



TRAITEMENT DU SIGNAL : **OPTIMISATION DE L'EFFET DE** **DISTORSION**

SOMMAIRE



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- Hard Diode Clipping
- Modèle BOSS DS-1

III. Personnalisation du Modèle

- Montage
- Réalisation
- Résultats/Comparaison

I. Principaux types d'effets et pédales

Effet de tonalité



Equaliseur



Booster/Enhancer



Wah Wah

Effet de modulation



Chorus



Delay/Reverb



Flanger

Effet de saturation



Overdrive





Distorsion

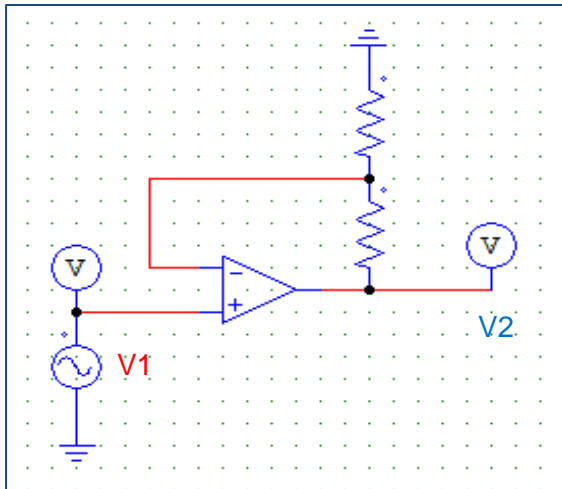


Fuzz

I. Les pédales de l'étude

PEDALE	METHODE	MONTAGE	EFFET SUR LE SON
 <p>An orange Boss Distortion DS-1 pedal with three knobs: CHECK (red LED), LEVEL, and DIST. It has an input and output jack on the left side.</p>	HARD DIODE CLIPPING	Deux diodes en antiparallèles reliées à la masse	Distorsion
 <p>A green Ibanez Tube Screamer TS908 pedal with three knobs: OVERDRIVE, TONE, and LEVEL. It has an input and output jack on the right side.</p>	SOFT DIODE CLIPPING	Deux diodes en antiparallèles dans la rétroaction	Overdrive

I. Notion de saturation



Régime non saturé

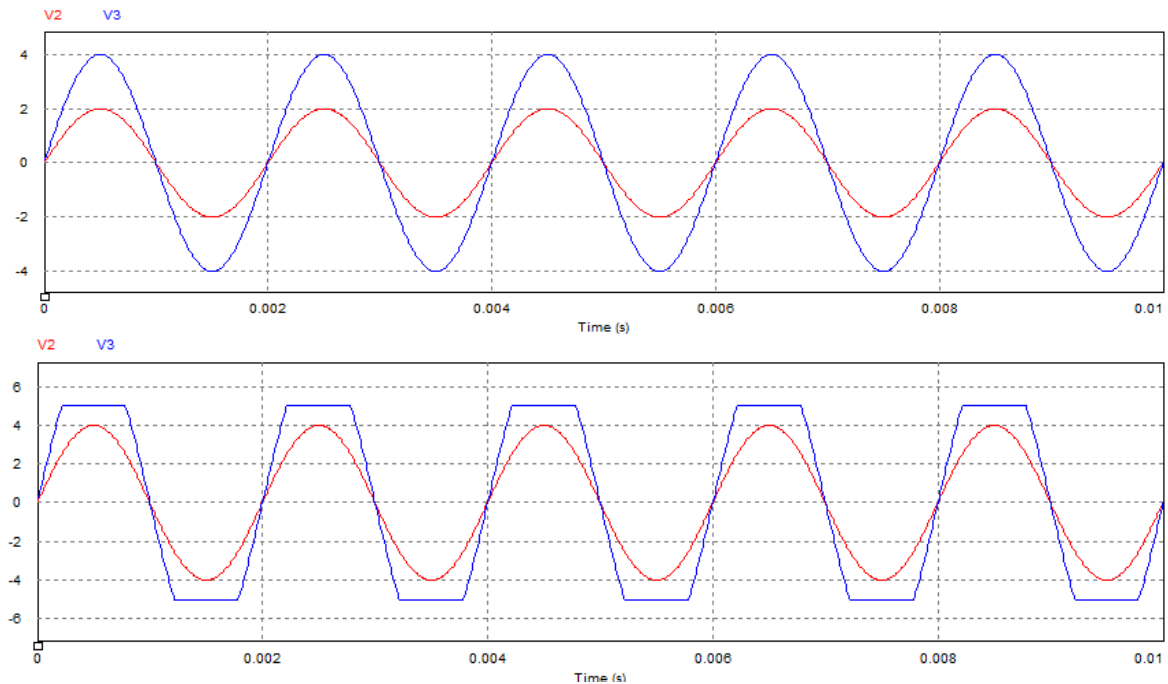
Régime saturé

Principe :

Montage non inverseur de gain 2

Alimentation bipolaire (+5V, -5V)

Saturation lorsque la tension de sortie dépasse la tension d'alimentation

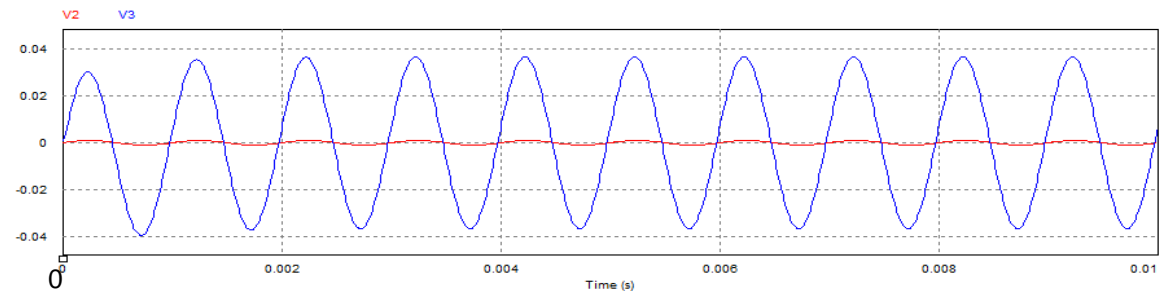
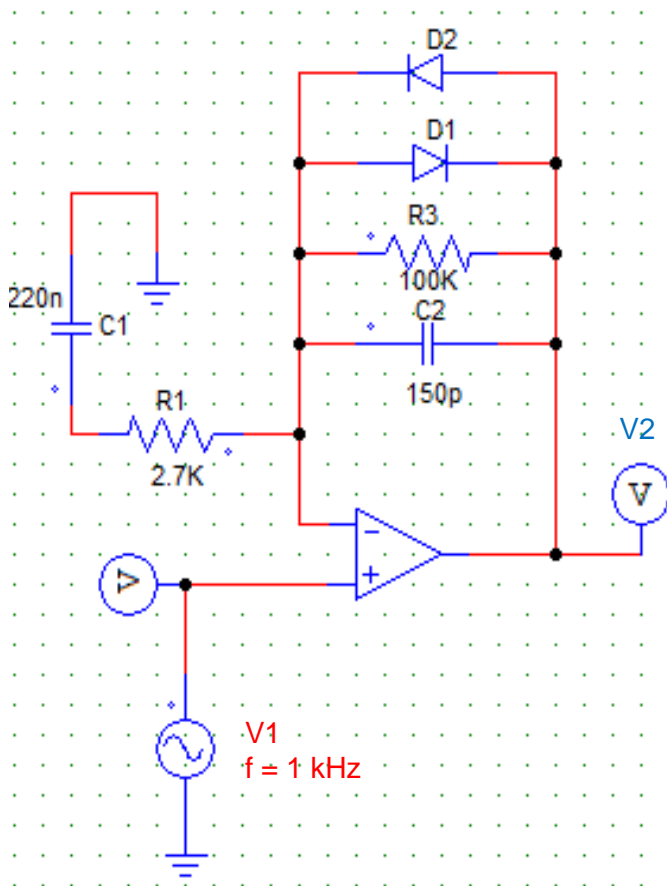


II. Soft Diode Clipping

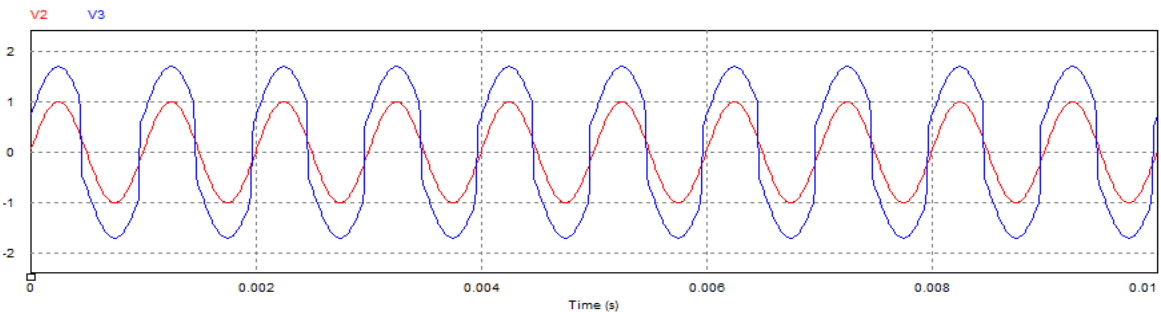
Amplificateur non inverseur, alimentation bipolaire (-5V, +5V)

$$\text{Gain : } G = \frac{V_2}{V_1} = 1 + \frac{R_3}{R_1} = 38 \text{ (31,6 dB)}$$

Mesure n°1 : entrée à 1 mV (pas suffisante pour que les diodes conduisent) **AMPLIFICATION**

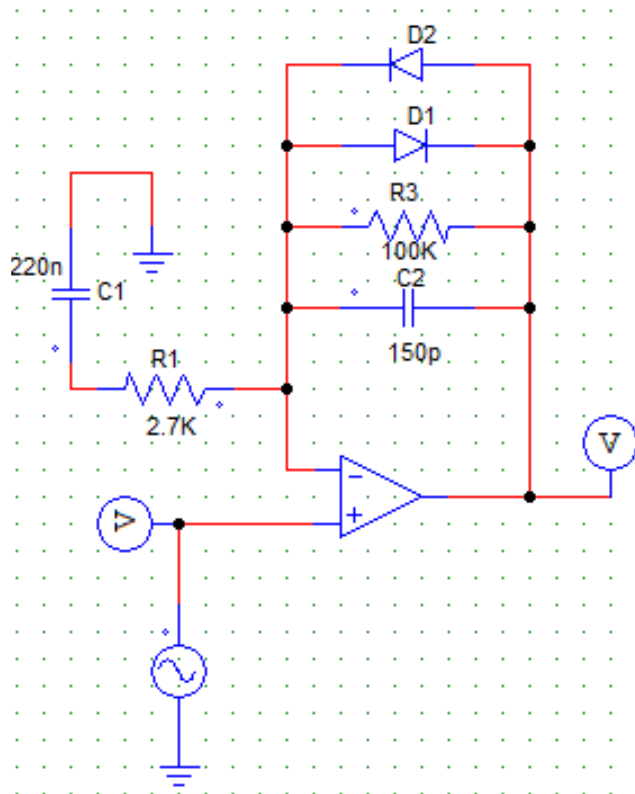


Mesure n°2 : entrée à 1 V (arrondissement des crêtes, les diodes conduisent tel que $V_2 = V_1 + V_d$) **DISTORTION**

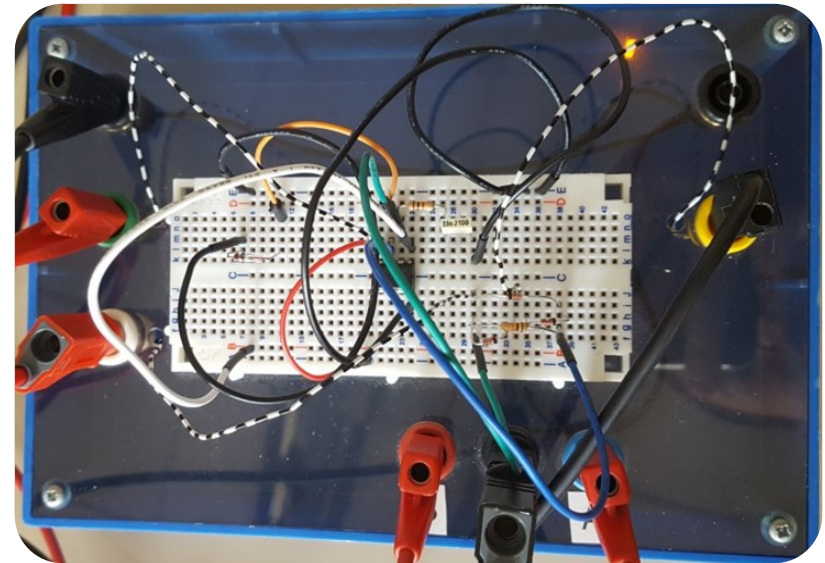


II. Montage Soft Diode Clipping

Simulation

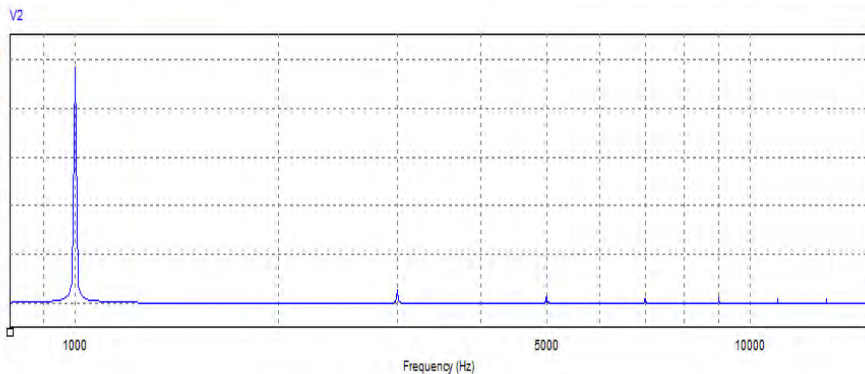
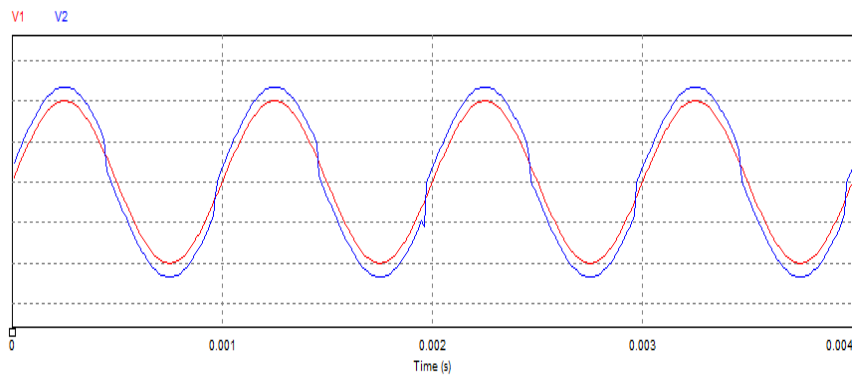


Expérience

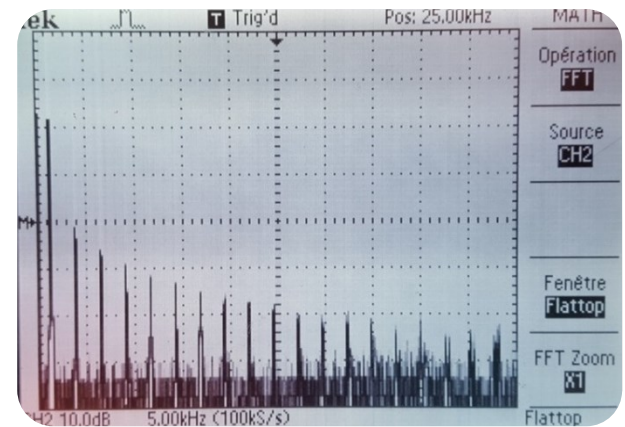
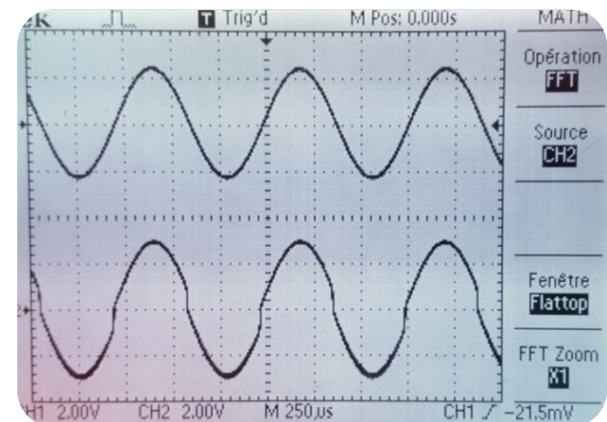


II. Montage Soft Diode Clipping (2)

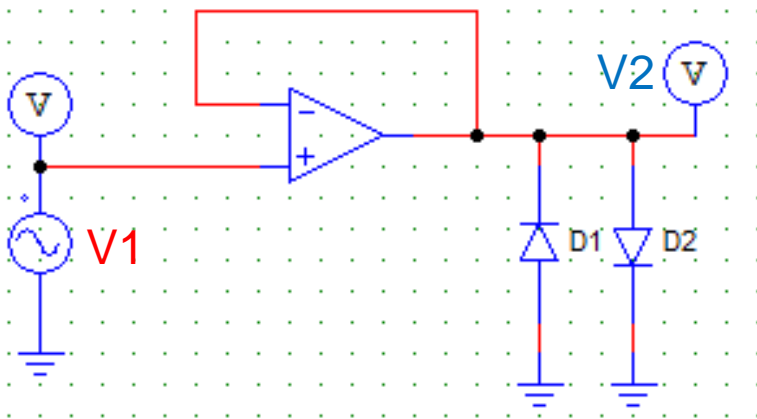
SIMULATION



EXPERIMENTATION



II. Hard Diode Clipping

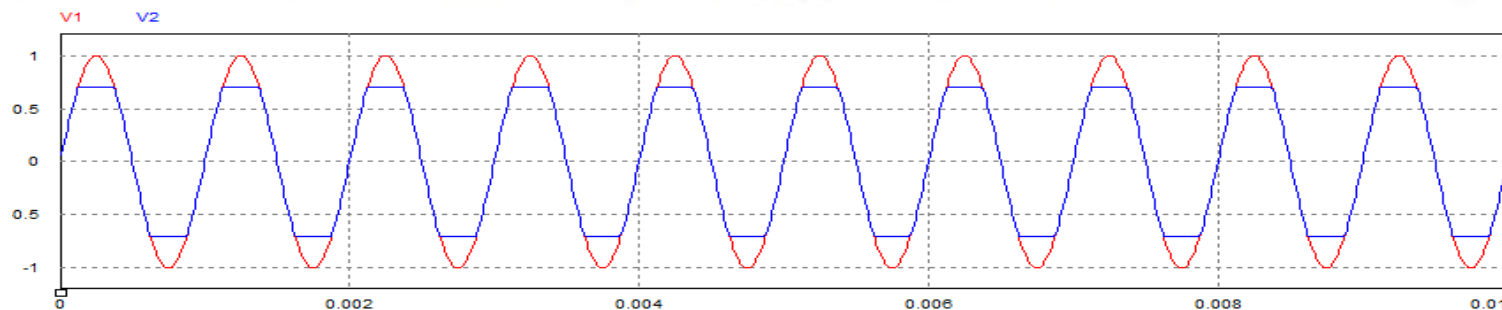
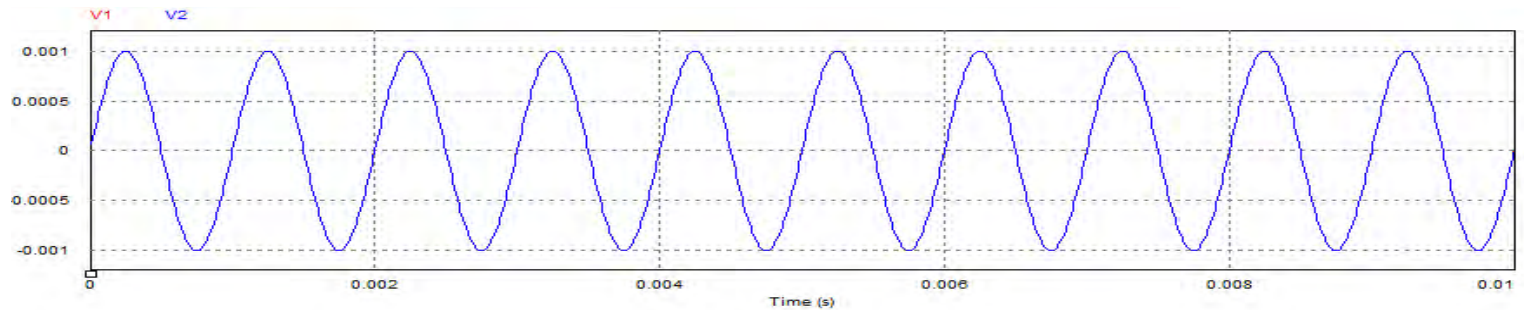


Amplificateur suiveur, alimentation bipolaire (5V, -5V), fréquence 1 kHz, diodes silicium

Mesure n°1 : entrée à 0,2V (pas suffisante pour que les diodes conduisent)

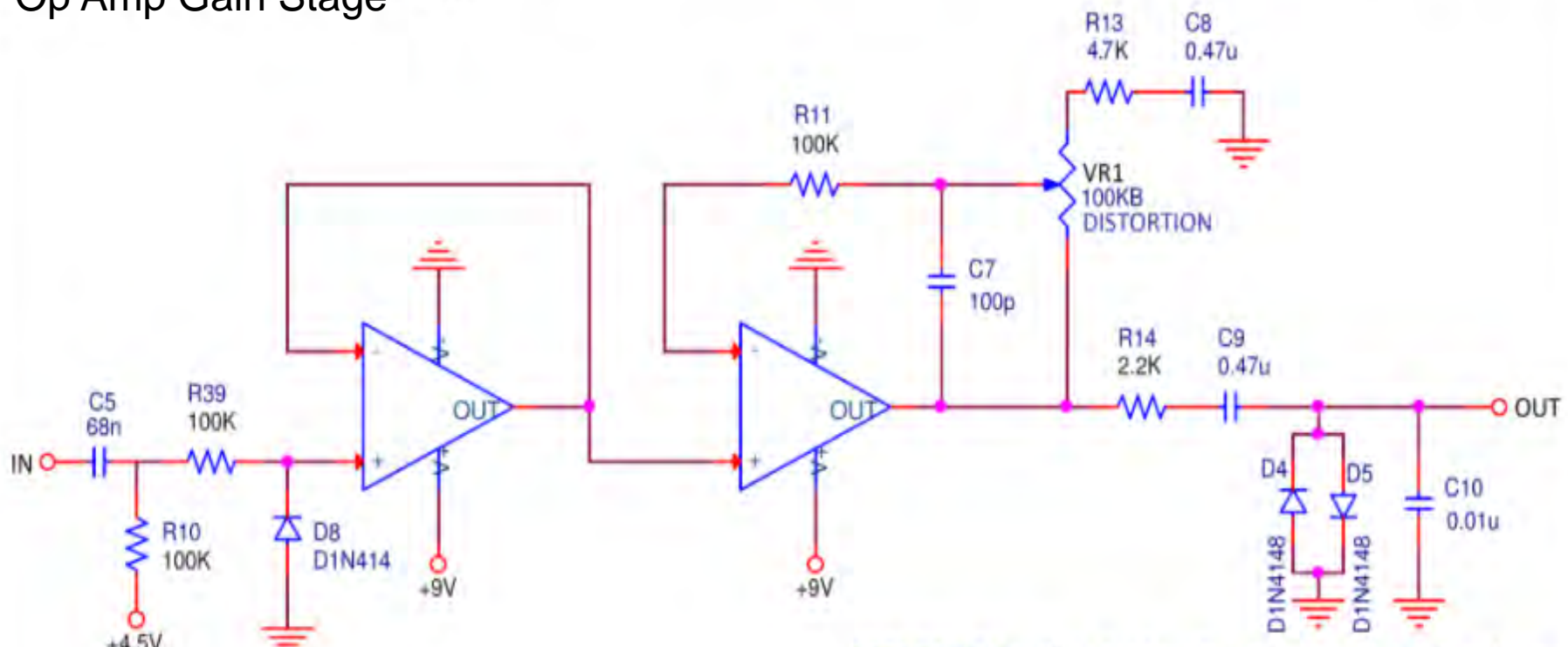
Mesure n°2 : entrée à 2V (écrêtage, les diodes conduisent)

DISTORSION

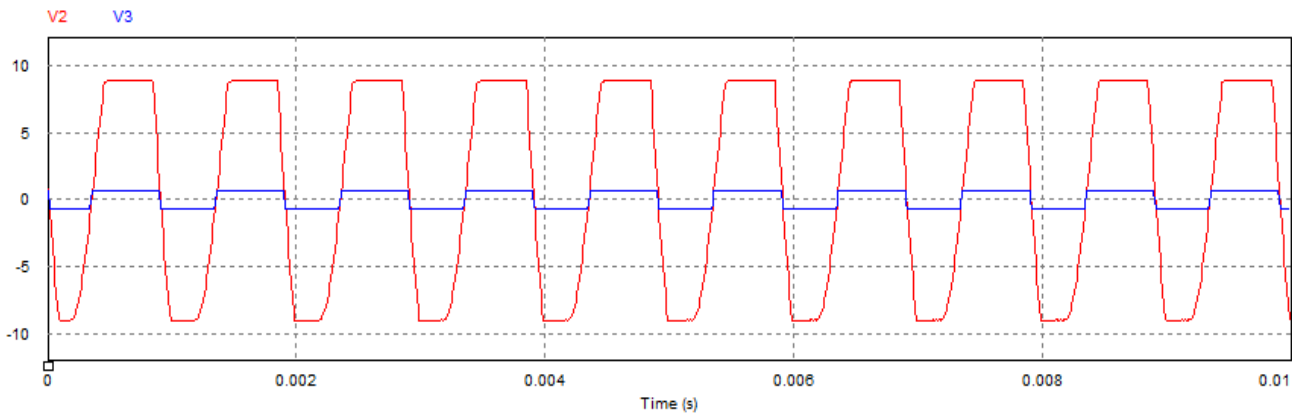


II. Modèle BOSS DS-1

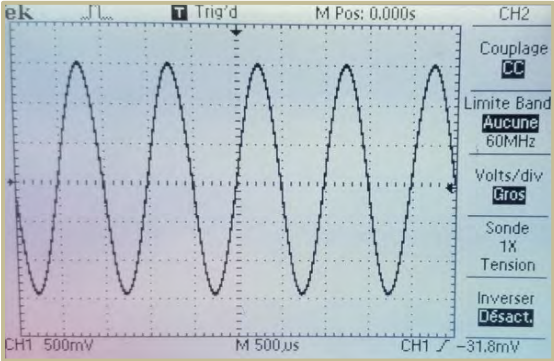
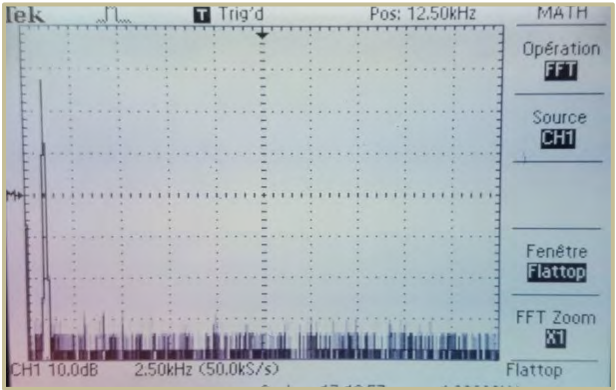
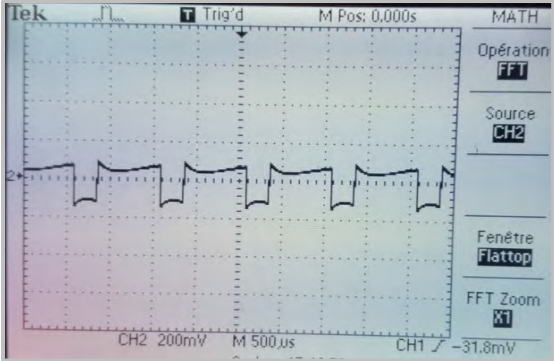
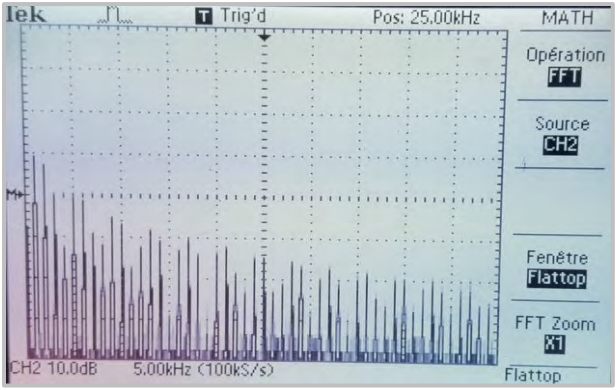
Op Amp Gain Stage



II. Modèle BOSS DS-1 (2)

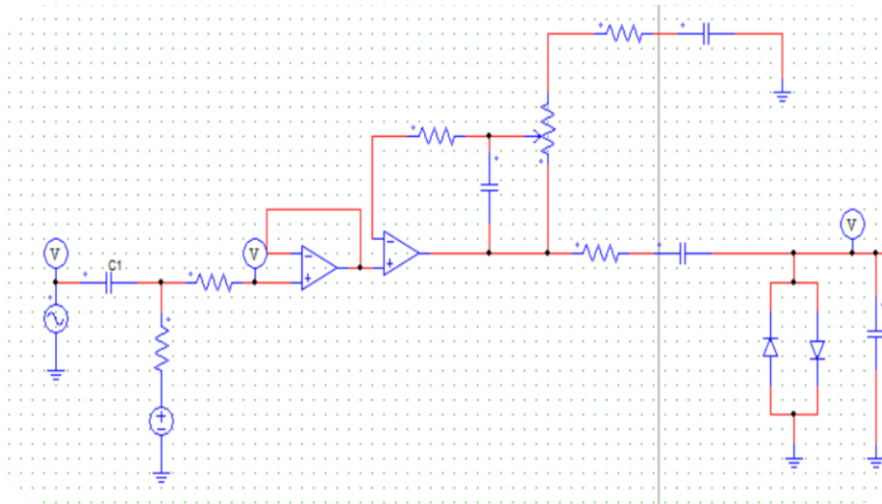
<u>Filtrage passe haut</u>	$f_c = \frac{1}{2\pi C_5 R_{10}} = 23,4 \text{ Hz}$
<u>Calcul du Gain</u>	$G = \frac{V_s}{V_e} = 1 + \frac{VR1}{R_{13}} = 1 + \frac{\alpha * 100k}{(1 - \alpha) * 100k + 4,7k}$
<u>Calcul de la fréquence</u>	$F_{Cmax} = 1/(2\pi * R2 * C2) = 72 \text{ Hz}$ $F_{Cmin} = 1/(2\pi * C2 * (R2 + VR1)) = 3 \text{ Hz}$
<u>Simulation</u>	

EXPERIENCE - Modèle BOSS DS-1

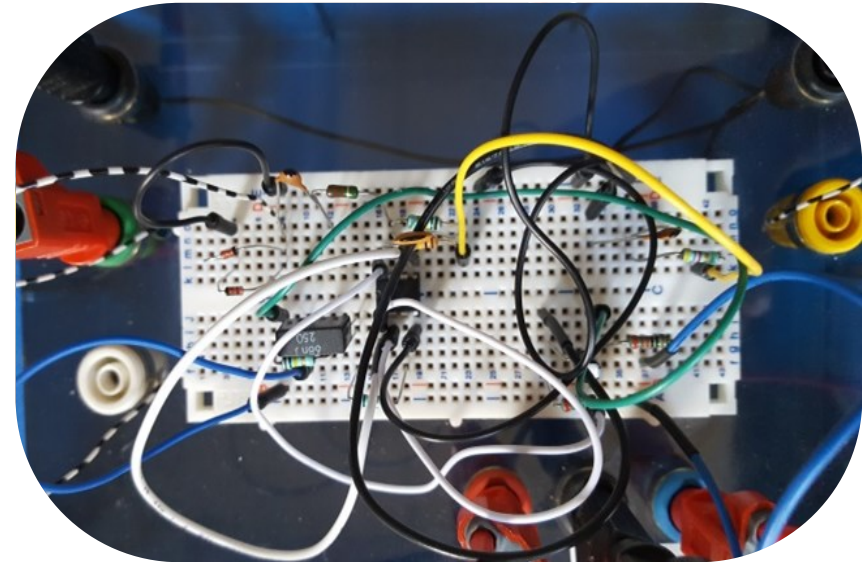
	TEMPORELLE	FREQUENTIELLE
Entrée		
Sortie		

EXPERIMENTATION – Montage Hard Diode Clipping

Simulation

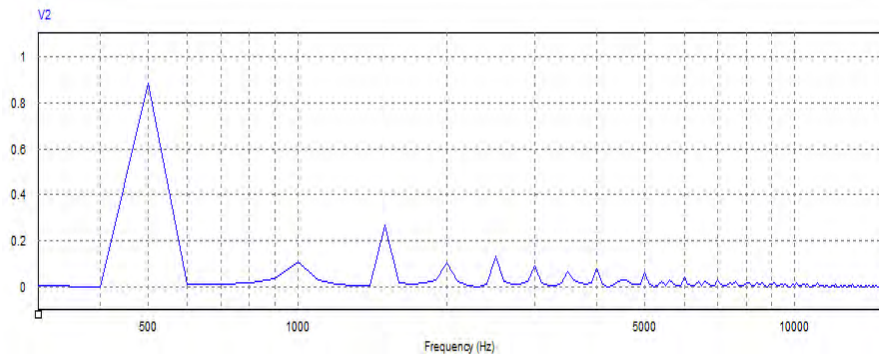
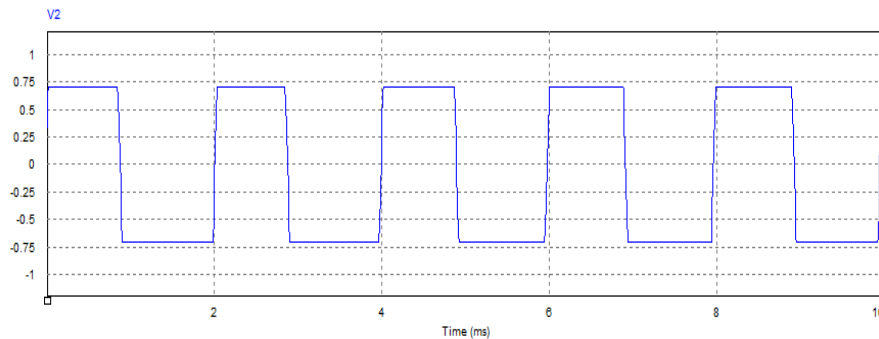


Expérience

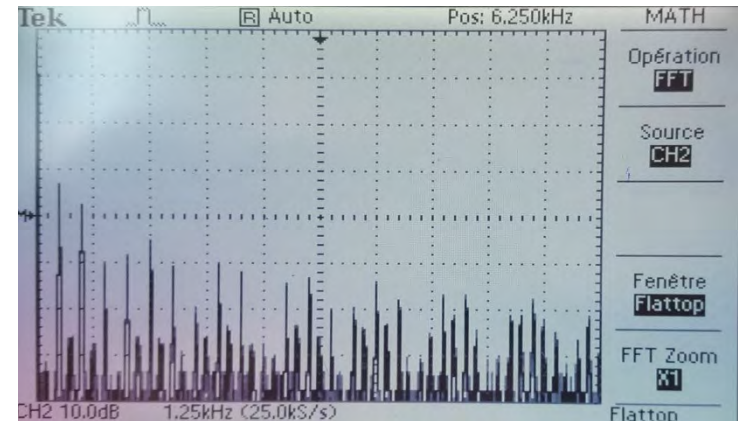


EXPERIMENTATION – Montage Hard Diode Clipping (2)

SIMULATION



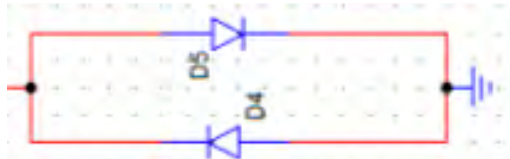
EXPERIMENTATION



III- Montage Simulation



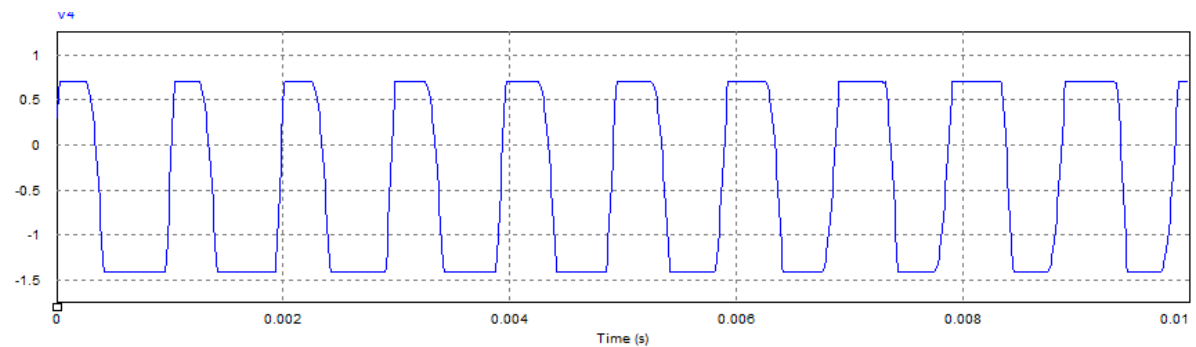
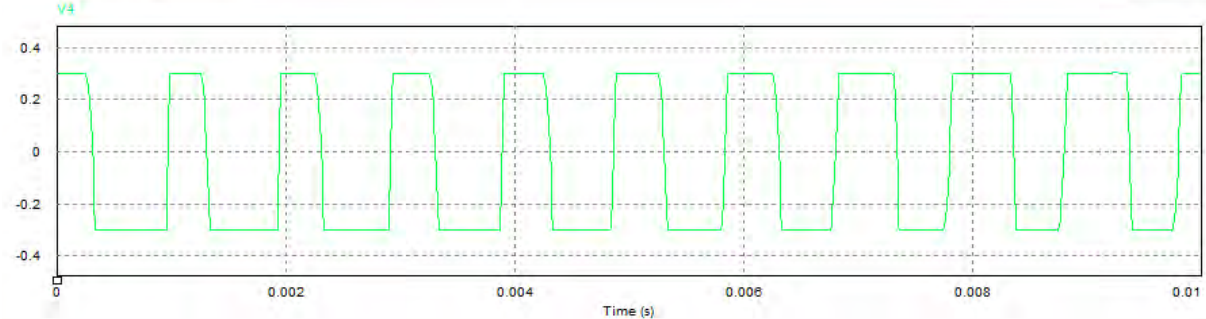
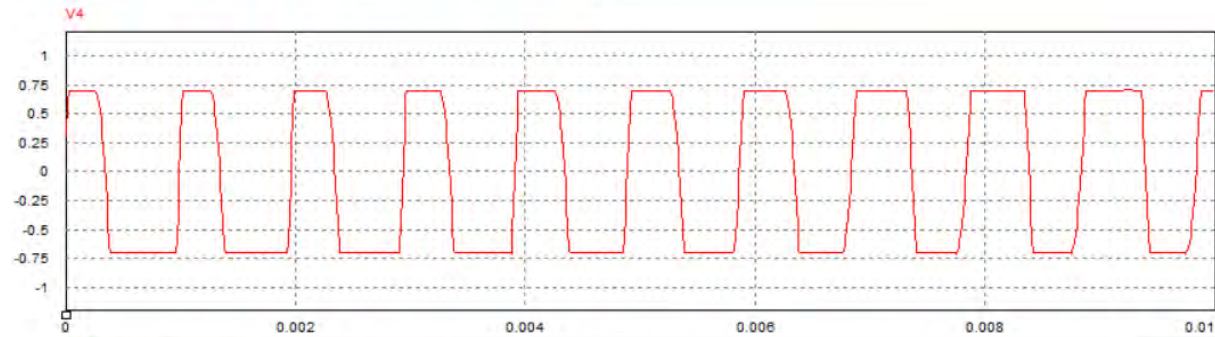
Silicium



Germanium

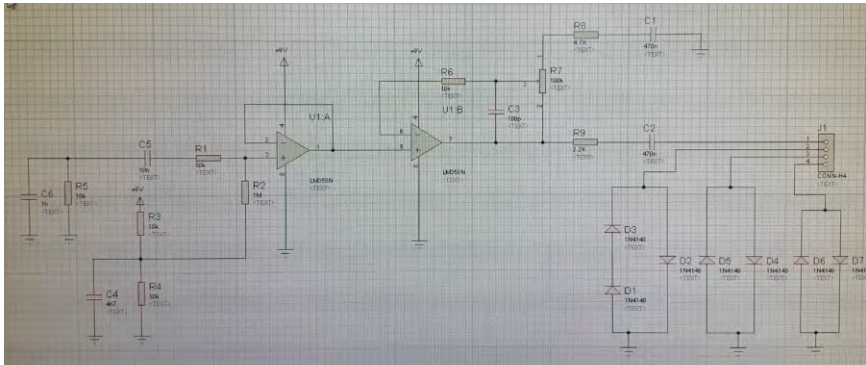


Silicium

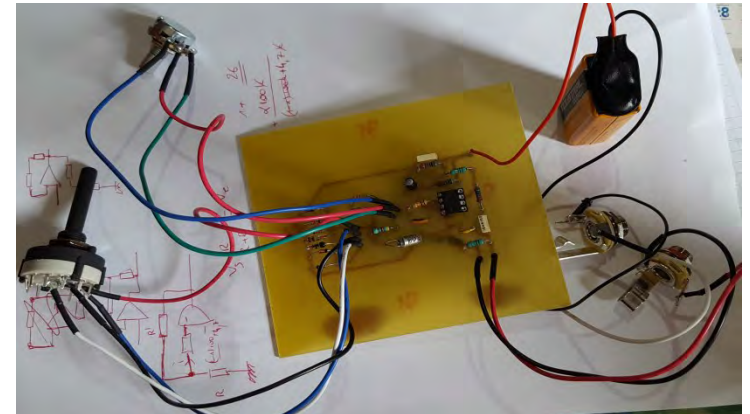
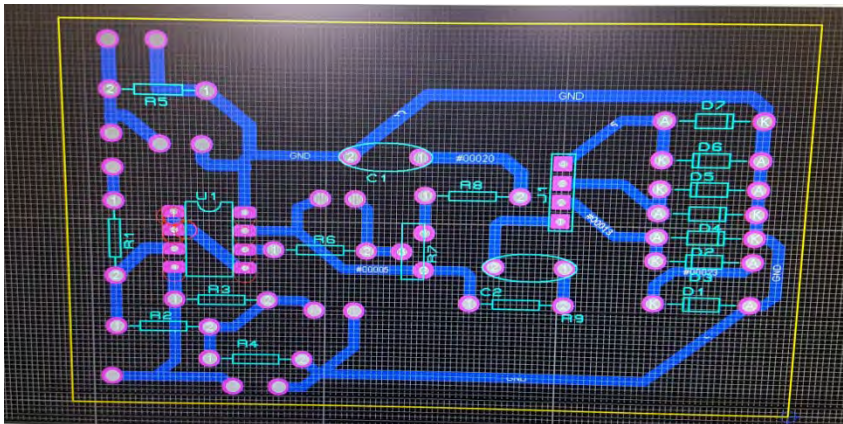
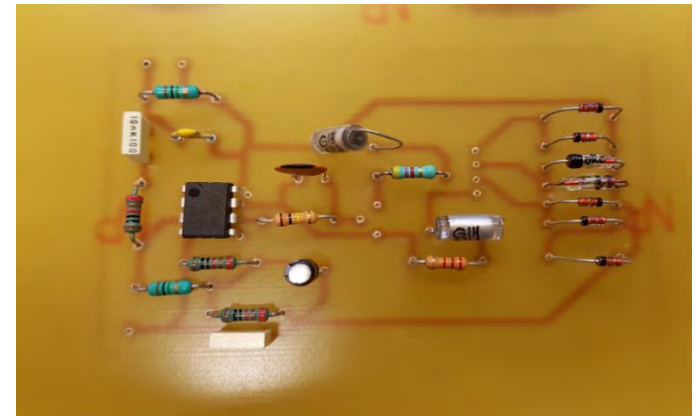


Réalisation


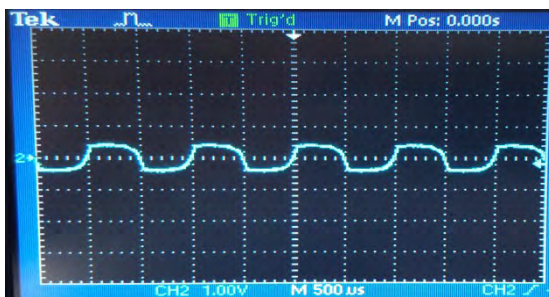
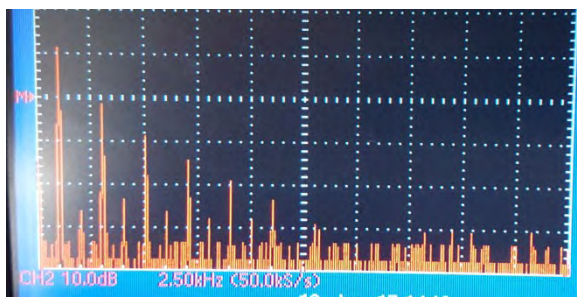
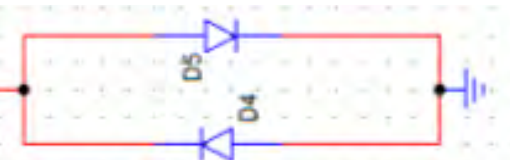
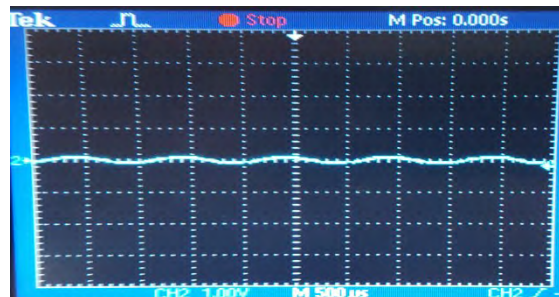
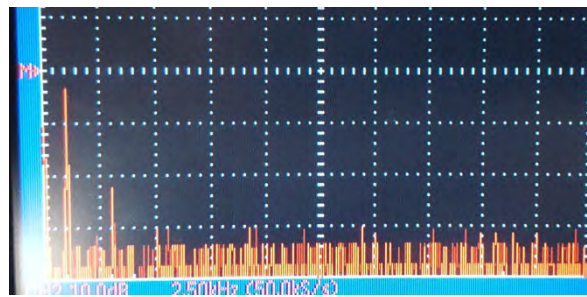


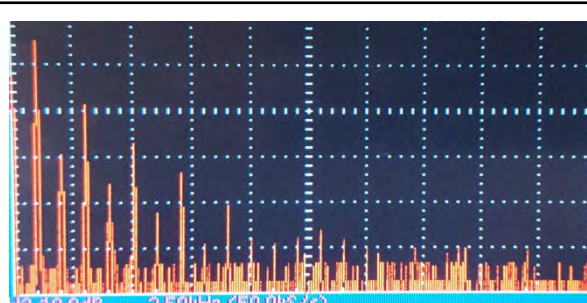
Création sur logiciel



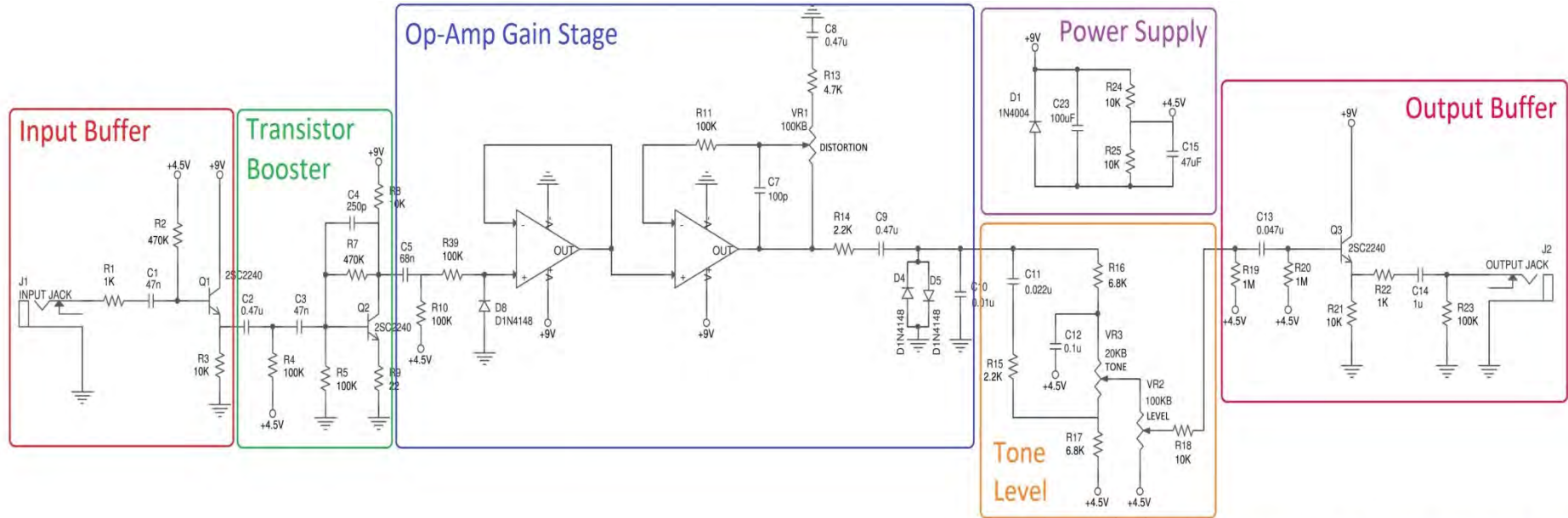
RESULTAT (avec et sans fils)



Résultats et comparaisons

POSITION SWITCH	TEMPORELLE	FREQUENTIELLE
 <p>Silicium</p>		
 <p>Germanium</p>		
 <p>Silicium</p>		

Annexe 1 – BOSS DS-1



Boss DS-1 Distortion Schematic DS-1A ElectroSmash.com