Dirty Electronics: Dirty Carter Experimental Sound Generating Instrument

John Richards 2010 (2nd ed.)
"An Endeavour of Chris Carter and John Richards"

contact@dirtyelectronics.org
http://www.dirtyelectronics.org

The Dirty Carter Experimental Sound Generating Instrument uses a dual 4-stage shift register. Each register is controlled independently. Two oscillators are used per register: one as a clock, the other as input data that is cascaded through the four stages. The outputs from the stages are mixed together. A fast clock rate produces a crude form of wavetable synthesis, whilst a slow clock rate creates audible pulses and clicks. The clock speed and the data input's frequency are controlled by touch electrodes/pads. By tilting the instrument, sound from both the 4-stage shift registers can be mixed together. Glitchy noise, deep drones and percussive peeps!

Features

Digital noise, Feedback, Wavetable synthesis
Self-supporting/hand-held device, Tilt and touch control

Playing the Instrument

Find your own way to play the instrument. Some tips: One stage of the shift register is controlled by touching the left feathers and electrodes, the other by the feathers and electrodes on the right. Lick your left thumb and index finger. Bridge the circular electrodes D and E on the back of the instrument with the index finger (see Appendix 1). This controls the pitch/frequency of an oscillator used as the data input for the shift register. Do the same using the thumb on the eyes of the peacock feathers A and B (see Appendix 1). This controls the frequency of an oscillator used as a clock to control the speed at which the data is passed through the shift register. With the instrument flat as a reference point, tilt the instrument to the left (left hand down), and slightly up (towards you). A gnarling oscillator sound should be heard. Thumb and finger/fingers (board back and front/both oscillators) need to be used simultaneously for 'normal' functionality.

The second register (right side touch pads) can be controlled in a similar manner. Tilting the instrument to the right will mix the signals of both stages of the shift register. Tilting the instrument back to the left will result in just one shift register being heard (left side). Because multiple signals from the circuit are running through the human body, various spurious and 'bleeding' sounds may occur.

Tilting the instrument forward in most cases produces a low pass filter effect (bass/muffled tone). Tilting back produces a brighter sound.

Other touch pads: A very slow clock speed can be created by touching the middle and lower peacock feathers (B and C, H and I). Whilst also inputting data as mentioned above, pulses, clicks and peeps will be heard.

The bottom circular touch pads (F and L), used with the other pads, create a feedback loop for a register (the output of a register is fed back into the data input). This generally changes the timbre of the sound.

The moister the fingers and the greater pressure on the touch pads the higher the pitch and denser the sound.

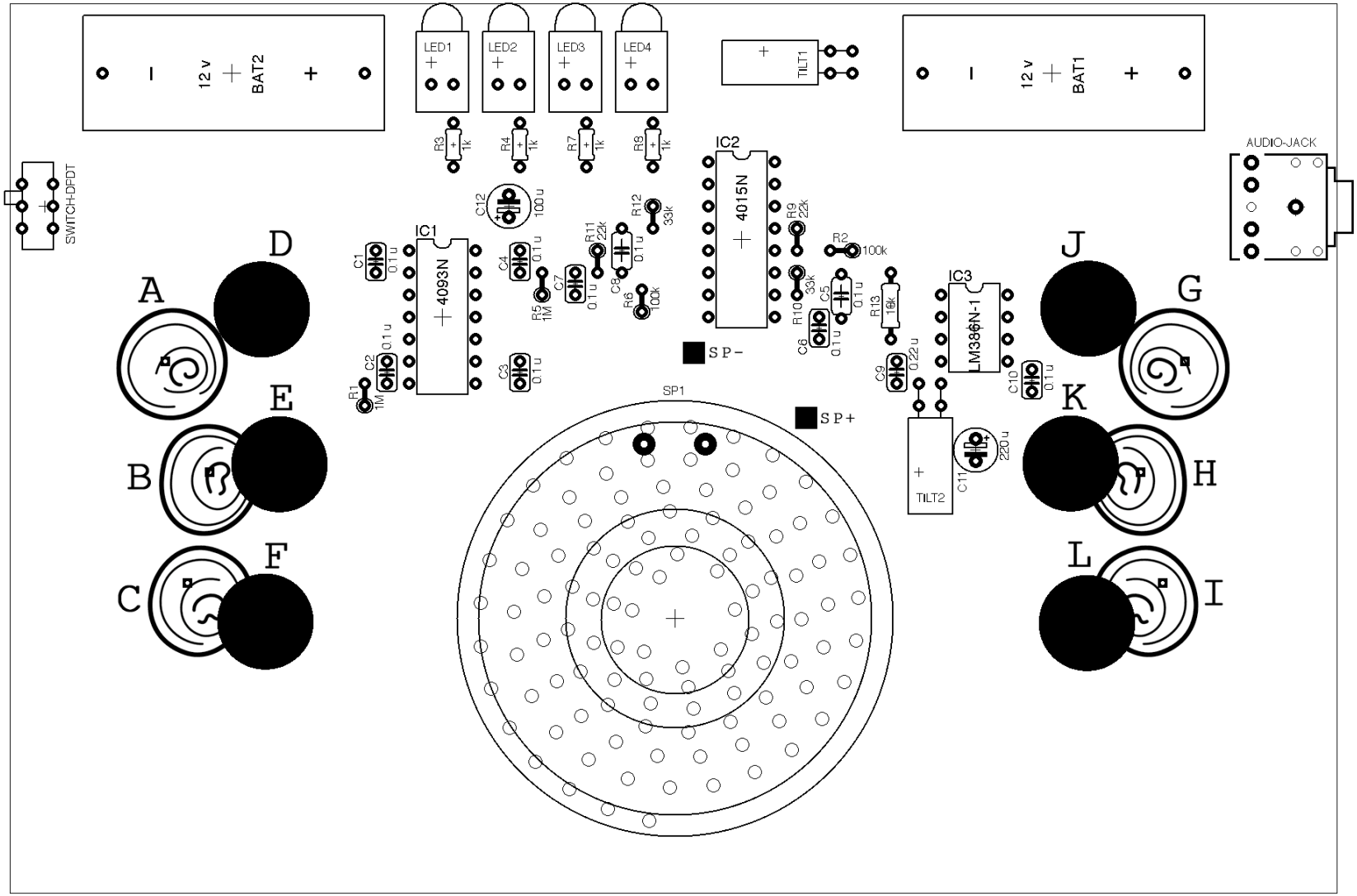
Reference

Brindley, Keith. *Starting Electronics*. Amsterdam: Elsevier/Newnes, 2005.
Collins, Nicolas. *Handmade Electronic Music: The Art of Hardware Hacking*. New York [etc.]: Routledge, 2006.
Henry, Thomas. *The Noise Generator Cookbook*. Magic Smoke Electronics, 2009
Horowitz, Paul and Hill, Winfield. *The Art of Electronics*. 2nd Edition, Cambridge University Press, 1989.
Lancaster, Don. *CMOS Cookbook*. Indianapolis: H.W. Sams, 1977
Richards, John. "Getting the Hands Dirty," *Leonardo Music Journal* (18) 2008.
Richards, John. *Nine Easy Pieces for the Sudophone*. 2009.

Part List: Dirty Carter Experimental Sound Generating Instrument

C1	0.1 uF	
C2	0.1 uF	
C3	0.1 uF	
C4	0.1 uF	
C5	0.1 uF (5mm package)	
C6	0.1 uF	
C7	0.1 uF	
C8	0.1 uF (5mm package)	
C9	0.22 uF	
C10	0.1 uF	
C11	220 uF	
C12	100 uF	
IC1	4093N	DIL14
IC2	4015N	DIL16
IC3	LM386N-1	DIL08
LED1	LED4.8MM	
LED2	LED4.8MM	
LED3	LED4.8MM	
LED4	LED4.8MM	
R1	1M	
R2	100k	
R3	1k	
R4	1k	
R5	1M	
R6	100k	
R7	1k	
R8	1k	
R9	22k	
R10	33k	
R11	22k	
R12	33k	
R13	10k	
SP1	50mm	
SWITCH	DPDT	
TILT1	SWITCH-HTILT	
TILT2	SWITCH-HTILT2	
AUDIO JACK	3.5 MM	
BAT HOLDER1	N SIZE	
BAT HOLDER2	N SIZE	
BATTERY1	A23	
BATTERY2	A23	

Appendix 1: Board Layout



Appendix 2: Schematic

DIRTY CARTER EXPERIMENTAL SOUND GENERATING INSTRUMENT - JR/CC 10