Electric Druid PentaNoise Generator

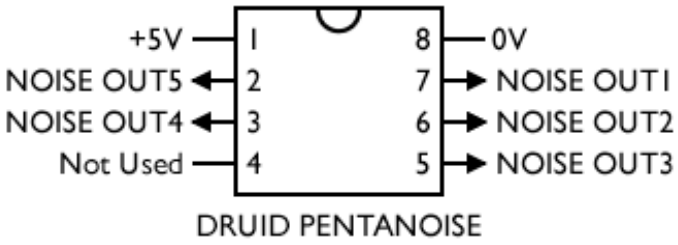
Introduction

This very easy-to-use digital noise source provides five channels of independent pure white noise over the full audio spectrum.

The Electric Druid PentaNoise Generator uses a 47-bit linear feedback shift register (LFSR) algorithm to generate pseudo-random bits at an output rate of around 148KHz. The output bit pattern will not repeat for over 3½ years. The high output rate ensures that the noise is pure white throughout the audio spectrum.

Since a whole new byte of random data is generated by the LFSR on each processing loop before individual bits of that byte are placed on the outputs, the effect is of five separate 44-bit LFSRs run in parallel. Each output has its own sequence which is not related to the other outputs.

Pinout Diagram



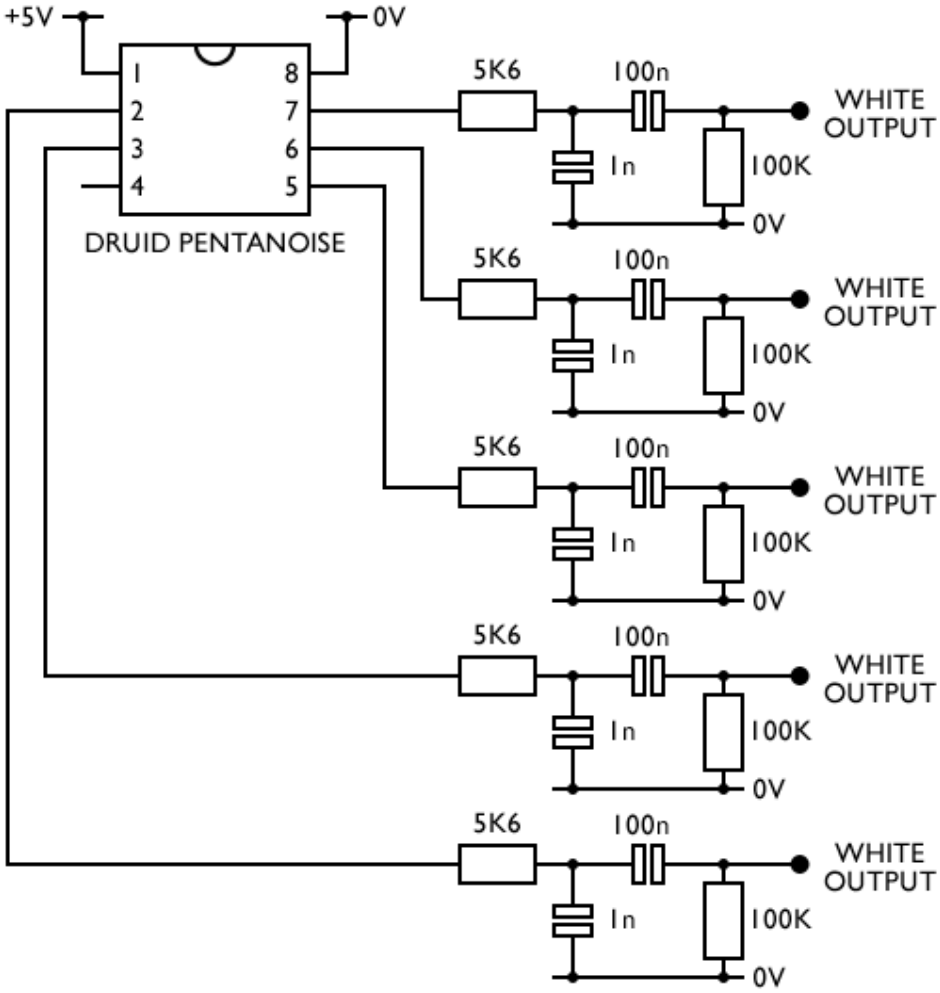
Pin	Function	Details	Notes
1	+5V	Power supply	
2	NOISE OUT5	0-5V digital output	Random digital pulses @ 148KHz, 0-5V
3	NOISE OUT4	0-5V digital output	Random digital pulses @ 148KHz, 0-5V
4	Unused	0-5V digital input	
5	NOISE OUT3	0-5V digital output	Random digital pulses @ 148KHz, 0-5V
6	NOISE OUT2	0-5V digital output	Random digital pulses @ 148KHz, 0-5V
7	NOISE OUT1	0-5V digital output	Random digital pulses @ 148KHz, 0-5V
8	0V	Power supply	

Application Notes

The chip is very simple to use. Once powered up, it produces random 5V pulses on the five output pins. This digital noise output can be used as-is, or can be lowpass filtered to provide an analogue audio noise signal. A simple RC filter is all that is required. An example is shown below.

Note that the digital noise signal has only two levels; 0V and +5V. Although this sounds the same as analogue white noise to the human ear, sometimes the difference is significant - if the chip is used to feed a Sample-and-Hold, for example.

Circuit diagram for five channel analogue white noise generator



The 148KHz digital noise outputs from the chip are followed by a RC lowpass filter (5K6/1n gives Fc=28KHz) and a RC highpass filter for DC blocking (100n/100K gives Fc=15Hz). Because of the highpass filter, each output will take 50msecs to settle at turn on. Outputs levels are approximately +/-2.5V (e.g. 5Vpp around 0V).