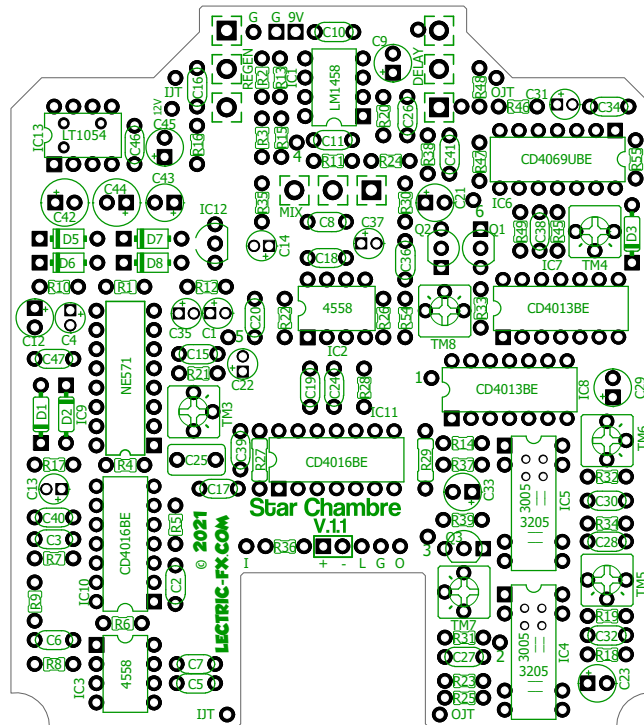


Star Chambre

Analogue Delay V.1.1
© LECTRIC-FX.COM



Enter the Star Chambre, a copy of the 70's vintage green MXR-118 V1 analogue delay, converted from the 3 x SAD1024 of the original (achieving a respectable 300ms of delay time) to use 2 x MN3005 (or 3205) for a total of 800ms of delay!

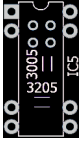
What sets this delay apart from the rest of the era (and even most today) is it's use of 'tracking' filters that adjust the filters' cut-offs as you increase (darker) or decrease (brighter) the delay time to pull out as much time as possible from the BBD's. Originally a way to get a usable tape style delay length from the low stage chips of the era, by replacing them with modern available 4096-stage chips, available delay time is drastically increased.

Controls:

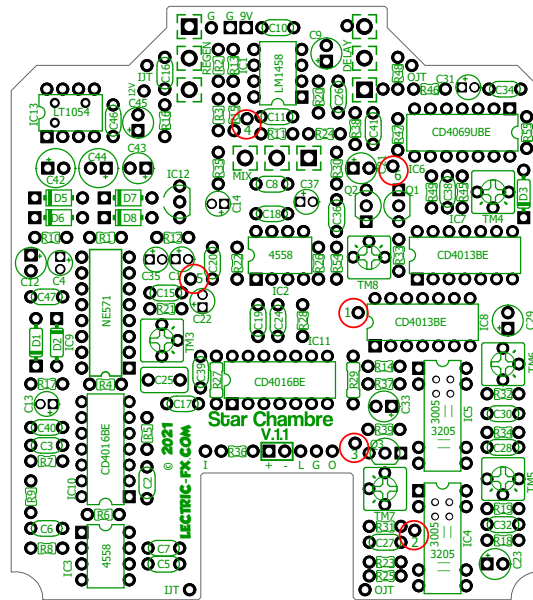
Delay: Adjusts the delay time from slap back to approximately 800ms.

Mix: Adjusts wet/dry blend of clean guitar signal to effected signal.

Regen: Adjusts the number of delays from 1 to sustained oscillation.



Notice the 4 small pads within each BBD chip. A set of 2 jumpers MUST be placed on these, on each BBD. For example, if building with MN3005's, the 2 jumpers would be soldered in vertically as indicated on the silkscreen.



Biasing Procedure:

Before you begin, you will need a signal source to input to the pedal (guitar, looper, CD player etc.) an audio probe and a frequency counter (scope or multimeter). You may find that using headphones instead of listening through a speaker cabinet will help with the procedure (although please be wary of levels in case of runaway oscillation).

Control Settings: Delay - CW, Regen - CCW, Mix - CW

You should begin by setting all trimmers to their halfway points. Power on the unit and using your frequency counter, probe TP-1 and adjust TM8 until you read a frequency of 4kHz.

Set Delay - CCW

- With your input signal running through the pedal, audio probe TP-2 and adjust TM-5 for the least amount of clipping/cleanest signal.
- Now probe TP-3 and adjust TM-6, again for the least amount of clipping/cleanest signal.
- Next, while switching between TP-4 (dry signal) & TP-5 (wet signal), adjust TM3 until you achieve equal signal levels, this can be tricky, don't worry if you have to come back to it later to get it perfect.

Set Delay - CW

While playing through the pedal, TM4 is adjusted to set the minimum filter cut-off point, set it for the most pleasing balance of noise (hiss & aliasing) vs. bandwidth. Finally, unplug your input signal from the pedal and probe TP-3, adjust TM-7 for the least amount of whine. Afterwards, you may wish to revisit the previous step to balance the overall noise performance now the clock whine has been removed.

Congratulations, you have now completed the Star Chamber set up procedure!

BBD Choice:

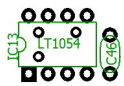
Due to the ability of the circuit to pull extended amounts of delay above that which is usually possible, mixing and matching 3008 & 3005 or 3208 & 3205 will still produce a very usable 600mS of delay time, the 3X08 should be placed in IC4 and R31 changed to 150k.

Using 3X08 in both chip positions is not recommended as the wet signal may not have enough gain to match the dry without further circuit adjustment.

(Note - While technically possible, don't attempt to mix and match 300X & 320X chips in the same pedal.)

Modulation:

Pads are provided at the delay pot to experiment with adding modulation to the circuit, this has not been tested.



C46 - This cap can be used to adjust the frequency of the LT1054 up or down in case you have heterodyning (the jumper pads provided underneath IC13 must be used- see the LT1054 datasheet for further info). For the most part, it should be omitted.

C47 - This capacitor is entirely optional and not found in the original units, but if you prefer a less punchy and more ambient delay (with a very minor noise reduction), feel free to try it.

Delay Tone:

In some original units, C11 & 16 are 150n, this will mean more bass content reproduction in your delay signal but we recommend starting with the 100n stated in the parts list as the larger value may feel a bit boomy. **Edit:** You might want to try a lower value like **10n for C16**. We've had reports from some builders that this sounds less percussive (possibly more in line with other analog delays). I'll be making a note about this on the BOM, but probably not the schematic.

Feedback:

Most analogue delay pedals usually have extra low pass filtering in the feedback path, this is not the case in the 118 so the repeats don't fade away quite as gradually, you may wish to try experimenting with reducing the value of C16 for a more 'tape' style repeat.

Using the MN3205/v3205:

While we have not tested 3205 chips in this circuit, they should work fairly well with a few adjustments (and the appropriate jumper orientation).

First of all, you **MUST** use a 78L09 regulator for IC12.

Secondly, you may wish to try replacing C5 with a 1n5 and R9 with a 6k8, this will reduce the input level to the BBD's and help prevent any distortion.

Third, R1 & R12 should be adjusted in value to achieve ~4.5V on IC9 pin 10, a good value to start with would be 24k.

Unity Volume: We've also had reports that R20 is better at around **150k** in this regard. Again, a note about this will be on the BOM, but not the schematic.

STAR CHAMBRE BILL OF MATERIALS

1/8W RESISTORS		R34	6k8	C21	4.7u	DIODES	
R1	36k	R35	10M	C22	1u	D1	1n4148
R2	470k	R36	4k7 (CLR)	C23	15u	D2	1n4148
R3	470k	R37	150K	C24	300p	D3	1n4148
R4	10k	R38	100k	C25	330n	D5	1n5817
R5	10k	R39	10k	C26	33p	D6	1n5817
R6	10k	R45	3k	C27	150n	D7	1n5817
R7	10k	R46	1k	C28	100n	D8	1n5817
R8	10k	R47	27k	C29	15u	TRANSISTORS	
R9	20k	R48	2k4	C30	100n	Q1	2N5087
R10	2k	R49	1k	C31	1u	Q2	2N5088
R11	47k	R54	100k	C32	150n	Q3	2N5088
R12	36k	R55	10k	C33	47u	ICs	
R13	470k	CAPACITORS		C34	30p	IC1	LM1458
R14	22R	C1	1u	C35	1u	IC2	JRC4558
R15	1k	C2	1n	C36	100n	IC3	JRC4558
R16	33k	C3	1n5	C37	1u	IC4	MN3005
R17	10M	C4	1u	C38	30p	IC5	MN3005
R18	100K	C5	1n	C39	1n5	IC6	CD4069UBE
R19	6k8	C6	470p	C40	1n5	IC7	CD4013BE
R20	100k *	C7	300p	C41	150n	IC8	CD4013BE
R21	100k	C8	4n7	C42	220u	IC9	NE571
R22	1k	C9	4.7u	C43	10u	IC10	CD4016BE
R23	2k4	C10	10n	C44	100u	IC11	CD4016BE
R24	100R	C11	100n	C45	10u	IC12	78L12
R25	2k4	C12	15u	C46	OMIT	IC13	LT1054
R26	10k	C13	0.47u	C47	33p ***	POTS	
R27	10k	C14	1u	TRIMMERS		MIX	50KB
R28	10k	C15	2n2	TM3	20K	REGEN	50KA
R29	10k	C16	100n **	TM4	20K	DELAY	50KB
R30	47k	C17	1n5	TM5	100K		
R31	68K	C18	470p	TM6	100K		
R32	100K	C19	1n	TM7	5K		
R33	16k	C20	15n	TM8	20K		

ALL RESISTORS 1/8W SIZE.
BUT R27 & 29 CAN BE 1/4W

* See page 3 note on Unity Volume...**150k**?

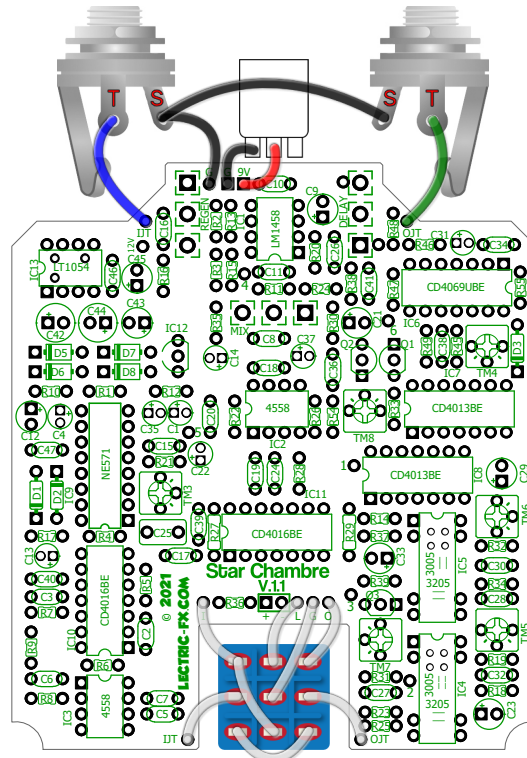
** See page 3 note on Delay Tone...**10n**?

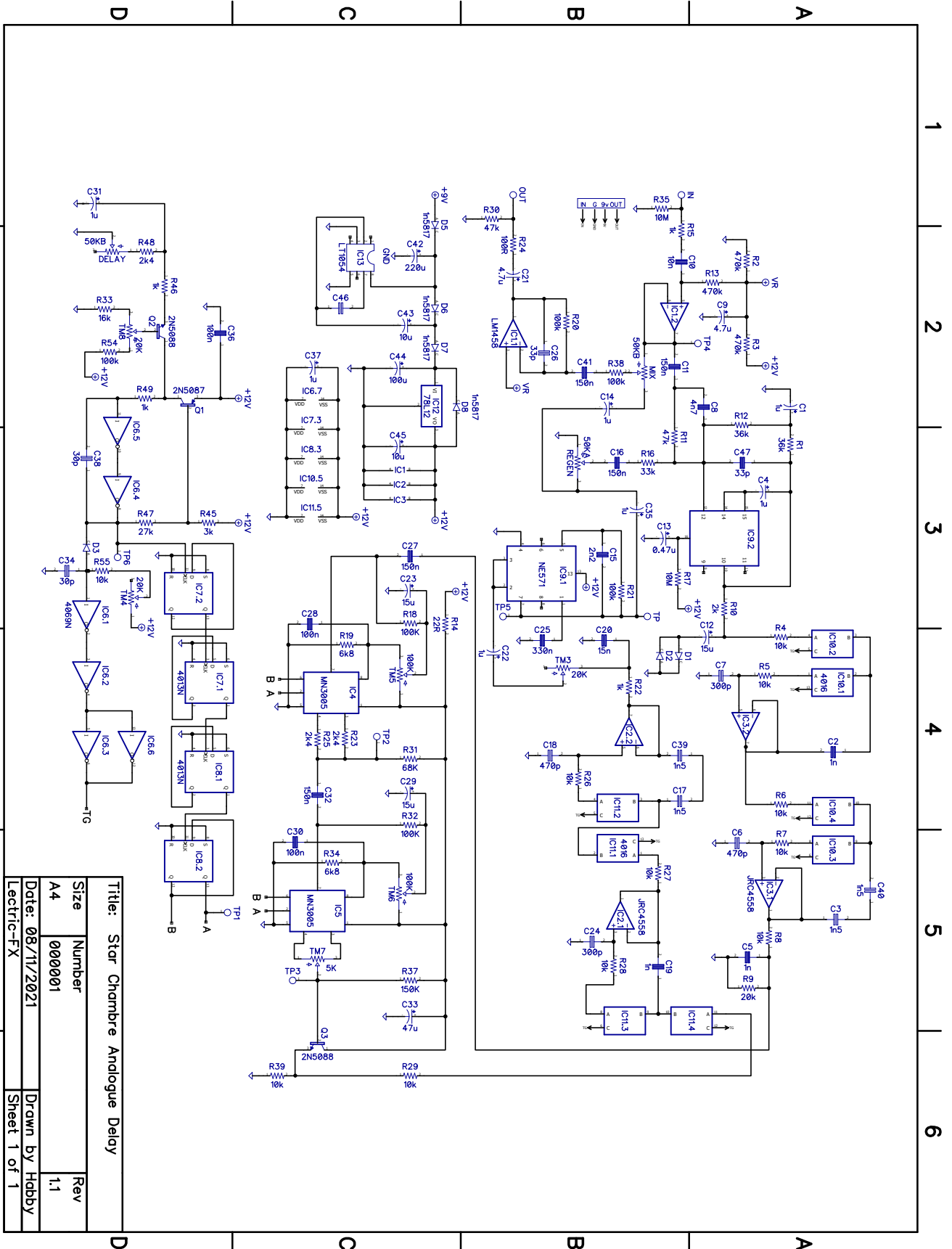
*** See page 3 note on C47.

STAR CHAMBRE PART TOTALS

Total (RES)	Value	Total (CAP)	Value	Diode Total	Part #
1	22R	2	30p	3	1n4148
1	100R	2	33p *	4	1n5817
4	1k	2	300p	Trans Total	Part #
1	2k	2	470p	1	2n5087
3	2k4	3	1n	2	2n5088
1	3k	4	1n5	IC Total	Part #
2	6k8	1	2n2	1	LM1458
11	10k	1	4n7	2	JRC4558
1	16k	1	10n	2	MN3005
1	20k	1	15n	1	CD4069UBE
1	27k	5	100n	2	CD4013BE
1	33k	3	150n	2	CD4016BE
2	36k	1	330n	1	NE571
1	4k7	1	0.47u elect	1	LT1054
2	47k	7	1u electro	1	78L12
1	68k	2	4u7	POT Total	Value
6	100k *	2	10u	2	50KB
1	150k	3	15u	1	50KA
3	470k	1	47u	Trim'r Total	Value
2	10M	1	100u	1	5k tr
		1	220u	3	20k tr
				2	100k tr

* See previous page about these parts (R20 and C16).





Title: Star Chambre Analogue Delay	
Size A4	Number 000001
Date: 08/11/2021	Rev 1,1
Lectric-FX	Drawn by Hobby
Sheet 1 of 1	

STAR CHAMBRE DRILL TEMPLATE

