s
Electron Surface Conversion Rate	10/s
Proton Surface Conversion Rate	10/s
Neutron Surface Conversion Rate	10/s
Neutrino Surface Conversion Rate	10/s
Graviton Surface Conversion Rate	10/s
Gluon Surface Conversion Rate	10/s
Quark Surface Conversion Rate	10/s
Lepton Surface Conversion Rate	10/s
Photon Surface Interconversion Rate	10/s
Electron Surface Interconversion Rate	10/s
Proton Surface Interconversion Rate	10/s
Neutron Surface Interconversion Rate	10/s
Neutrino Surface Interconversion Rate	10/s
Graviton Surface Interconversion Rate	10/s
Gluon Surface Interconversion Rate	10/s
Quark Surface Interconversion Rate	10/s
Lepton Surface Interconversion Rate	10/s
Photon Surface Oscillation Rate	10/s
Electron Surface Oscillation Rate	10/s
Proton Surface Oscillation Rate	10/s
Neutron Surface Oscillation Rate	10/s
Neutrino Surface Oscillation Rate	10/s
Graviton Surface Oscillation Rate	10/s
Gluon Surface Oscillation Rate	10/s
Quark Surface Oscillation Rate	10/s
Lepton Surface Oscillation Rate	10/s