

PIONEER MODULE SPECIFICATIONS

EA2000 Voltage Controlled Amplifier



The EA2000 Voltage Controlled Amplifier is an exponentially and/or linearly controlled amplifier for envelope shaping or control functions. It contains an EA1001 VCA submodule.

The top two signal inputs pass through their respective attenuators, and are summed with the full level input. The result appears at the output, amplified by a factor determined by the control inputs. The second signal input is inverting for increased flexibility.

The control inputs are similarly summed with the initial gain control (which effectively varies from -5 to +5 volts) to produce the total input control voltage.

The 3 position mode switch determines the function of the control voltages. In linear mode, the amplifier has zero gain for total control voltages below zero, and the gain increases linearly above zero, passing through unity at +5 volts. In exponential mode, the amplifier again has unity gain at +5 volts, and changes 10 dB per volt around this point.

With the mode switch in the center position, the two leftmost control inputs and the initial gain control behave the same as in linear mode. The rightmost control input, however, acts as a multiplier on the gain, with a sensitivity of 10 dB per volt.

Maximum gain available from the amplifier is approximately +6 dB.

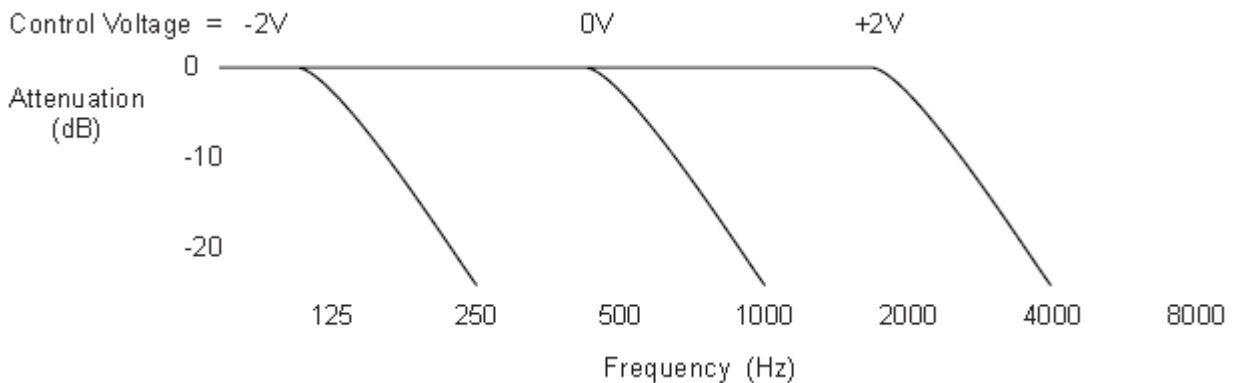
EA2100 Voltage Controlled Low Pass Filter



The EA2100 Voltage Controlled Lowpass Filter is an exponentially controlled lowpass filter with variable Q for electronic music applications. It contains an EA1100 VCF submodule.

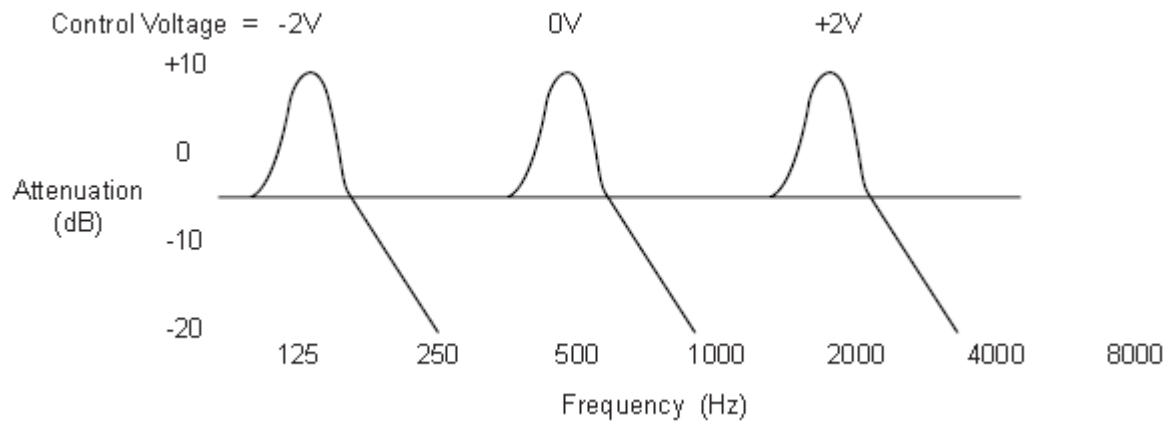
The top two signal inputs pass through their respective attenuators and are summed with the full level input to form the total signal input. This signal is then lowpass filtered with a cut-off frequency determined by the sum of the initial cut-off frequency controls and the control inputs. The cut-off slope is 24 dB/octave, and the signal path is DC coupled. The control inputs are algebraically summed to give a total control input voltage, which will vary the cut-off frequency one octave per volt around the initial cut-off frequency.

The keyboard switch allows instant patching of either of two keyboards at precisely one volt per octave. The 1V/octave control input jack is also accurately calibrated. The filter's operation is best illustrated by the pass characteristic, a plot of attenuation against signal frequency. The first illustration shows typical curves with the initial cut-off frequency controls at midrange (500 Hz) and the Q control fully counter clockwise.



Although maximum accuracy is maintained over the range of 20Hz - 20kHz, the cut-off frequency may be brought as low as 1Hz for special effects.

The Q control varies the resonance of the filter at the cut-off frequency. At high Q, the pass characteristic looks like this:



As the Q approaches maximum setting, the filter breaks into oscillation, producing a pure sine wave. Lowest distortion occurs with the Q control set barely into the oscillation region.

EA2200 Voltage Controlled Oscillator



The EA2200 Voltage Controlled Oscillator is a complete, four waveform, exponentially and linearly controlled oscillator with an output mixer. It is exceptionally stable and accurate for use with full size synthesizer keyboards. It contains an EA1201 VCO submodule, and an EA1210 wave converter submodule.

The upper three inputs are for frequency control. The uppermost is attenuable from 1 volt per octave with exponential response; the center has AC coupled linear response with a maximum sensitivity of 20% per volt. The lowest input responds exponentially at precisely 1V/octave. The keyboard switch will instantly connect either of two keyboards at exactly 1V/octave.

The oscillator's initial frequency can be adjusted by the coarse control over more than ten octaves, while the fine adjustment with its four semitone range allows precise tuning.

The range switch shifts the oscillator initial frequency down ten octaves. The frequency can be swept, however, over the entire twenty octave range from 0.03Hz to 30kHz.

The pulse width control and the pulse width modulation input vary the duty cycle of the pulse waveform from 0% to 100%. Maximum sensitivity is 10%/volt.

The four upper output jacks give each of the waveforms at full level (10V peak-to-peak for sine, triangle, and pulse, 0 to +5V for sawtooth). The waveforms are phased as shown on the panel; the falling edge of the pulse waveform is varied by the pulse width voltage. The output mixer enables the creation of waveforms with infinitely variable harmonic content. The mixer is inverting, allowing the oscillator to simultaneously produce any output waveform and its inverse for control purposes.

The sync switch allows phase-locking any oscillators in the system. Oscillators tuned to whole number ratios will lock if their sync switches connect them to the same sync bus. The range of pull is slightly less than a semi tone. The sync input will force the sawtooth to discharge, taking the other waveforms to their analogous locations, when a rapidly falling edge is applied. The gate input synchronously turns the oscillator off when the input exceeds about +2.5V. As long as the high level is maintained, the sawtooth is not allowed to discharge, and rests slightly above +5 volts. As soon as the gate input is brought low, the discharge occurs, and the oscillator runs again. The gating and sync input features are not only useful in control oscillators at subaudio frequencies, but also produce interesting timbres when both the controlling and sync'd or gated oscillators are run at audio rates.

EA2210 Sawtooth Pulse Voltage Controlled Oscillator



The EA2210 Sawtooth/Pulse VCO is a two waveform exponentially voltage controlled oscillator with many of the features of our 2200 VCO. It contains the stable and accurate EA1201 VCO submodule.

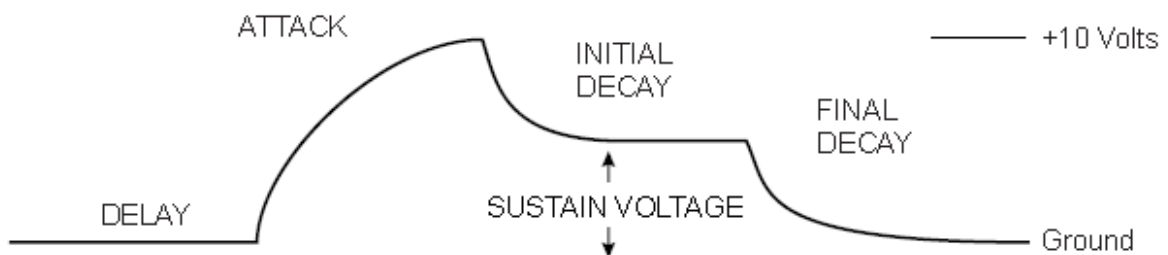
The oscillator's frequency is determined by the sum of the settings of the coarse and fine initial frequency controls and any frequency control inputs. Control voltages may be applied from either of 2 keyboards via the keyboard switch, through the precision 1V/octave input, or through the attenuated frequency control input. As with the 2200, switching to low range lowers the frequency ten octaves, but the entire 20 octave range may be continuously swept.

The pulse width control and the pulse width modulation input are summed and vary the duty cycle of the pulse waveform from 0% to 100%, with a maximum sensitivity of 0%/volt. The phase relationship between sawtooth and pulse is the same as in the 2200: the pulse rises as the sawtooth falls, and the pulse falling edge location is controlled by pulse width modulation.

EA2350 Dual Delayed Transient Generator



The EA2350 Dual Delayed Transient Generator module contains two independent fourphase electronic music transient generators in a single module. It is based on two EA1350 submodules. With the triggering switch in the external position, the module will produce a four-phase transient when triggered by an external gate:

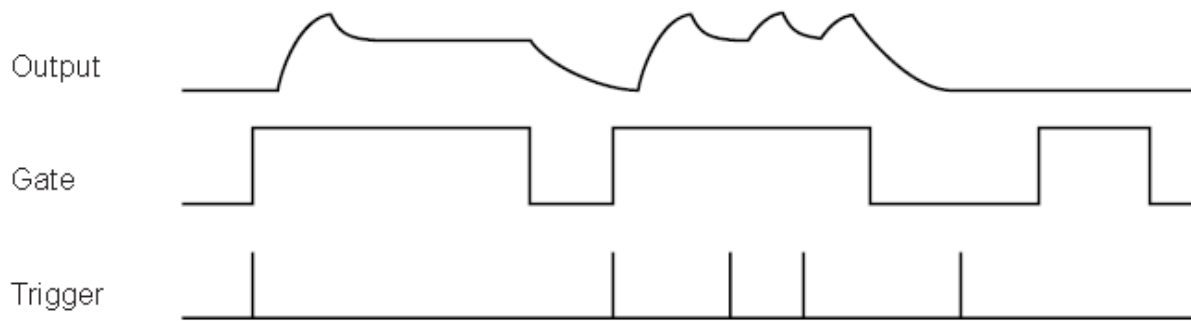


The time constants for the four independent phases, and the sustain voltage, are determined by the settings of the appropriate controls.

In the keyboard mode, the module will similarly respond to the depression of a key (producing simultaneous gate and trigger) with a delay, attack, initial decay, and final decay.

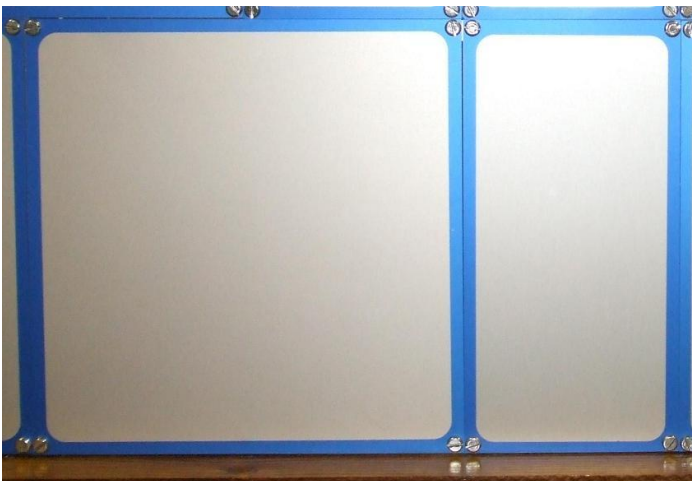
Should an additional key be depressed before the first is released, a new attack will begin after the delay time has elapsed. When all keys are released, final decay phase always begins, and no further attacks will occur. If the delay function is not desired, the delay control should be set fully counter clockwise.

KEYBOARD FUNCTION:



The manual gate acts in the same manner as an external gate input, allowing the user to conveniently determine the effect of a particular transient generator section within a complex patch. The attack, initial decay, and final decay contours are all exponential functions in time, whose time constants are variable over a wide range. The controls vary the time constants exponentially, resulting in remarkably smooth and accurate control over the entire range. The standard control range for the time constants is 1 millisecond to 10 seconds (3 msec to 3 seconds on delay), but the range can be expanded or reduced on request. The gate lamp indicates the presence of a high level (logic "1") on the gate input.

EA2800, EA2801, EA2802 Blank Panels



These are blank panels designed to fill empty spaces in your modular system. There are 3 sizes available

EA2800 3" x 6" Blank Panel

EA2801 6" x 6" Blank Panel

EA2802 9" x 6" Blank Panel

EA2905 Power Supply Panel



The EA2905 Power Supply Modules are complete power systems for the Pioneer Modular synthesizer. The 2905's front panel contains the power switch and 3 pilot lamp, plus multiple input/outputs for two keyboards. When a keyboard is not connected, the associated system busses can be used for routing any signal by applying via these power supply panel jacks.

The interface panel (on cabinet rear) holds the power cord connector, fuse, and connectors jack sockets for the two keyboard bus inputs. General purpose 24 pin connectors can be added for custom functions, or inter-cabinet firm-wiring.

The power supplies are current limited, overvoltage and reverse voltage protected and factory calibrated. One 2905 module is required per cabinet.

EA2906 Multiple Panel



The EA2906 multiple panel consists of eight four-wide multiples.