Noise Engineering
Quantus Pax
4-channel transposable precision adder
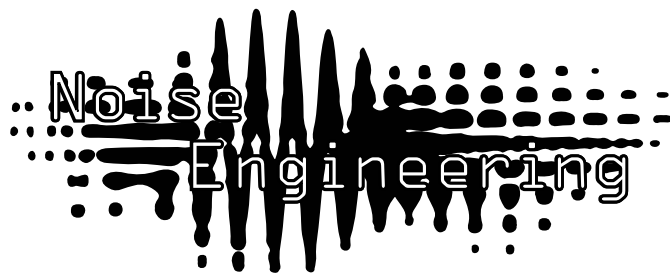
Overview

Type	Quantus Pax
Size	6HP Eurorack
Depth	.8 Inches
Power	2x5 Eurorack
+12 mA	85 mA
-12 mA	85 mA

Quantus Pax is a four-channel precision adder, buffered multiple, and polyphonic transposition utility. Each channel has two CV inputs and can be further modified by the three Xpose inputs. QP is made with high quality low-tolerance resistors for unbeatable accuracy. Patch-wide key changes, polyphonic movement, mathematically derived melodies, and more are all to be had with this simple but useful utility.

Etymology

Quantus -- from Latin: "how many"
Pax -- from Latin: "harmonious"

"How much harmony"

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.

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.
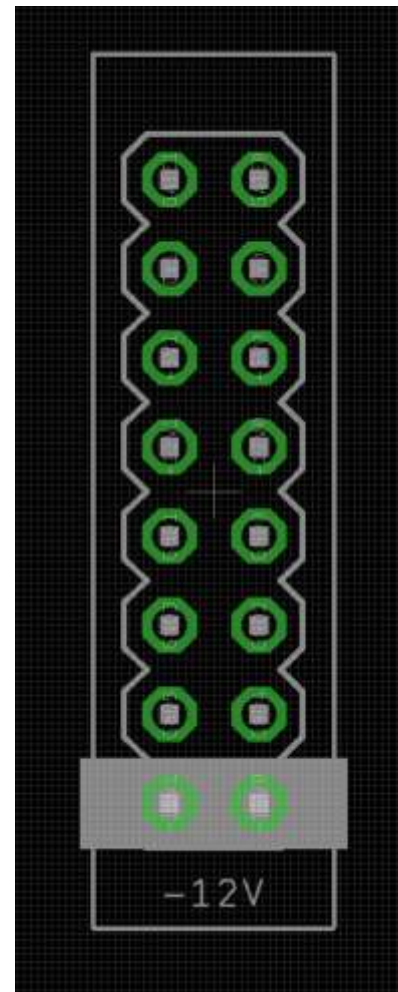
Warranty

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 of the original retail purchase (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.

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

Interface

Upper input 1-4:

CV input. Summed with channel's lower input and the three xpose inputs. The upper inputs of each channel are circularly normalled together; patching to an input breaks normalization.

Lower input 1-4:

CV input. Summed with channel's upper input and the three xpose inputs.

Output 1-4:

CV outputs. Sum of each channel's two inputs and the three xpose inputs.

Xpose inputs:

CV inputs for global transposition. Each input is summed to all four channels simultaneously.

Patch Tutorial

Patch 1:

Patch a sequence to the upper input of channel 1. Patch another sequence or other 1v/octave voltage source to channel 1's lower input. Patch channel 1's output to an oscillator's pitch input. Listen to how the two sequences sum together and create new-but-related melodies.

Patch 2:

Since the upper inputs of each channel are normalled together, QP can be used as a buffered multiple with a twist. Using the same patch as the previous example, patch some of the other channel's outputs to other pitch destinations in your system. The signal is split pitch-accurately to each output.

For even more fun, the original sequence can then be modified per-channel by inputting other voltages to each channel's lower input.

Patch 3:

Patch each CV of a polyphonic pitch sequence (like a chord or multiple melodies/harmonies) to separate channels on QP. The xpose inputs can now be used to transpose all four inputs at once. A separate sequence or octave switch like Quant Gemi can be used for transposition, an LFO can be used to add universal vibrato, and more.

Patch 4:

Summing melodies and harmonies to create new countermelodies is a great way to generatively create mathematically related musical ideas.

Take two pitch CV sources. Mult them to two oscillators and to the first and second inputs of a channel of QP. Take the QP channel's output and patch it to a third oscillator. A new melody has been created, based off of the pitch information of the other two notes.
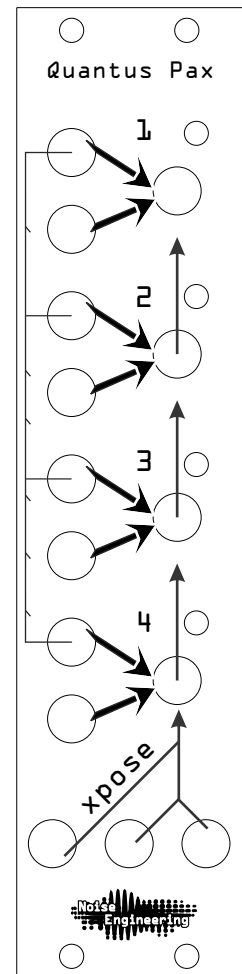
Technical Details

QP is built using extremely high quality .01% tolerance resistors for zero-compromise accuracy in voltage summing.

Input and output voltages

All of QP's ins and outs are rated to -10v - +10v.

Design Notes

QP started simply enough to address the relative lack of ease of transposing things in Eurorack. Our first prototype had a slightly different layout, with only two transpose ins and a third CV input on channel 4. Some internal warring occurred within NE -- the typical kind we have here where we take a side, argue, and by the end, everyone has changed their side. Over time, we all came to agree that a third transpose in would be more useful to most people than the third CV input. So we revised the PCB and rebuilt.

Somewhere along the way, the idea of normaling the top inputs came to us too. It seemed quite odd at first, but the more we talked about it, the more all of us were in love with the idea. It got put into second version.

When it came time for production, we were concerned about price. The high precision resistors we were using pushed the build cost up so high that all of us just stared at it for a while. Concerned about cost, Kris spent a couple of hours carefully replacing every resistor on the board to see if a lower precision part would suffice…only to test it and find way too much drift.

Stephen then wrote a program to test the probability of failures at each value for the resistor that we could find (math ftw) and if we learned that if dropped to a lower value, about 20% of the modules we made would have at least one channel that wasn't pitch accurate. Begrudgingly, we stuck with the more expensive part, because the build really just required it.

Special Thanks

Bana Haffar was one of the inspirations for the QP as we lamented (multiple times over multiple years) how hard it is to do a key change in modular. JJ Abrams gave us the kick we needed to get the QP into production.