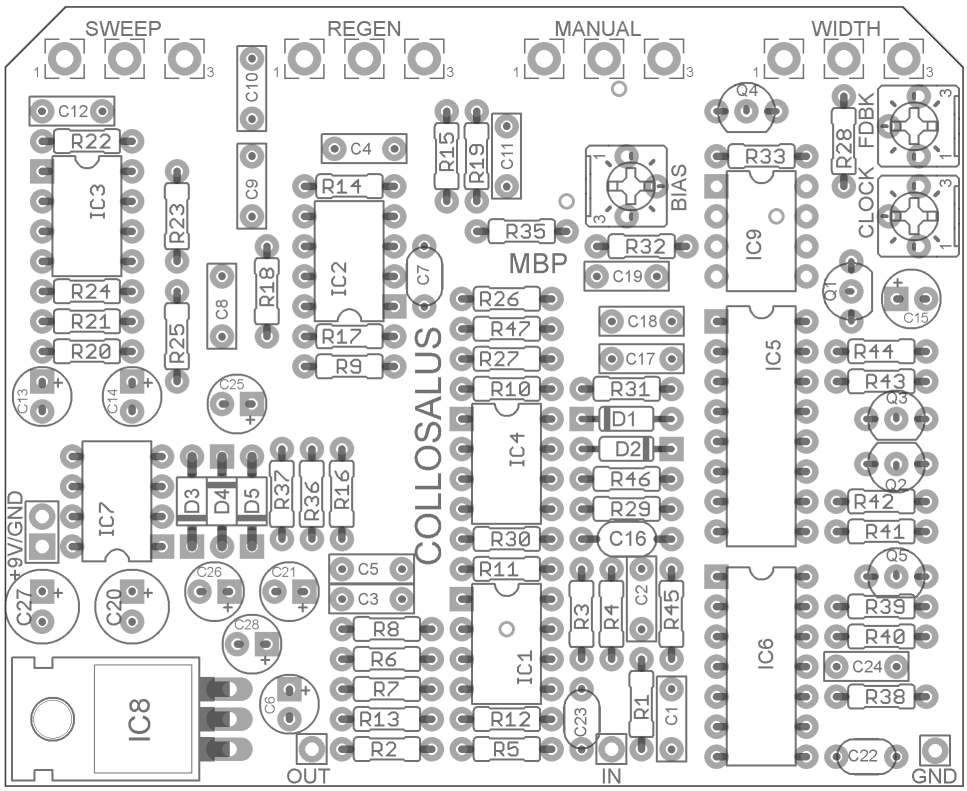
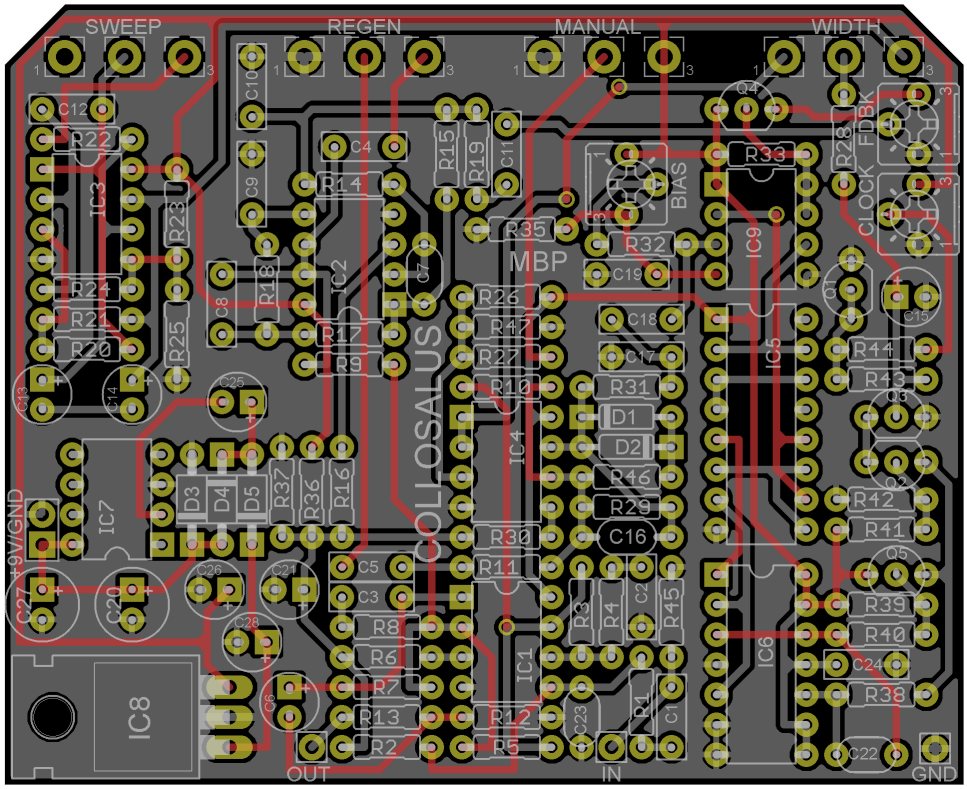
COLLOSALUS

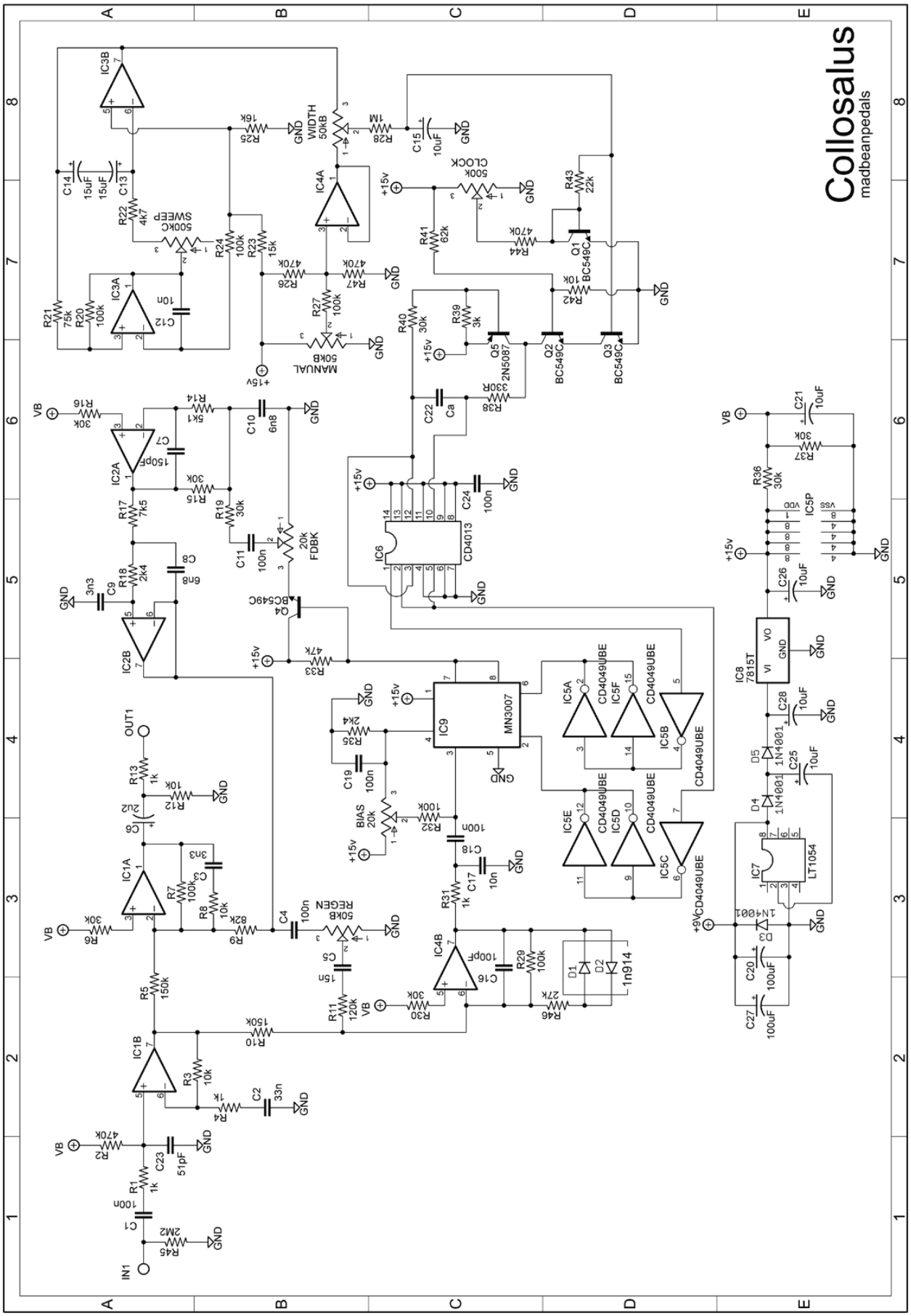
FX Type: Flanger

UPDATED: 05.03 – Corrected Q4 and Q5 on schematic and layout pics.
3.2” W x 2.6” H





Schematic



Voltages

	IC1
1	7.41
2	7.41
3	7.39
4	0
5	7.09
6	7.42
7	7.42
8	14.82

	IC2
1	7.41
2	7.41
3	7.39
4	0
5	7.41
6	7.42
7	7.42
8	14.82

	IC3
1	varies
2	7.61
3	varies
4	0
5	7.69
6	7.69
7	varies
8	14.82

	IC4
1	7.06
2	7.06
3	6.99
4	0
5	7.38
6	7.41
7	7.41
8	14.82

	IC5
1	14.81
2	7.38
3	7.38
4	7.38
5	7.38
6	7.38
7	7.38
8	0
9	7.38
10	7.38
11	7.38
12	7.38
13	mV
14	7.38
15	7.38
16	mV

	IC6
1	7.38
2	7.38
3	12.53-13.89
4	0
5	0
6	0
7	0
8	14.82
9	14.82
10	10.98-11.63
11	14.82
12	12.55-13.89
13	14.82
14	14.82

	IC7
1	1.42
2	6.33
3	0
4	7mV
5	100mV
6	2.34
7	1.46
8	12

	IC8
1	21.8
2	0
3	14.82

	IC9
1	14.81
2	7.37
3	6.12
4	1.54
5	0
6	7.37
7	4.7-5.67
8	4.7-5.67

These voltages were measured using a regulated 12vDC 200mA supply. IC8 is the 15v regulator used to supply power to the PCB. Pin 1 is the voltage input (which has been bumped up to about 22v by the LT1054 charge pump in this case) and Pin3 is the voltage output which measures 14.82v . You should be able to use between a 9-12v supply provided it is well-regulated and can provide sufficient current to the effect. However, I have found that some 9v supplies were a bit noisier, particularly the 1-Spot. This noise can be dialed out to a degree by following the biasing tips in this document. If you experience persistent noise in the extreme of the flanger sweep, consider using a higher voltage supply like 12v. This will likely tame it.

UPDATE 05.03: Using 1N5817 for D4 & D5 and increasing C26 to 100uF eliminated clock noise when using a 9v supply on the production board. The noise seems to be only an issue on my prototype board.

Keep in mind that some of the voltages here will change some depending on where your trimmers and knobs are set. These are intended as a rough guide only, should you need a reference point in building the project.

Bill of Materials

Resistors		Resistors		Caps		Diodes	
R1	1k	R29	100k	C1	100n	D1, D2	1n914
R2	470k	R30	30k	C2	33n	D3 – D5	1N4001
R3	10k	R31	1k	C3	3n3	**Transistors**	
R4	1k	R32	100k	C4	100n	Q1 – Q4	BC549C
R5	150k	R33	47k	C5	15n	Q5	2N5087
R6	30k	R35	2k4	C6	2u2	**ICs**	
R7	100k	R36	30k	C7	150pF	IC1	NE5532
R8	10k	R37	30k	C8	6n8	IC2 – IC4	JRC4558
R9	82k	R38	330R	C9	3n3	IC5	CD4049UBE
R10	150k	R39	3k	C10	6n8	IC6	CD4013
R11	120k	R40	30k	C11	100n	IC7	LT1054
R12	10k	R41	62k	C12	10n	IC8	LM7815
R13	1k	R42	10k	C13	15uF	IC9	MN3007
R14	5k1	R43	22k	C14	15uF	**Trimpots**	
R15	30k	R44	470k	C15	10uF	BIAS	20k
R16	30k	R45	1M – 2M2	C16	100pF	FDBK	20k
R17	7k5	R46	27k	C17	10n	CLOCK	500k
R18	2k4	R47	470k	C18	100n	**Pots**	
R19	30k			C19	100n	MANUAL	50kB
R20	100k			C20	100uF	REGEN	50kB
R21	75k			C21	10uF	SWEEP	500kC
R22	4k7			C22	***	WIDTH	50kB
R23	15k			C23	51pF		
R24	100k			C24	100n		
R25	16k			C25	10uF		
R26	470k			C26	10uF		
R27	100k			C27	100uF		
R28	1M			C28	10uF		

***62pF – 47pF

Overview

The **Collosalus** is an updated version of the classic MXR-117 Flanger. The MXR-117 utilizes just a few simple controls to produce a range of deep and resonant flange to fast liquid-like chorus effects. The **Collosalus** makes several key updates to the original design taking into consideration the lack of availability of the original SAD1024 BBDs and transformer-based power supply. These include conversion to MN3007 operation (which are much more widely available) and a charge pump based supply.

The **Collosalus** ranks as a difficult build due to the number of components and complexity of the effect. However, the reward is a unique and instantly recognizable effect that has been popularized for decades.

Special thanks for madbeanpedals forum member “Scruffie” who supplied feedback during the development process of this project. Thanks also to www.shredaholic.com and www.diystompboxes.com which also served as a source of information in realizing this design.

Sweep: Controls the rate of the low-frequency oscillator which drives the flanger.
Regen: Sets the amount of feedback into the flanger which results in increased intensity of the effect.
Manual: Sets the resonant frequency that is swept through the flanger when the Width control is set low. The Manual control also works interactively with Regen and can produce metallic, steel-drum types of tones.
Width: Sets the overall depth of the flanging effect.

Notes

R45 is an optional pull-down resistor not featured in the original design. 1M – 2M2 is suggested. I found my own build did not need it since there was no excessive “pop” when engaging the effect.

A TO-220 style regulator, such as the LM7815, should be used for IC8 as it offers superior regulation and current supply.

C22 should be socketed. This capacitor determines the clock frequency at which the CD4013 supplies the BBD. The vintage unit lists 62pF as the nominal value for driving the SAD1024, but I found that a 47pF worked best in my own build. Smaller values will reduce noise but also make the flanger effect more shallow.

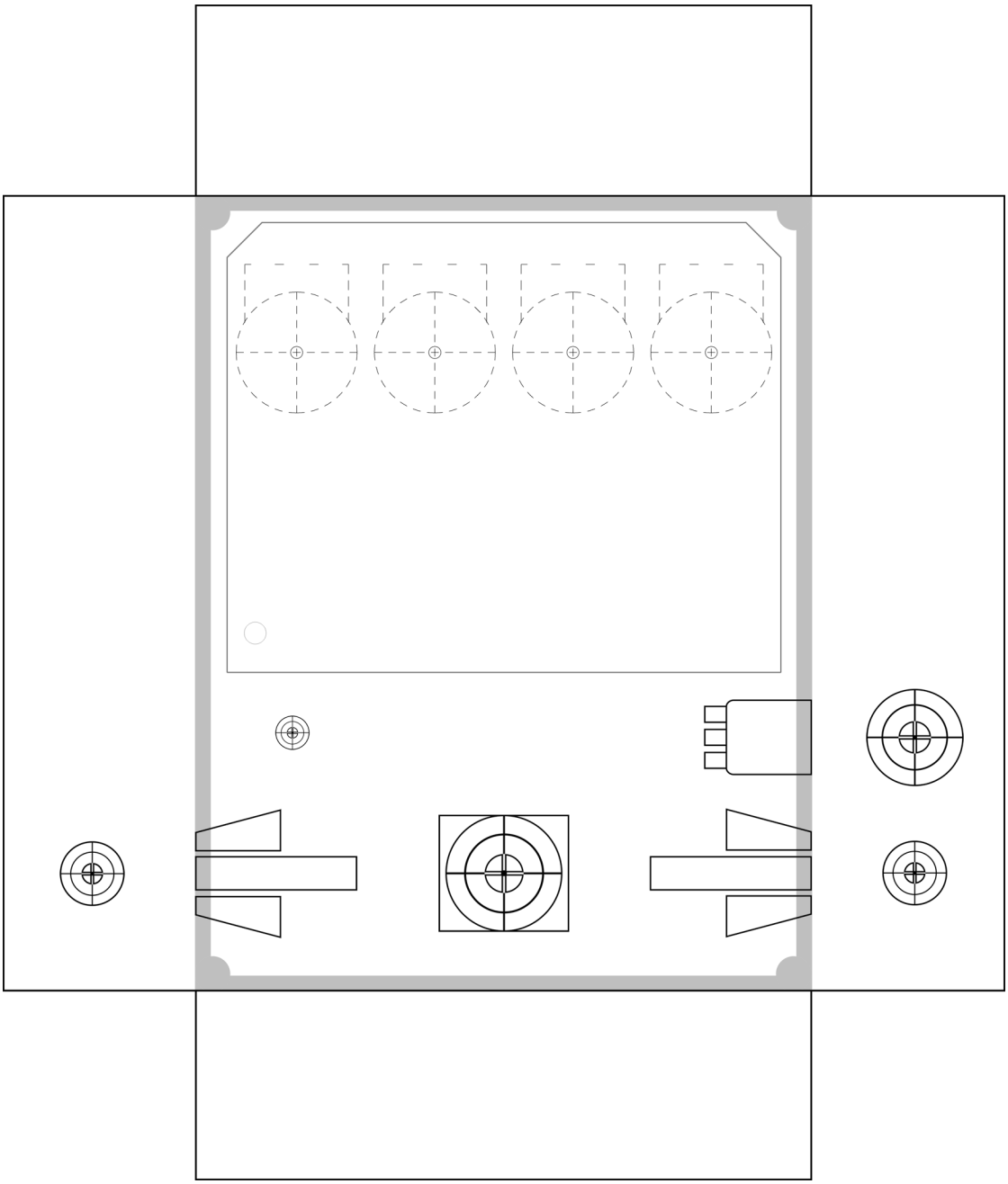
Biasing the effect:

- Set Manual fully counter-clockwise, Width and Regen about ½ up, and Sweep about ¼ up.
- Position the CLOCK and BIAS trims ¼ up and the FDBK ½ up.
- Apply power to the effect. Adjust the BIAS trim in small increments until you hear the effect start to sweep. Find the positions left and right on the trimmer where the sweeping stops, and then set the BIAS trimmer halfway between those two points. Now adjust the CLOCK trimmer left and right. In the left most position the bottom of the sweep will tend to flatten out at the most extreme. As you turn the trimmer up, the range of the sweep will decrease and become more shallow. Set this trimmer so that you get the highest depth possible while keeping the up and down portion of the sweep as symmetrical as possible. I found this to be about ¼ up on the trimmer.
- Set the Regen fully clockwise. Now adjust the FDBK trimmer to increase the maximum amount of feedback you can achieve before it begins to self-oscillate. You will hear this as a loud “sproing” at the bottom of the flanger's sweep. Back off the trimmer from this position until the “sproing” goes away.

1590B Drill Template

5.8”W x 6.8”H

This template is approximate. Please check carefully before committing to drill.



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