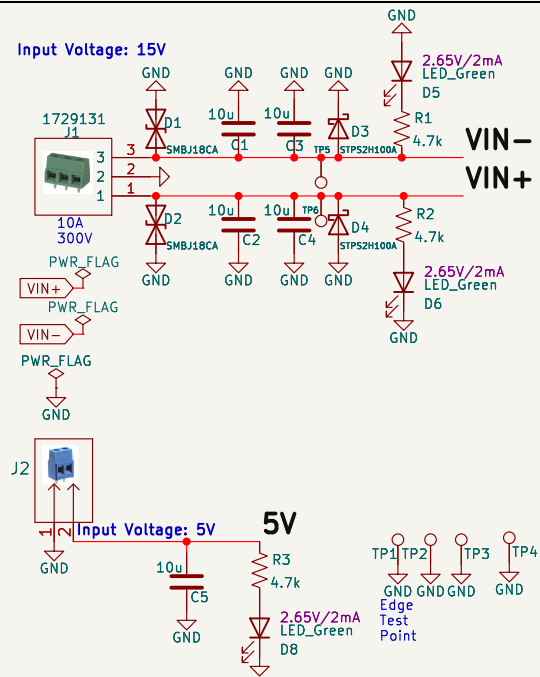
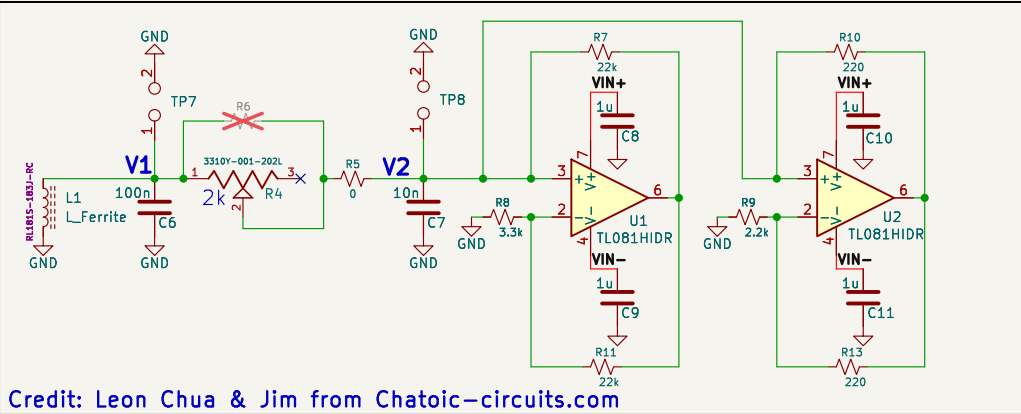


Voltage Input & Protections



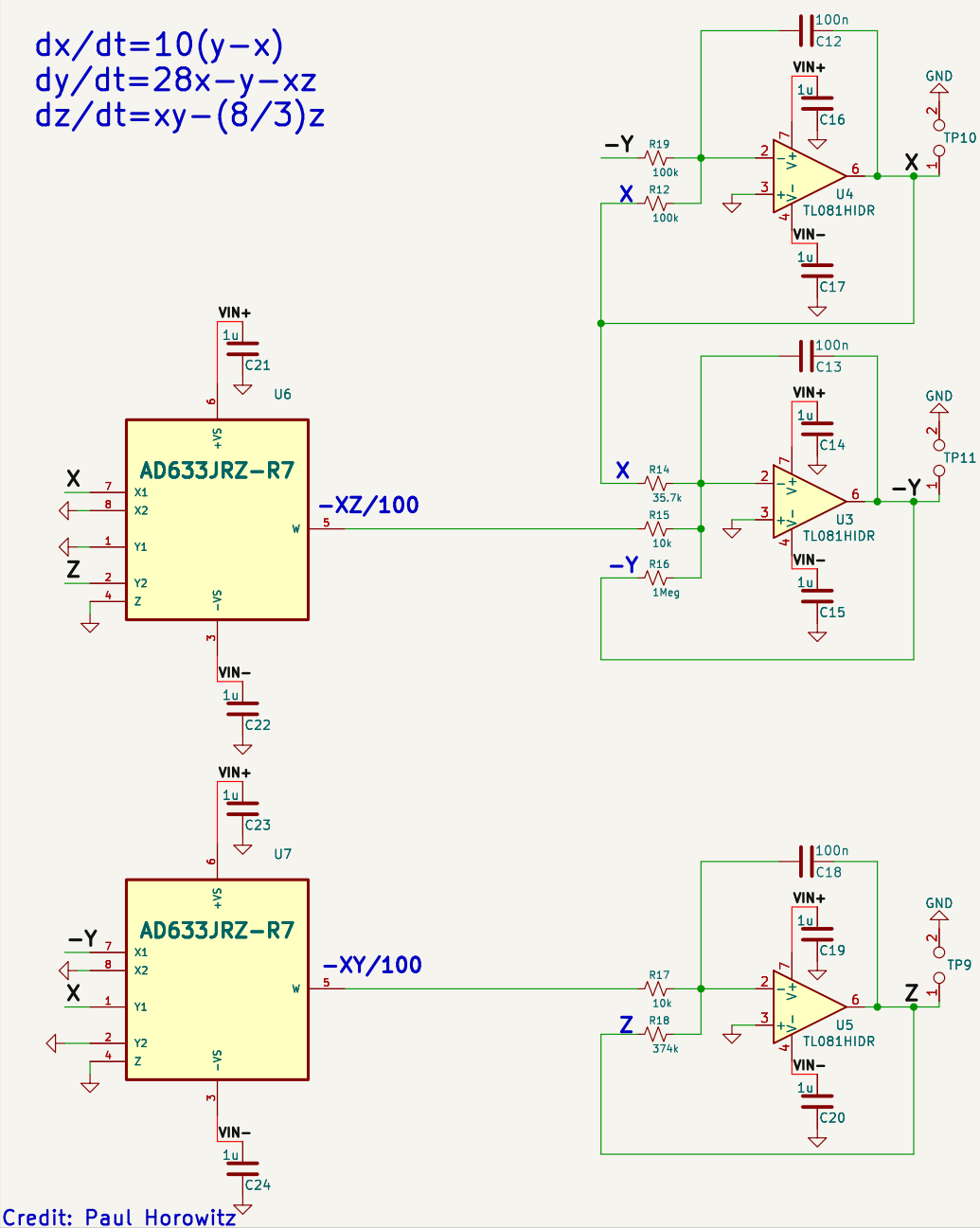
CHUA'S CIRCUIT



Credit: Leon Chua & Jim from Chatoic-circuits.com

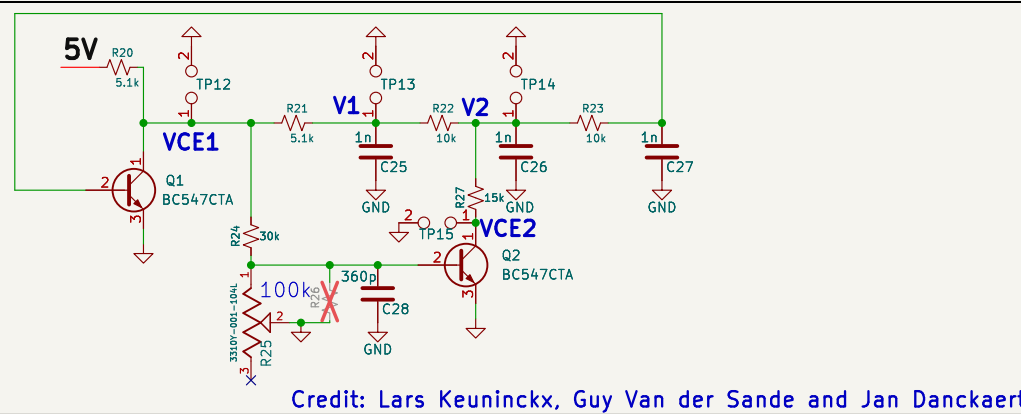
Lorenz's Butterfly

$$\begin{aligned} dx/dt &= 10(y-x) \\ dy/dt &= 28x-y-xz \\ dz/dt &= xy-(8/3)z \end{aligned}$$



Credit: Paul Horowitz

Two-Transistor Single-Supply Resistor-Capacitor Chaotic Oscillator

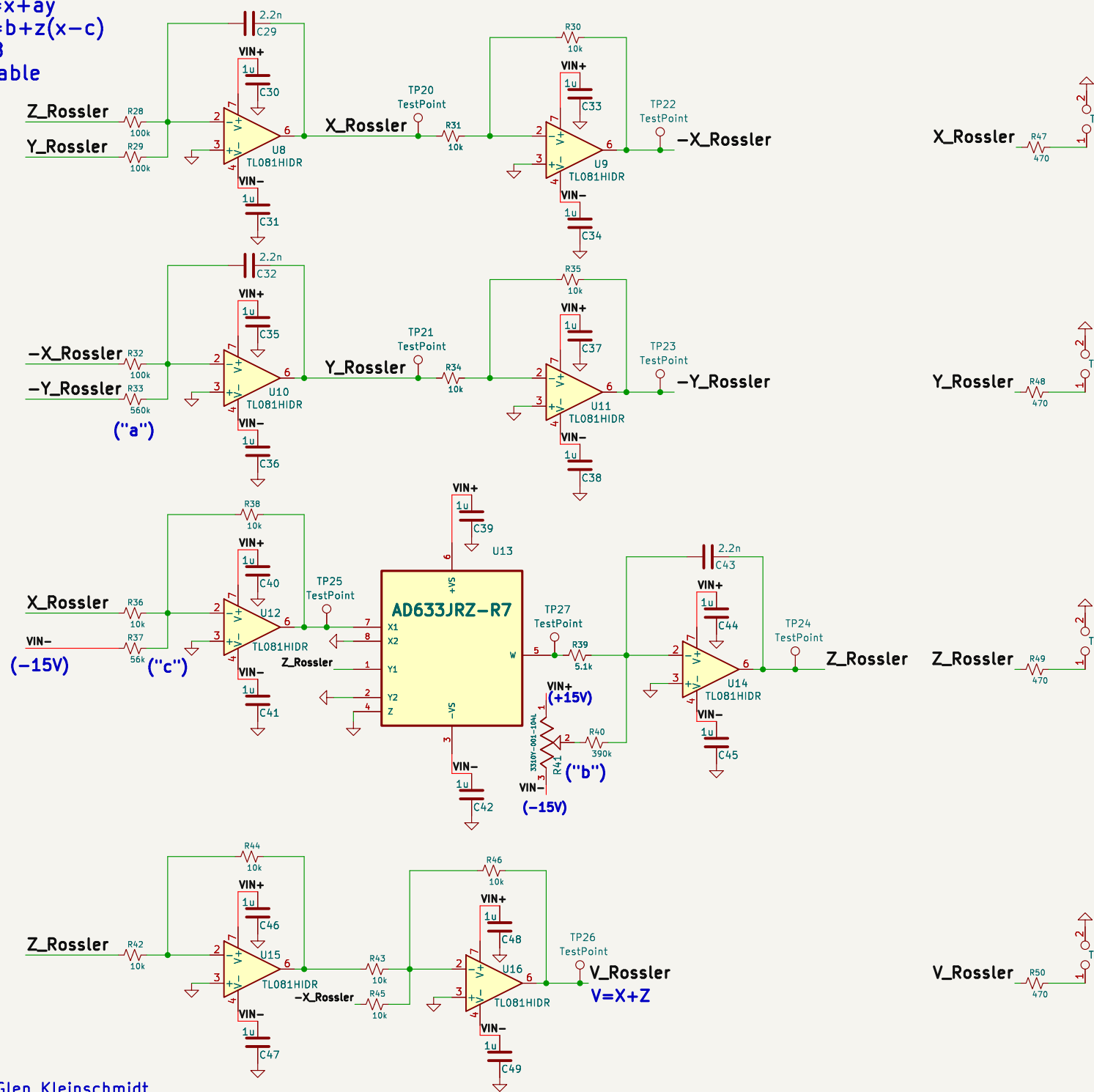


Credit: Lars Keuninckx, Guy Van der Sande and Jan Danckaert

Rössler Attractor

$$\begin{aligned} dx/dt &= -y-z \\ dy/dt &= x+ay \\ dz/dt &= b+z(x-c) \end{aligned}$$

$a=0.18$
 $b=\text{variable}$
 $c=5.3$



Credit: Glen Kleinschmidt

#	Reference	Qty	Value	Part Number	Description	Manufacturer	Package	Tolerance	Voltage Rating
1	C1,C2,C3,C4,C5	5	10u	GCN31CD71H106KE36K	10 µF ±10% 50V Ceramic Capacitor X7T 1206 (3216 Metric)	Murata	1206	10%	50V
2	C6,C12,C13,C18	4	100n	COB05C104F5AC7800	10.1 µF ±5% 50V Ceramic Capacitor X7R 0805 (2012 Metric)	Kemet	0805	5%	50V
3	C7	1	10n	COB05C103F5AC7800	10000 pF ±1% 50V Ceramic Capacitor C0G, NP0 0805 (2012 Metric)	Kemet	0805	1%	50V
4	C8,C9,C10,C11,C14,C15,C16,C17,C19,C20,C21,C22,C23,C24,C30,C31	32	1u	CL21B105KBFN00N	1 µF ±10% 50V Ceramic Capacitor X7R 0805 (2012 Metric)	Samsung Electro-Mechanics	0805	10%	50V
5	C25,C26,C27	3	1n	COB05C102J5GAC7800	1000 pF ±5% 50V Ceramic Capacitor C0G, NP0 0805 (2012 Metric)	KEMET	0805	5%	50V
6	C28	1	360p	CC0805JNPO98N361	360 pF ±5% 50V Ceramic Capacitor C0G, NP0 0805 (2012 Metric)	YAGEO	0805	5%	50V
7	C29,C32,C43	3	2.2n	CL21B222J5BANNN	2200 pF ±5% 50V Ceramic Capacitor X7R 0805 (2012 Metric)	Samsung Electro-Mechanics	0805	5%	50V
8	D1,D2	2	SMB18CA	SMB18CA	24-V Clamp 24.6A (pp) Tvs Diode Surface Mount DO-214AA (SMB)	Littelfuse Inc.	SMB		
9	D3,D4	2	STPS2H100A	STPS2H100A	Diode 100 V 2A Surface Mount SMA (DO-214AC)	STMicroelectronics	SMA		100V 2A
10	D5,D6,D8	3	LED_Green	APT3216LZGCK	Green 525nm LED Indication - Discrete 2.65V 1206	Kingbright	1206		2.65V/2mA
11	J1	1	1729131	1729131	PCB terminal block, nominal current: 13.5 A, rated voltage (U1/U2): 400 V,	Phoenix Contact	Connector		
12	J2	1	796681-2	796681-2	2 Position Wire to Board Terminal Block Horizontal with Board 0.197" (5.00mm) Through Hole	TE Connectivity AMP Connectors	Connector		
13	L1	1	L_Ferrite	RL1815-1831-RC	18 mH Shielded Drum Core, Wirewound Inductor 21 mA 17Ohm Max Radial, Vertical Cylinder	Bourns Inc.	Radial, Vertical Cylinder		
14	Q1,Q2	2	BC547CTA	BC547CTA	Bipolar (BJT) Transistor NPN 45 V 100 mA 300MHz 500 mW Through Hole TO-92-3	onsemi	TO-92-3		
15	R1,R2,R3	3	4.7k	RC0603FR-074K7L	RES 4.7K OHM 1% 1/10W 0603	YAGEO	0603	1%	
16	R4	1	3310V-001-104L	3310V-001-104L	2k Ohm 1 Gang Linear Panel Mount Potentiometer None 1.0 Kierros Conductive Plastic 0.25W, 1/4W PC Pins	Bourns Inc.	Pot		
17	R5	1	0	RMC11206ZT0R00	RES 0 OHM JUMPER 1/4W 1206	Stackpole Electronics Inc	1206		
18	R7,R11	2	22k	CR0603FR-0722K	RES 22K OHM 1% 1/8W 0805	Vishay Dale	0805	1%	
19	R8	1	3.3k	CR0603FR-073K3	RES 3.3K OHM 1% 1/8W 0805	Vishay Dale	0805	1%	
20	R9	1	2.2k	CR0603FR-072K2	RES 2.2K OHM 1% 1/8W 0805	TE Connectivity Passive Product	0805	1%	
21	R10,R13	2	220	CR0603FR-07220	RES SMD 220 OHM 1% 1/8W 0805	TE Connectivity Passive Product	0805	1%	
22	R12,R19,R28,R29,R32	5	100k	ERA-6AEB104V	RES SMD 100K OHM 0.1% 1/8W 0805	Panasonic Electronic Components	0805	0.10%	
23	R14	1	35.7k	ERA-6AEB3572V	RES SMD 35.7K OHM 0.1% 1/8W 0805	Panasonic Electronic Components	0805	0.10%	
24	R15,R17,R22,R23,R30,R31,R34,R35,R36,R38,R42,R43,R44,R45,R46	15	10k	RC02012P-103-B-T5	RES SMD 10K OHM 0.1% 1/8W 0805	Susumu	0805	0.10%	
25	R16	1	1Meg	RT0603FR-071ME	RES SMD 1M OHM 0.1% 1/8W 0805	YAGEO	0805	0.10%	
26	R18	1	374k	YAGEO	RES SMD 374K OHM 0.1% 1/8W 0805	YAGEO	0805	0.10%	
27	R20,R21,R39	3	5.1k	RC0805FR-075K1L	RES 5.1K OHM 1% 1/8W 0805	YAGEO	0805	1%	
28	R24	1	30k	CR0603FR-0730K	RES SMD 30K OHM 1% 1/8W 0805	TE Connectivity Passive Product	0805	1%	
29	R25,R41	2	3310V-001-104L	3310V-001-104L	100k Ohm 1 Gang Linear Panel Mount Potentiometer None 1.0 Kierros Conductive Plastic 0.25W, 1/4W PC Pins	Bourns Inc.	Pot		
30	R27	1	15k	CR0603FR-0715K	RES SMD 15K OHM 1% 1/8W 0805	TE Connectivity Passive Product	0805	1%	
31	R33	1	560k	RC0805FR-07560K	RES SMD 100K OHM 0.1% 1/8W 0805	YAGEO	0805	0.10%	
32	R37	1	56k	RC0805FR-0756K	RES 56K OHM 1% 1/8W 0805	YAGEO	0805	1%	
33	R40	1	390k	ERI-66NF3903V	RES SMD 390K OHM 0.1% 1/8W 0805	Panasonic Electronic Components	0805	1%	
34	R47,R48,R49,R50	4	470	RC0805FR-07470R	RES 470 OHM 1% 1/8W 0805	YAGEO	0805	1%	
35	U1,U2,U3,U4,U5,U8,U9,U10,U11,U12,U14,U15,U16	13	TL081HIDR	TL081HIDR	J-FET Amplifier 1 Circuit Push-Pull 8-SOIC	Texas Instruments	8-SOIC		
36	U6,U7,U13	3	AD633JRZ-R7	AD633JRZ-R7	Analog Multiplier 4-Quadrant 8-SOIC	Analog Devices Inc.	8-SOIC		

Sariel Hodisan

Sheet: /

File: Chaos Circuits.kicad_sch

Title: Chaos Circuits

Size: A2 Date: 2024-06-17

KiCad E.D.A. B.0.2

Rev: 1

Id: 1/1