

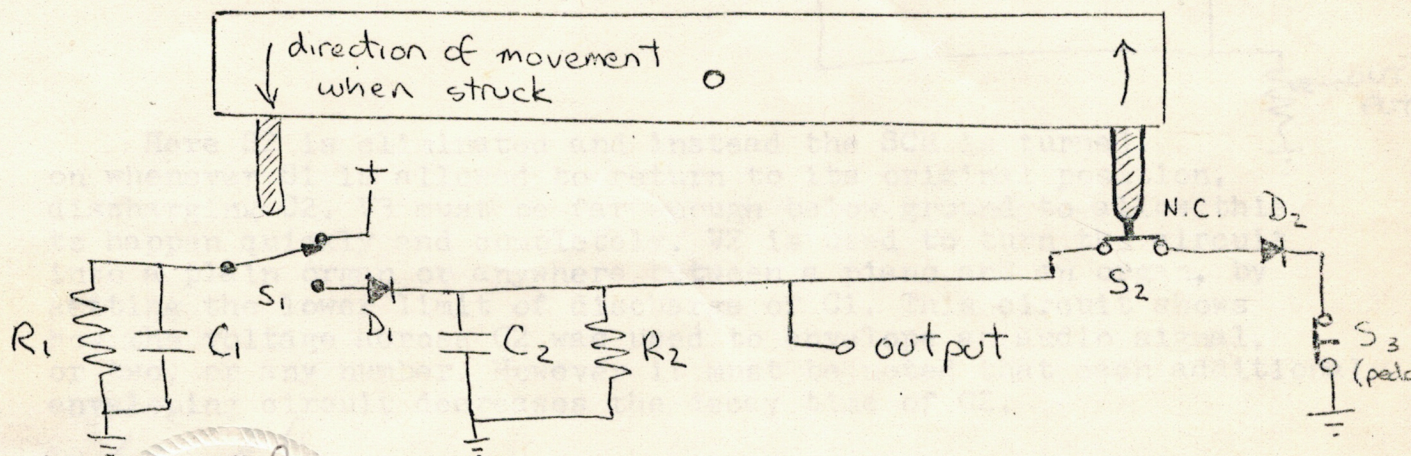
# RECORD OF PROGRESS TO DATE ON DESIGN OF ELECTRONIC PIANO KEY

1

For the past few months my roommate, Greg Kusnick and myself, George Stetten, have been involved in experimenting with and developing what is as far as we know a new idea in electronic organs and pianos. We have decided now to make a record of what we have accomplished so far so as to establish the originality of our ideas.

The basic problem we were concerned with was that of the lack of control one has when playing the electronic organ, control not over the entire output of the instrument at once, such as the stops and volume pedal on the normal electronic organ, but over the individual notes. Present electronic organs are nothing but a matrix of switches each being on or off at a given time. It seems to us that this system entirely lacks the most important parameter of the keyboard, that is, how hard the individual note is struck. As far as we know all present regular and electric pianos translate this parameter into volume by means of some mechanical system. Our object was to do it completely electronically.

Our original idea was to have a stationary mounted coil through which a magnet was pushed by the key. The voltage generated would be a function of the velocity with which the key had been pushed and could be used to control the voltage of an oscillator. However we soon abandoned this idea for another more simple one pictured below.



Subscribed and sworn  
to before me this 12th  
day of July, 1974  
Walter L. Reed  
My Comm. expires May 1, 1977

7/12/74 George D. Stetten

7/12/74 Gregory C. Kusnick

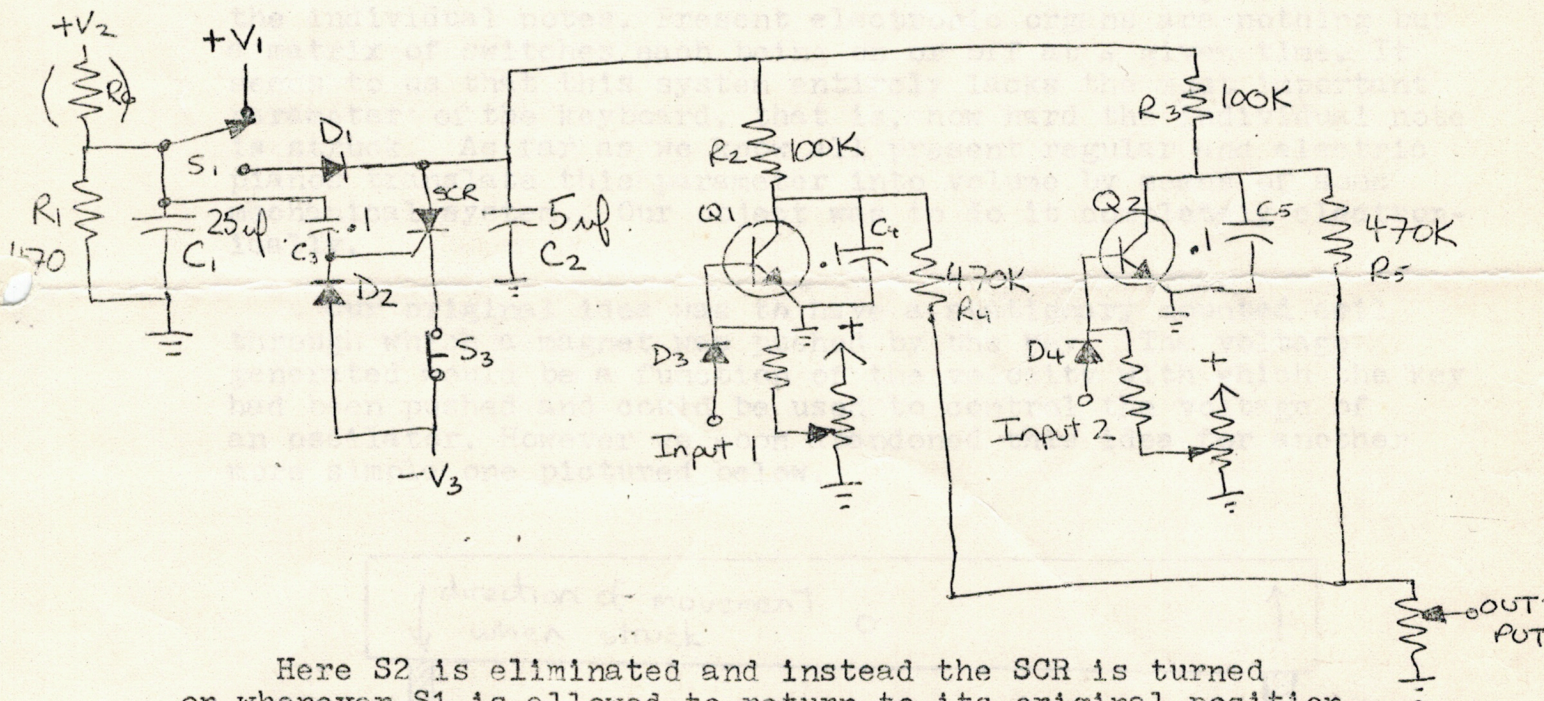


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2

C1 is kept fully charged until the key is depressed a small amount and S1 opens. C1 then begins to discharge through R1. When S1 is fully depressed C2 becomes charged to whatever voltage is on C1 (assuming C2 is much less than C1). C2 then discharges through R2 independent of anything to the left of D1. The RC values are picked to make C1 discharge much faster than C2. The faster the key is depressed the less C1 has had a chance to discharge, and the greater the voltage transferred to C2. When the key is allowed to return to its original position S2 closes and assuming the pedal is not depressed C2 discharges completely. The output here is a voltage which is used to control the volume of the note.

This was developed into the circuit pictured below.



Here S2 is eliminated and instead the SCR is turned on whenever S1 is allowed to return to its original position, discharging C2. V3 must be far enough below ground to allow this to happen quickly and completely. V2 is used to turn the circuit into a plain organ or anywhere between a piano and an organ, by setting the lower limit of discharge of C1. This circuit shows how the voltage across C2 was used to envelope an audio signal, or two, or any number. However it must be noted that each additional enveloping circuit decreases the decay time of C2.

Submitted and shown  
to before me this 12

Day of 1974  
Walter A. Reed  
My Comm expires  
May 1, 1977

7/12/74 George D. Stetten

7/13/74 Luigi P. Thirion