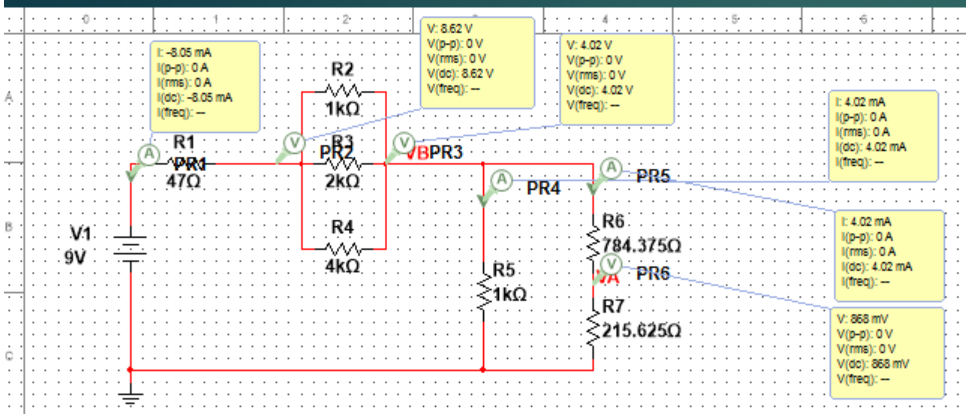
Lab notebook

MUSTAFA SMAILI

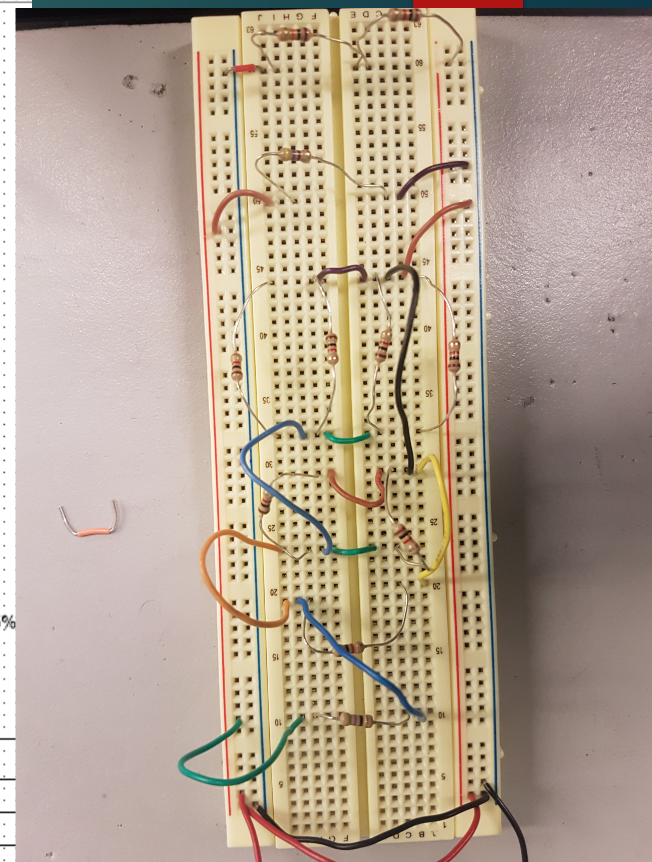
EECT211

EECT121 Lab review



Perform the following simulations
1.) Simulate VA, VB, VC, IT, I2 and I3
B) Modify circuit so VA = 2.5 times originial VA
III) Determine wattage needed for each resistor
assume 25% of rating
1W -> 1/4W max
1/2W -> 1/8W max
1/4W -> 1/16W max
2^2) Design using only 1K resistors
e) Determine what max/min VA woiuld be assuming 5%
part tolerance of circuit "B"

Title: EECT 121 - Review		
EECT121_Review all		
Designed by: mustafa smaili	Document N:	Revision:
Checked by:	Date:	Size: A
Approved by:	Sheet 1 of 1	



7 basic questions

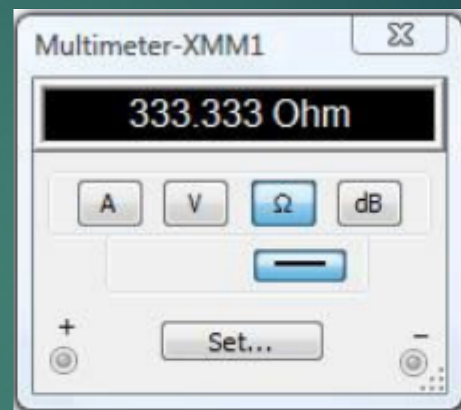
Multiple resistors combine in series and parallel.

Series

	A	B
1	R1 =	10.0E+3
2	R2 =	2.2E+3
3	R3 =	4.7E+3
4	RT =	16.9E+3

RT=B1+B2+B3

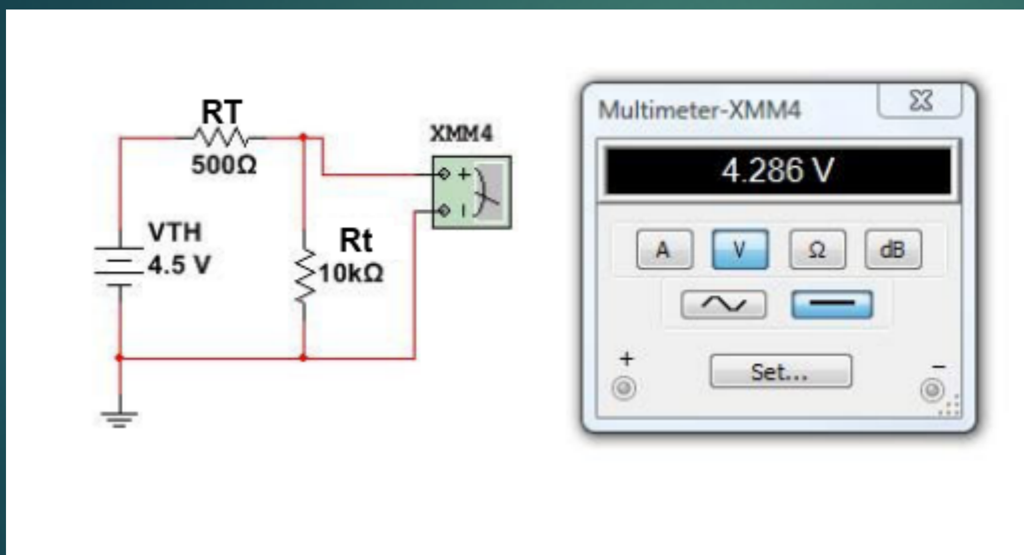
Parallel



	A	B
1	R4 =	1.0E+3
2	R5 =	1.0E+3
3	R6 =	1.0E+3
4	RT =	333.33

RT=1/((1/B1)+(1/B2)+(1/B3))

By example calculate the Thevenin Resistance and Voltage of a resistor network.



R1=	1E+3	Ω
R2=	1E+3	Ω
R3=	500E+0	Ω
R4=	500E+0	Ω
R5=	1E+3	Ω
R6=	1E+3	Ω
R12=	500E+0	Ω
R123=	1E+3	Ω
R56=	500E+0	Ω
R123456=	500E+0	Ω
R456	1E+3	Ω
RL=	10E+3	Ω
R456L=	909.091E+0	Ω
RT=	1.909E+3	Ω
V1=	9	V
Va=	4.286E+0	V
RTH=	500.0E+0	Ω
VTH=	4.5	V
VaTH=	4.286E+0	Ω

Multiple capacitors combine in series and parallel

Series

	A	B
1	C1 =	2.2E-6
2	C2 =	2.2E-6
3	C3 =	2.2E-6
4	CT =	733.3E-9

CT=1/((1/B1)+(1/B2)+(1/B3))

AnyOverCount_Caps
Single Frequency AC Analysis @ 1000 Hz

	AC Frequency Analysis	Real	Imaginary
1	1/((abs(imag(V(vout)/I(V1))))*1000*2*pi)	733.33333 n	0.00000

Parallel

	A	B
1	C4 =	10.0E-6
2	C5 =	2.2E-6
3	C6 =	4.7E-6
4	CT =	16.90E-6

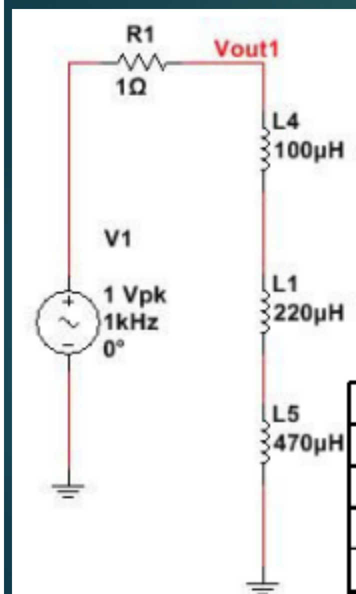
CT=B1+B2+B3

Parallel_Caps
Single Frequency AC Analysis @ 1000 Hz

	AC Frequency Analysis	Real	Imaginary
1	1/((abs(imag(V(vout)/I(V1))))*1000*2*pi)	16.90000 u	0.00000

Multiple inductors combine in series and parallel.

Series

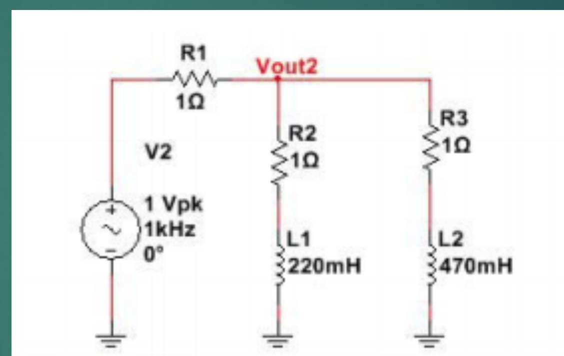


LT=L1+L2+L3...	
L1=	100.0E-6
L2=	220.0E-6
L3=	470.0E-6
LT=	790.0E-6

Series_Induct
Single Frequency AC Analysis @ 1000 Hz

	AC Frequency Analysis	Real	Imaginary
1	abs(imag((V(vout1)/I(R1))/(2*pi*1000)))	790.00000 u	0.00000

Parallel



LT=(L1*L2)/(L1+L2)	
L1=	220.0E-3
L2=	470.0E-3
LT=	149.9E-3

Para_Same_Induct
Single Frequency AC Analysis @ 1000 Hz

	AC Frequency Analysis	Real	Imaginary
1	abs(imag((V(vout2)/I(R1))/(2*pi*1000)))	149.85508 m	0.00000

Lab 10-Series/Parallel Capacitors

Lab 10 – Series/Parallel Capacitors

Names: Mustafa Smaili

Date: ______________________

The purpose of this lab is to:
Experiment with series circuits and parallel combinations of capacitors.

The following capacitors are needed (1 each of the following): 10uF, 22uF and 47uF

Measure and record the capacitance of each capacitor using the LCR meter. Connect the capacitors as shown in Figure 1 and measure and record the total capacitance, CT. Then connect the capacitors as shown in Figure 2 and measure and record the total capacitance, CT.

Equipment needed:

1 – LCR Meter
1 – Elvis II
3 – capacitors

	Expected	Measured	Simulated
C1 =	10uF	9.2uF	10uF
C2 =	22uF	18.84uF	22uF
C3 =	47uF	36.36uF	47uF
CT =	6uF	5uF	6uF

Expected = value you expect it to be
Measured = using LCR Meter
Simulated = using Multisim

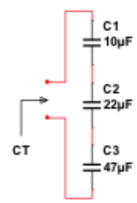


Figure 1
Series Circuit

	Expected	Measured	Simulated
C1 =	10uF	9.23uF	10uF
C2 =	22uF	17.84uF	22uF
C3 =	47uF	32.56uF	47uF
CT =	79uF	56.12uF	79uF

Expected = value you expect it to be
Measured = using LCR Meter
Simulated = using Multisim

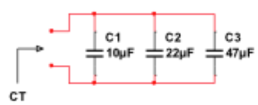
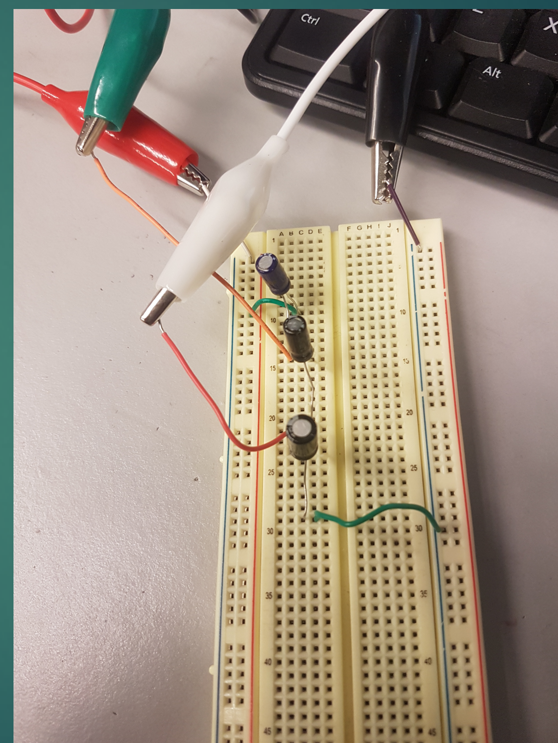


Figure 2
Parallel Circuit



Lab 11-RC lab

Lab 11 – RC Lab

Names: Mustafa Smaili

Date: ____________________

The purpose of this lab is to:
Experiment with RC (Resistor & Capacitor) circuits.

The following capacitors are needed (1 each of the following): 0.47uF, 1uF and 2.2uF

Measure and record the resistor value using the DMM and measure and record the capacitor values using the LCR meter in Table 1. Connect the resistor and capacitor as shown in Figure 1. Connect the Function Generator to the input at V1 and connect Channel 1 of the Oscilloscope to the input and Channel 2 to the output. Adjust the voltage of the Function Generator to 1Vpp at the frequencies shown in Table 2. Measure the input and output voltages using the Oscilloscope. Record the results in Table 2. Change the capacitor and retest.

Equipment needed:

1 – Digital Multimeter
1 – LCR Meter
1 – Oscilloscope
1 – Function Generator
1 – Elvis II
3 – capacitors
1 – resistor

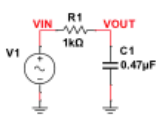


Figure 1
RC Circuit

	Capacitance or Resistance Expected	Measured
C1 =	0.47 uF	.464 uF
C2 =	1 uF	.915 uF
C3 =	2.2 uF	2.1 uF
R1 =	1k uF	1.001 uF

Table 1 – Resistance and Capacitances
Expected = value you expect it to be
Measured = using LCR Meter or DMM

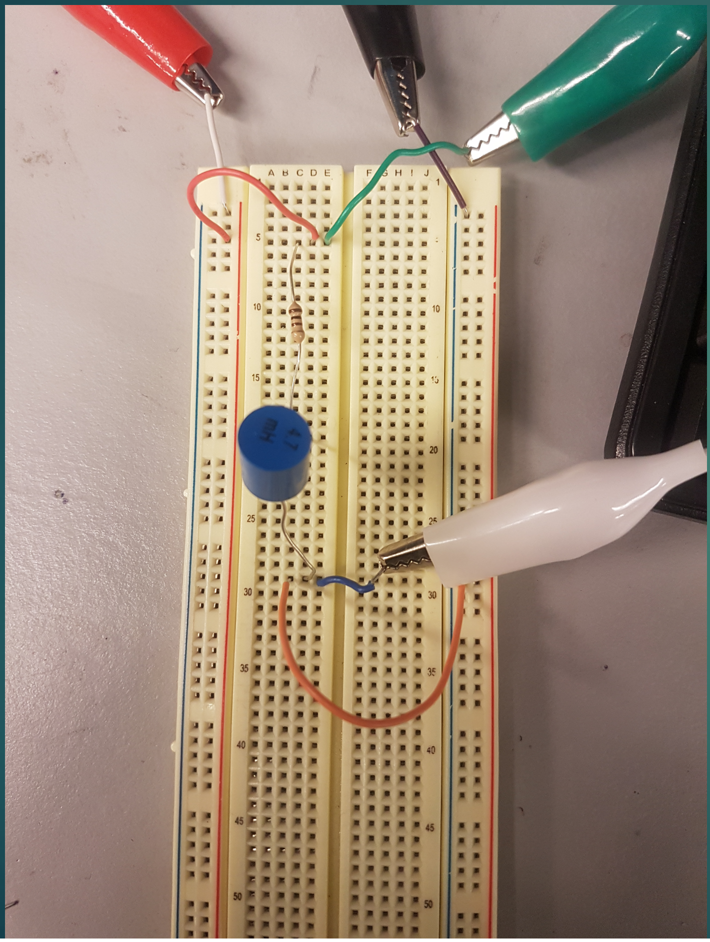
EECT111

	Output Voltage C = ________			Output Voltage C = ________			Output Voltage C = ________		
	Expected	Measured		Expected	Measured		Expected	Measured	
Frequency	Output Voltage	Input Voltage	Output Voltage	Output Voltage	Input Voltage	Output Voltage	Output Voltage	Input Voltage	Output Voltage
10	1	1	1	.998	1	1	.991	1	1
50	.989	1	1	.954	1	.940	.823	1	.820
100	.959	1	.98	.847	1	.840	.586	1	.600
200	.861	1	.88	.623	1	.620	.340	1	.380
300	.749	1	.76	.469	1	.480	.234	1	.260
400	.646	1	.660	.370	1	.400	.178	1	.220
500	.561	1	.580	.303	1	.340	.143	1	.180
600	.492	1	.520	.256	1	.300	.120	1	.160
700	.436	1	.460	.222	1	.260	.103	1	.160
800	.390	1	.420	.195	1	.240	.090	1	.140
900	.352	1	.380	.174	1	.220	.080	1	.140
1,000	.321	1	.360	.157	1	.200	.072	1	.140
2,000	.167	1	.200	.079	1	.140	.036	1	.120
3,000	.112	1	.160	.053	1	.100	.024	1	.056
4,000	.084	1	.104	.039	1	.056	.018	1	.048
5,000	.068	1	.088	.032	1	.048	.015	1	.048
6,000	.056	1	.080	.027	1	.040	.012	1	.040
7,000	.048	1	.072	.023	1	.032	.010	1	.032
8,000	.042	1	.064	.020	1	.032	.009	1	.032
9,000	.038	1	.064	.018	1	.032	.008	1	.032
10,000	.034	1	.056	.016	1	.032	.007	1	.032

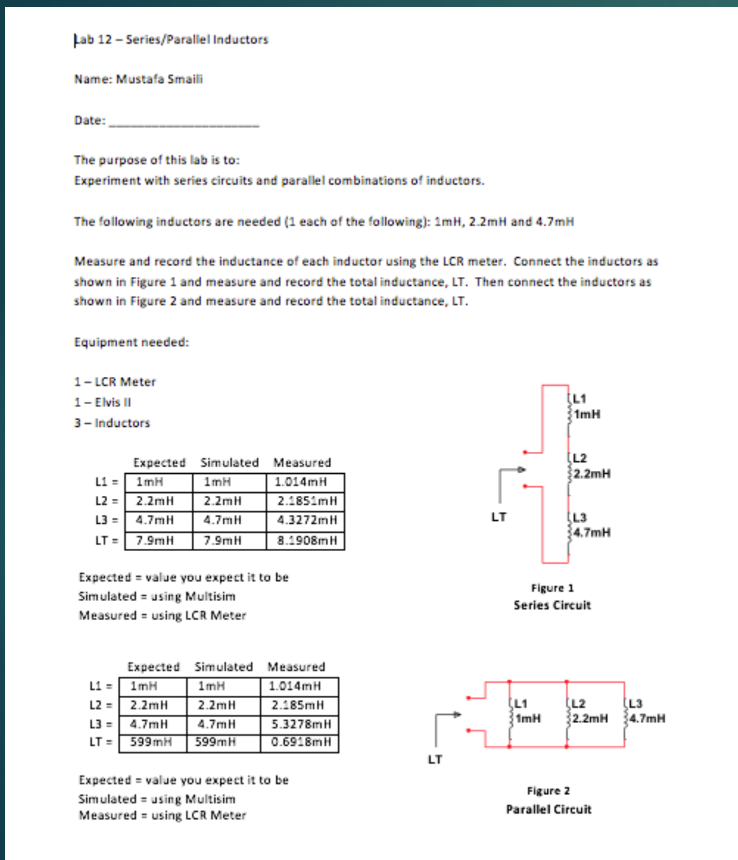
RC Frequency Response
Expected = value you expect it to be
Measured = Using Oscilloscope

Observations: Our first run of measurements were a failure due to a bad 10x switch on the probe measuring the Vout. After a second measuring session our numbers proved compatible with the calculated results. We could have gotten higher resolution if we had continuously adjusted the amplitude for Vout signal on the scope. Bench 6 was used on the first test but results were scrapped. Bench 5 LCR was used for Capacitor measurements, Bench 8 scope was used with bench 5 Elvis for second and final test run.

Lab 11 Continue



Lab 12-Series/Parallel Inductors



Lab 12 – Series/Parallel Inductors

Name: Mustafa Smaili

Date: ____________________

The purpose of this lab is to:
Experiment with series circuits and parallel combinations of inductors.

The following inductors are needed (1 each of the following): 1mH, 2.2mH and 4.7mH

Measure and record the inductance of each inductor using the LCR meter. Connect the inductors as shown in Figure 1 and measure and record the total inductance, LT. Then connect the inductors as shown in Figure 2 and measure and record the total inductance, LT.

Equipment needed:

1 – LCR Meter
1 – Elvis II
3 – Inductors

	Expected	Simulated	Measured
L1 =	1mH	1mH	1.014mH
L2 =	2.2mH	2.2mH	2.1851mH
L3 =	4.7mH	4.7mH	4.3272mH
LT =	7.9mH	7.9mH	8.1908mH

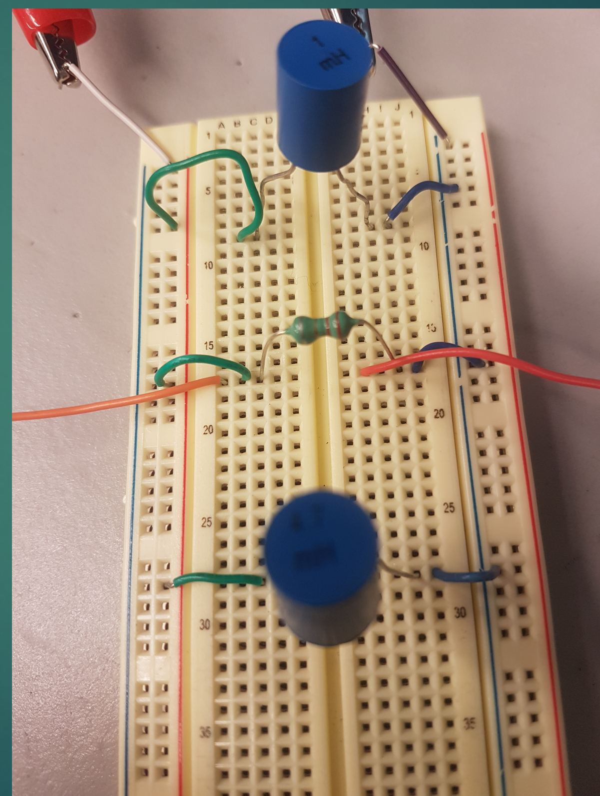
Expected = value you expect it to be
Simulated = using Multisim
Measured = using LCR Meter

Figure 1
Series Circuit

	Expected	Simulated	Measured
L1 =	1mH	1mH	1.014mH
L2 =	2.2mH	2.2mH	2.185mH
L3 =	4.7mH	4.7mH	5.3278mH
LT =	599mH	599mH	0.6918mH

Expected = value you expect it to be
Simulated = using Multisim
Measured = using LCR Meter

Figure 2
Parallel Circuit



Lab 13-RL Lab.

Lab 13 – RL Lab

Names: Mustafa Smaili

Date:

The purpose of this lab is to:
Experiment with RL (Resistor & Inductor) circuits.

The following inductors are needed (1 each of the following): 1mH, 2.2mH and 4.7mH

Measure and record the resistor value using the DMM and measure and record the inductor values using the LCR meter in Table 1. Connect the resistor and inductor as shown in Figure 1. Connect the Function Generator to the input at V1 and connect Channel 1 of the Oscilloscope to the input and Channel 2 to the output. Adjust the voltage of the Function Generator to 1Vpp at the frequencies shown in Table 2. Measure the input and output voltages using the Oscilloscope. Record the results in Table 2. Change the inductor and retest.

Equipment needed:

1 – Digital Multimeter
1 – LCR Meter
1 – Oscilloscope
1 – Function Generator
1 – Elvis II
3 – Inductors
1 – Resistor, 100 ohm

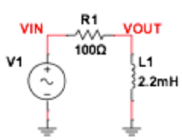


Figure 1
RL Circuit

	Inductance or Resistance	
	Expected	Measured
L1 =	2.2mH	2.12mH
L2 =	1mH	.98mH
L3 =	4.7mH	4.67mH
R1 =	100mH	99.99mH

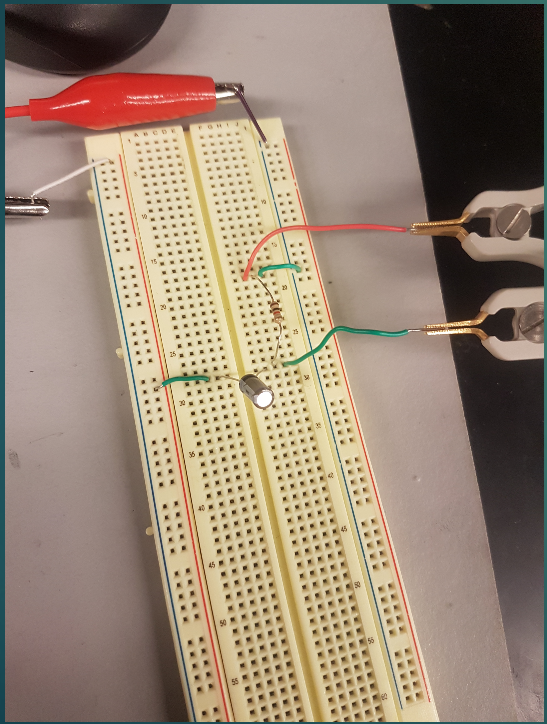
Table 1 – Resistance and Inductances
Expected = value you expect it to be
Measured = using LCR Meter or DMM

	Output Voltage L = 2.2mH			Output Voltage L = 1mH			Output Voltage L = 4.7mH		
	Expected	Measured		Expected	Measured		Expected	Measured	
Frequency	Output Voltage	Input Voltage	Output Voltage	Output Voltage	Input Voltage	Output Voltage	Output Voltage	Input Voltage	Output Voltage
10	166mV	451mV	4.3mV	75mV	640mV	21mV	355mV	642mV	96mV
50	832mV	451mV	18.8 mV	378mV	655mV	86mV	1.7v	675mV	116mV
100	1.6v	453mV	19.6mV	7 56mV	658mV	101mV	3.5v	678mV	150mV
200	3.3V	452mV	22.1mV	1.5v	656mV	101mV	7.1v	681mV	152mV
300	4.9v	452mV	43.3mV	2.2v	659mV	114mV	10.6v	684mV	187mV
400	6.6V	450mV	44.1mV	3.0V	661mV	120mV	14.1v	688mV	214mV
500	8.3v	451mV	44.7mV	3.7v	662mV	114mV	17.5v	695mV	232mV
600	9.9v	452mV	45.3mV	4.5v	660mV	160mV	21V	696mV	271mV
700	11.5v	454mV	47.7mV	5.2v	662mV	137mV	24.3v	700mV	290mV
800	13.2v	453mV	49.8mV	6v	663mV	150mV	27.6v	705mV	302mV
900	14.8v	454mV	55.2mV	6.7v	664mV	160mV	30.9v	708mV	310mV
1,000	16.4v	456mV	60.8mV	7.5v	665mV	172mV	34v	701mV	401mV
2,000	32v	462mV	116mV	15v	676mV	230mV	61.1v	750mV	463mV
3,000	46v	465mV	168mV	22.2v	683mV	278mV	79.78v	769mV	579mV
4,000	58.2v	477mV	217mV	29.3v	688mV	305mV	91.7v	808mV	629mV
5,000	68.3v	489mV	263mV	36v	697mV	347mV	99.4v	851mV	722mV
6,000	76.5v	502mV	308mV	42.4v	707mV	384mV	104.5v	860mV	740mV
7,000	83.5v	516mV	346mV	48.4v	718mV	417mV	108vv	892mV	814mV
8,000	89.1v	527mV	379mV	54.1v	726mV	440mV	110.5v	894mV	818 mV
9,000	93.6v	536mV	406mV	59.2v	730mV	491mV	112.3v	908mV	855mV
10,000	97.3v	544mV	427mV	63.9v	736mV	490mV	113.6v	909mV	857mV

RL Frequency Response
Expected = value you expect it to be
Measured = Using Oscilloscope

Observations: Numbers were not as expected

Lab 13 Cont.



+/- 9V power supply Requirements & Part List

Item	Part Description	Part Number	Qty	Unit Price	Total Price	Check	Cost	BOM
1	Power Transformers 12.6 VCT .3A	16P112-.3	1	$5.95	$5.95	53	$5.95	ok
2	Silicon Rectifiers - Max Current 1A Max PIV 50	111N4001	4	$0.10	$0.40	28	$0.10	ok
3	Volt. Regulator Adjustable 1A	10317-T	1	$0.35	$0.35	26	$0.35	ok
4	Volt. Regulator Adjustable 1A	10337-T	1	$0.75	$0.75	27	$0.75	ok
5	In-Line Holder For 1-1- 4 x 1- 4 Fuses	2001LINL	1	$0.55	$0.55	77	$0.55	ok
6	Bright Red LED	08L53HD	2	$0.14	$0.28	23	$0.14	ok
7	Instrument Fuses 1/4 Amp	2000AGX1/4	1	$0.95	$0.95	73	$0.95	ok
8	Multiturn Potentiometers Top Adjust - 2K Ohm	18MPT2K	2	$0.65	$1.30	69	$0.65	ok
9	Electrolytic Nonpolarized Radial Capacitors - 47 uf 50V	14ERN05047U	6	$0.80	$4.80	51	$0.80	ok
10	RSR SPST Toggle Switch with lead wires 6 Amp 125V	17SWTOGWR	1	$0.95	$0.95	66	$0.95	ok
11	Carbon Film Resistors 5% 1/4 W - Value 100	13005100	4	$0.06	$0.24	6	$0.06	ok
12	Carbon Film Resistors 5% 1/4 W - Value 10K	1300510K	2	$0.06	$0.12	35	$0.06	ok
13	Carbon Film Resistors 5% 1/4 W - Value 720	13005470	2	$0.06	$0.12	12	$0.06	ok

C1, C2 2200 uF 50V Electrolytic Capacitor

C3, C4, C5, C7 2.2 uF 50V Electrolytic Capacitor

C6, C8 100 uF 50V Electrolytic Capacitor

R1, R4 5K Potentiometer

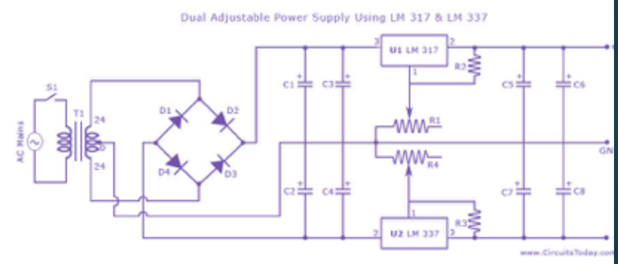
R2, R3 220 Ohms 1/4 W Resistor

D1 to D4 IN 4007 Diodes

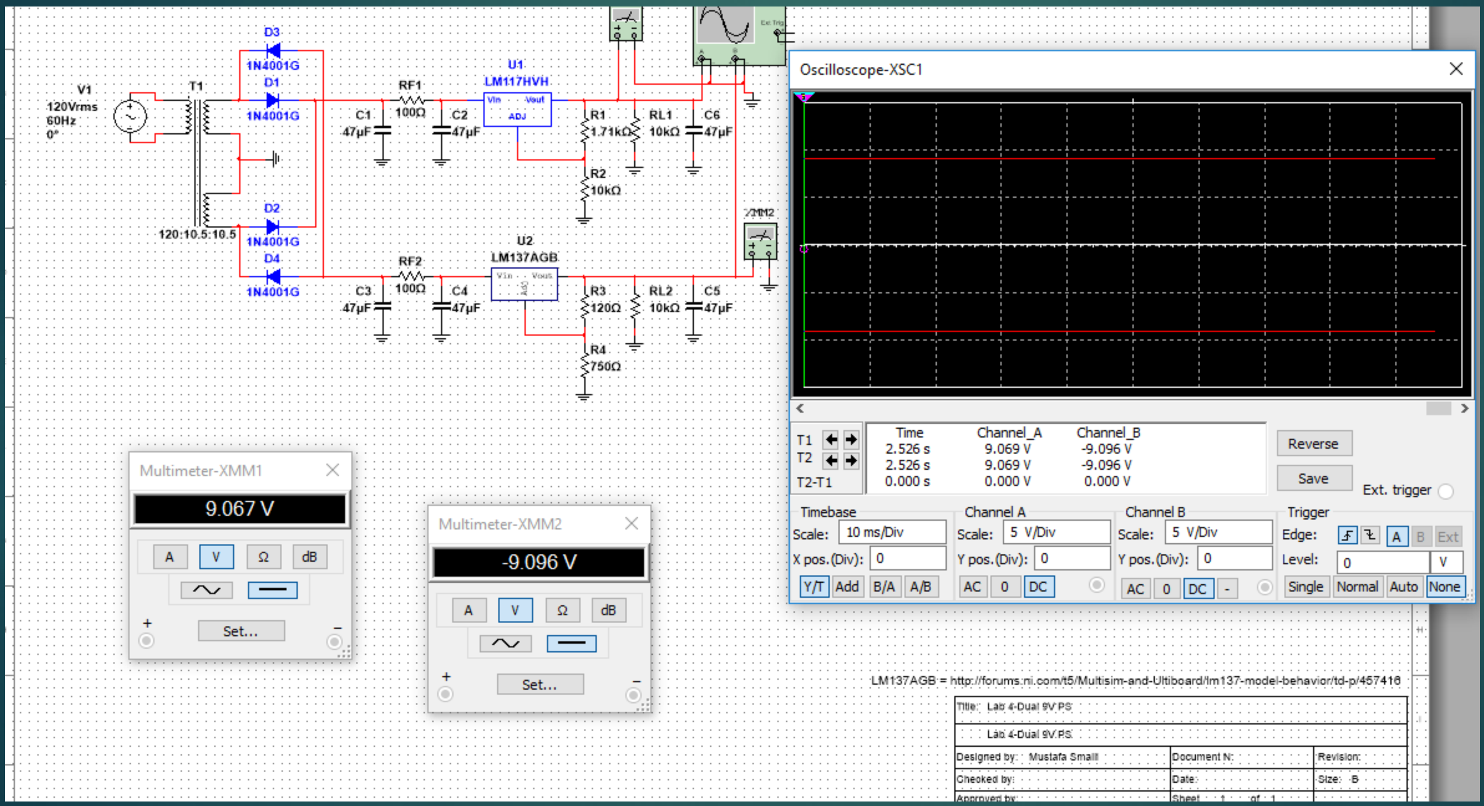
U1 LM317 U2 LM337 T1 24 0 24 Center Tapped 2 Ampere Transformer

S1 SPST 2 Ampere Switch

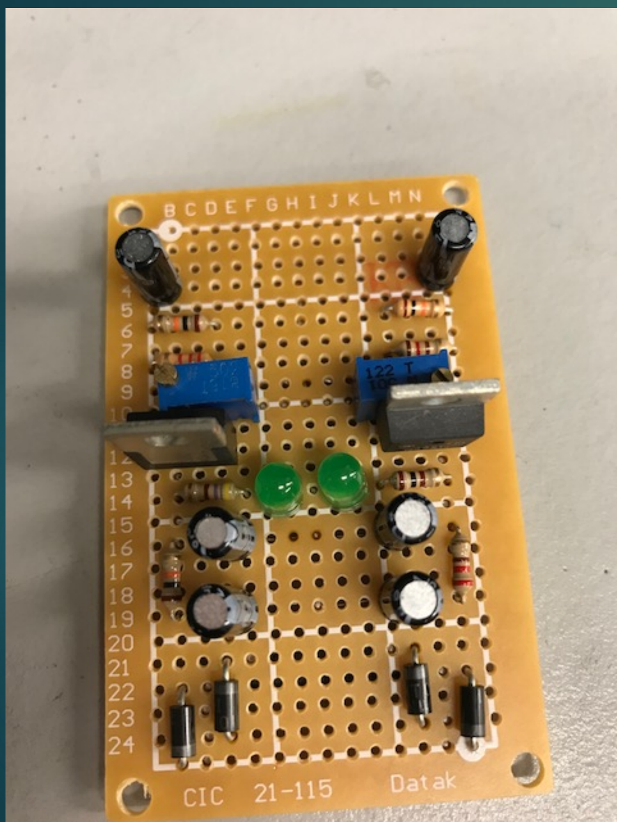
Extra Heat sinks for two IC's , Power Cord, Casing, Wire etc



+/-9V Power Supply Multisim



+/- 9V build



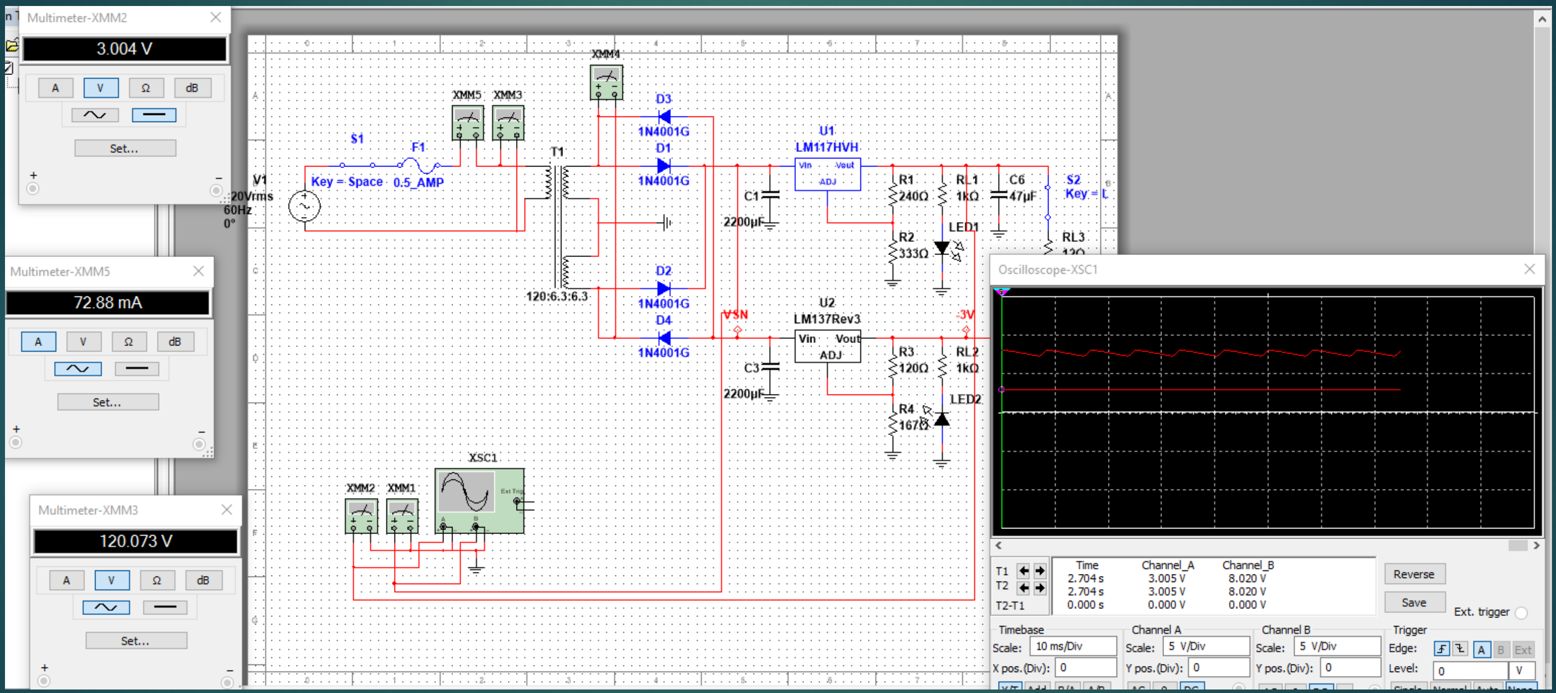
B C D E F G H I J K L M N
CIC 21-115
Datak

GW INSTEK
GDM-8245
Dual Display Digital Multimeter
POWER

+/-3V Power supply Requirements & Part List

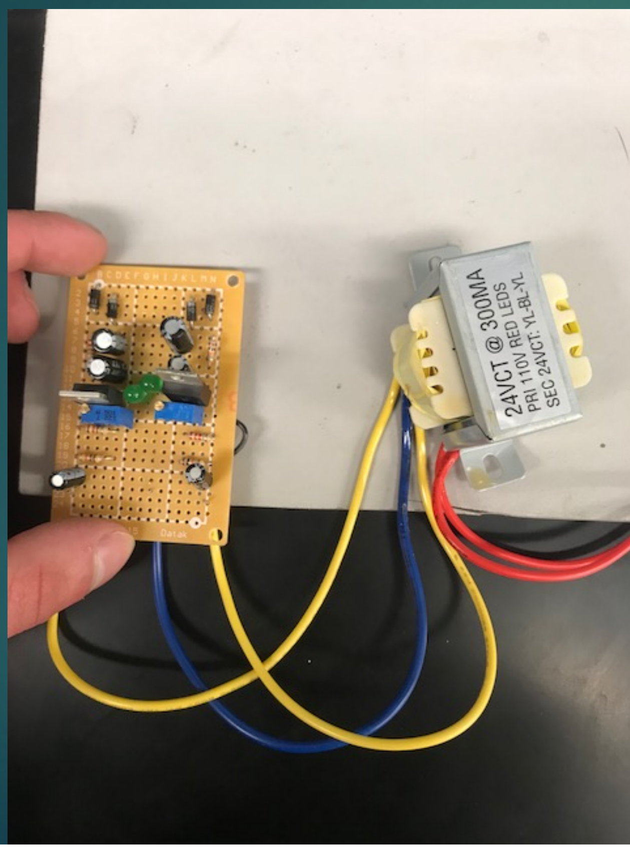
Item	Part Description	Part Number	Qty	Unit Price	Total Price
1	Power Transformers 12.6 VCT .3A	16P112-.3	1	$5.95	$5.95
2	Silicon Rectifiers - Max Current 1A Max PIV 50	111N4001	4	$0.10	$0.40
3	Volt. Regulator Adjustable 1A	10317-T	1	$0.35	$0.35
4	Volt. Regulator Adjustable 1A	10337-T	1	$0.75	$0.75
5	In-Line Holder For 1-1- 4 x 1- 4 Fuses	2001LINL	1	$0.55	$0.55
6	Bright Red LED	08L53HD	2	$0.14	$0.28
7	Instrument Fuses 1/4 Amp	2000AGX1/4	1	$0.95	$0.95
8	Multiturn Potentiometers Top Adjust - 2K Ohm	18MPT2K	2	$0.65	$1.30
9	Electrolytic Nonpolarized Radial Capacitors - 47 uf	14ERN05047U	6	$0.80	$4.80
10	RSR SPST Toggle Switch with lead wires 6 Amp 125	17SWTOGWR	1	$0.95	$0.95
11	Carbon Film Resistors 5% 1/4 W - Value 100	13005100	4	$0.06	$0.24
12	Carbon Film Resistors 5% 1/4 W - Value 10K	1300510K	2	$0.06	$0.12
13	Carbon Film Resistors 5% 1/4 W - Value 720	13005470	2	$0.06	$0.12
				Total=	$16.76

+/-3V Multisim



Multimeter-XMM2
3.004 V
Multimeter-XMM5
72.88 mA
Multimeter-XMM3
120.073 V
Oscilloscope-XSC1
LM117HVH
LM137Rev3
1N4001G
120:6.3:6.3
Key = Space
0.5_AMP
2200µF
-VSN
-3V
Time
Channel_A
Channel_B
2.704 s
3.005 V
8.020 V
0.000 s
0.000 V
Reverse
Save

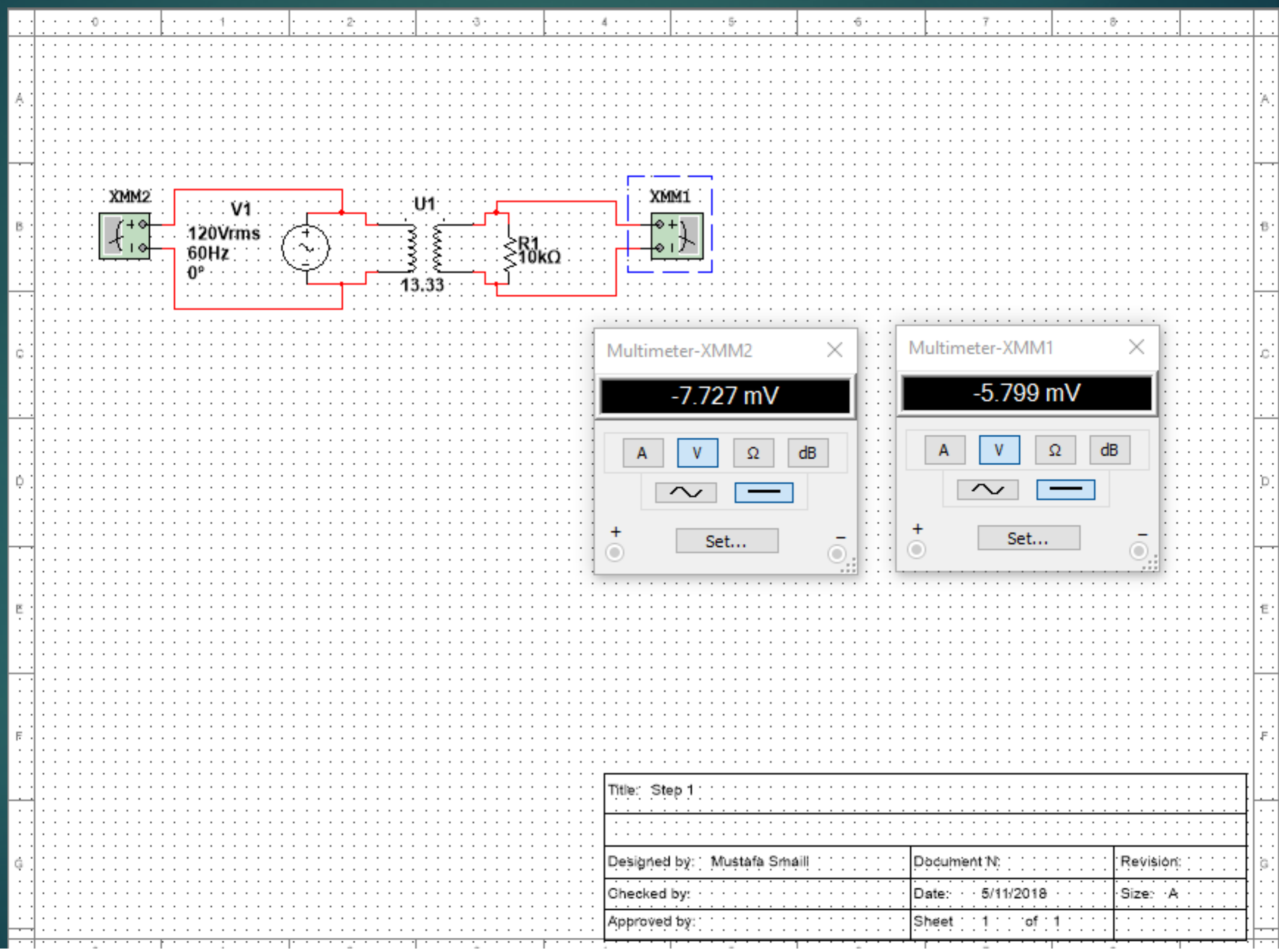
+/-3V Build


24VCT @ 300MA
PRI 110V RED LEDS
SEC 24VCT: YL-BL-YL

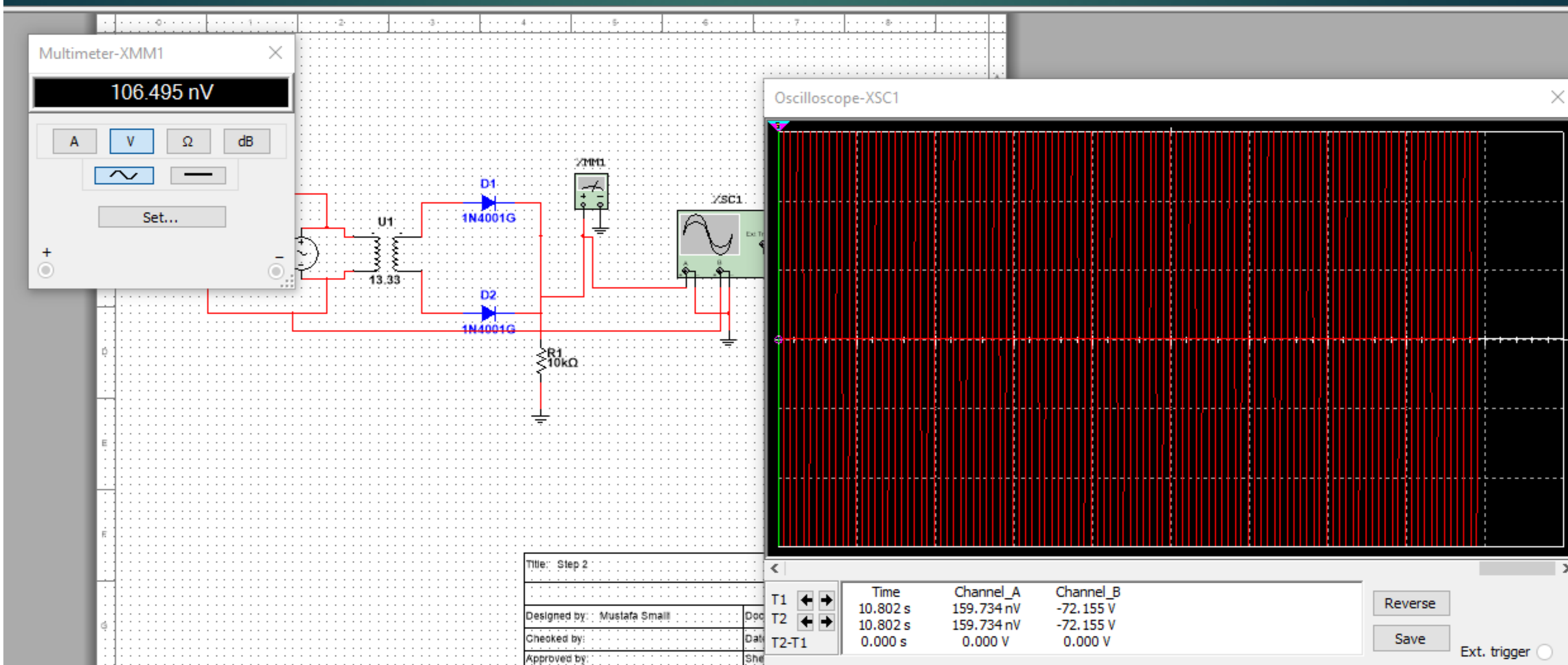

GW INSTEK GDM-8245


304
GW INSTEK GDM-8245

9 Step Approach
Step1

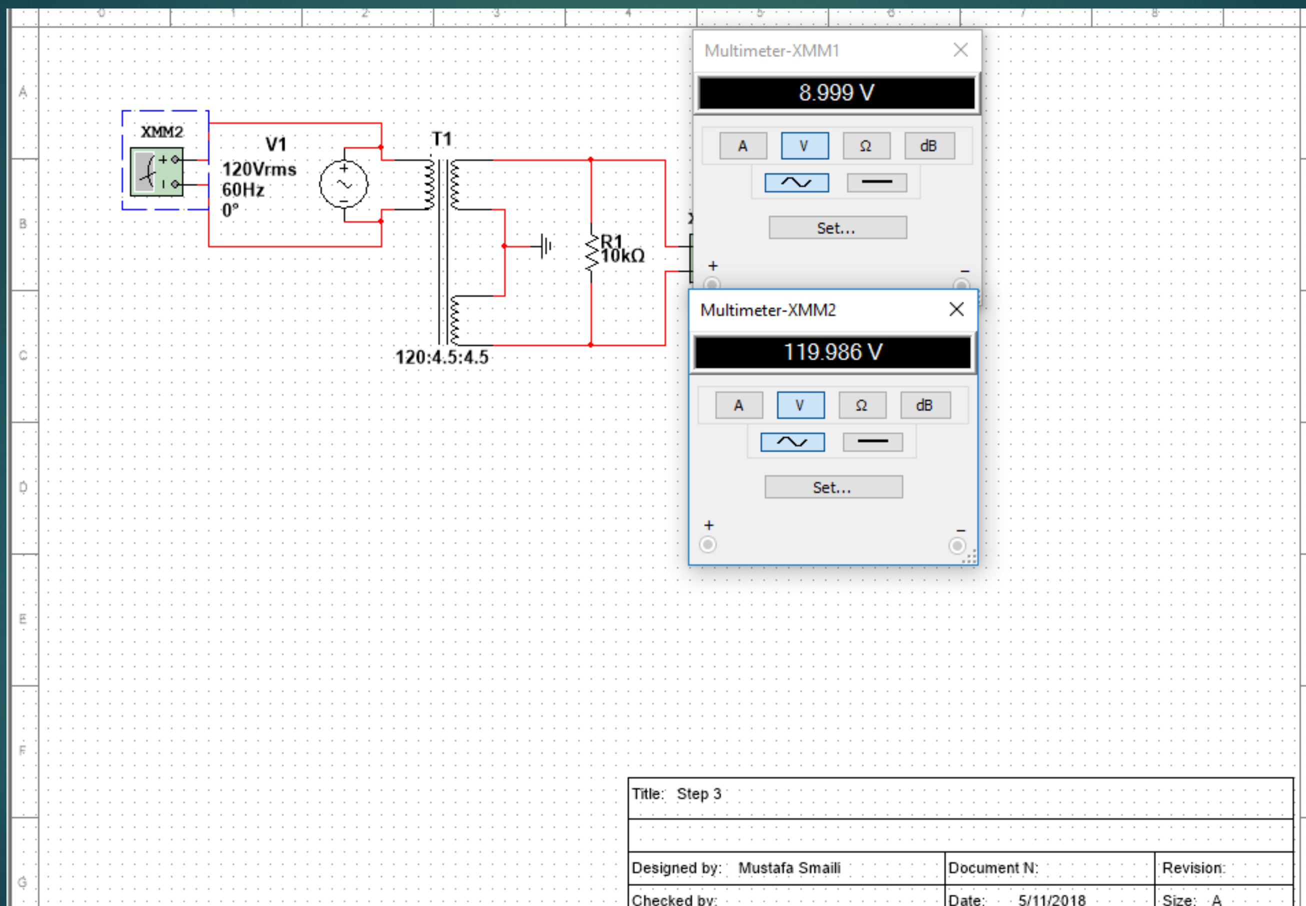


Step 2



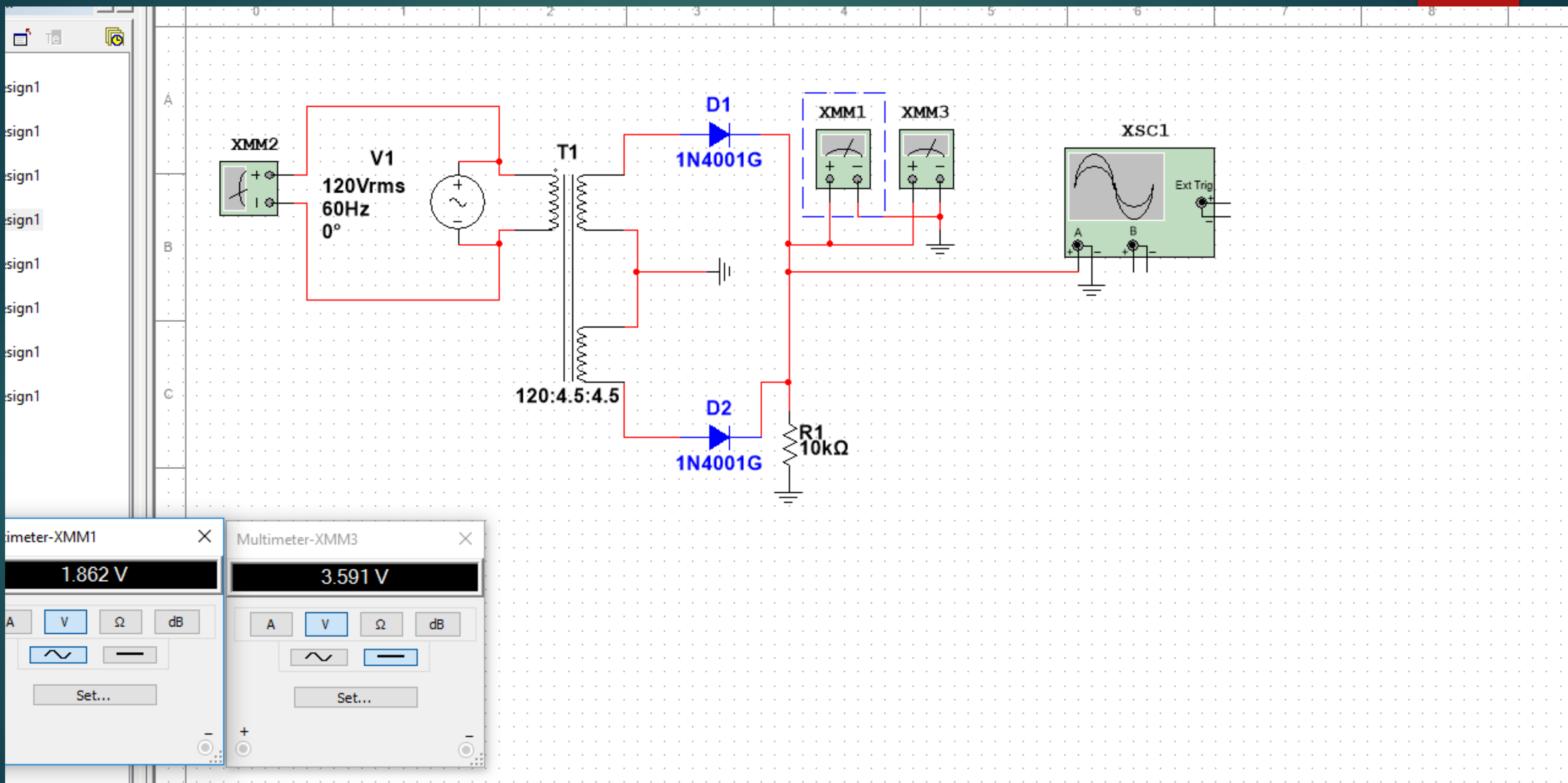
Multimeter-XMM1
106.495 nV
A
V
Ω
dB
Set...
D1
1N4001G
U1
13.33
D2
1N4001G
R1
10kΩ
XMM1
XSC1
Title: Step 2
Designed by: Mustafa Small
Checked by:
Approved by:
Oscilloscope-XSC1
T1
T2
T2-T1
Time
10.802 s
10.802 s
0.000 s
Channel_A
159.734 nV
159.734 nV
0.000 V
Channel_B
-72.155 V
-72.155 V
0.000 V
Reverse
Save
Ext. trigger

Step3



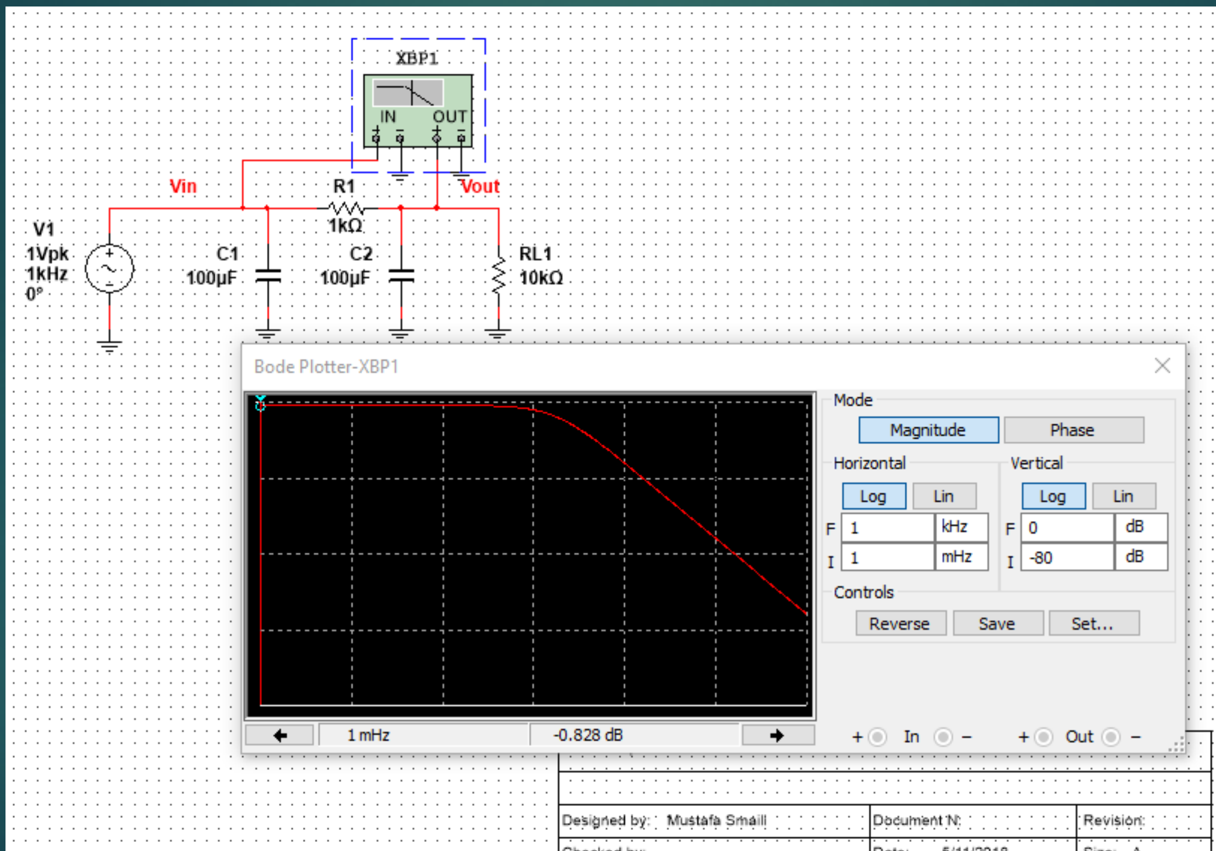
Multimeter-XMM1
8.999 V
A
V
Ω
dB
Set...
XMM2
V1
120Vrms
60Hz
0°
T1
R1
10kΩ
120:4.5:4.5
Multimeter-XMM2
119.986 V
A
V
Ω
dB
Set...
Title: Step 3
Designed by: Mustafa Smaili
Document N:
Revision:
Checked by:
Date: 5/11/2018
Size: A

Step4



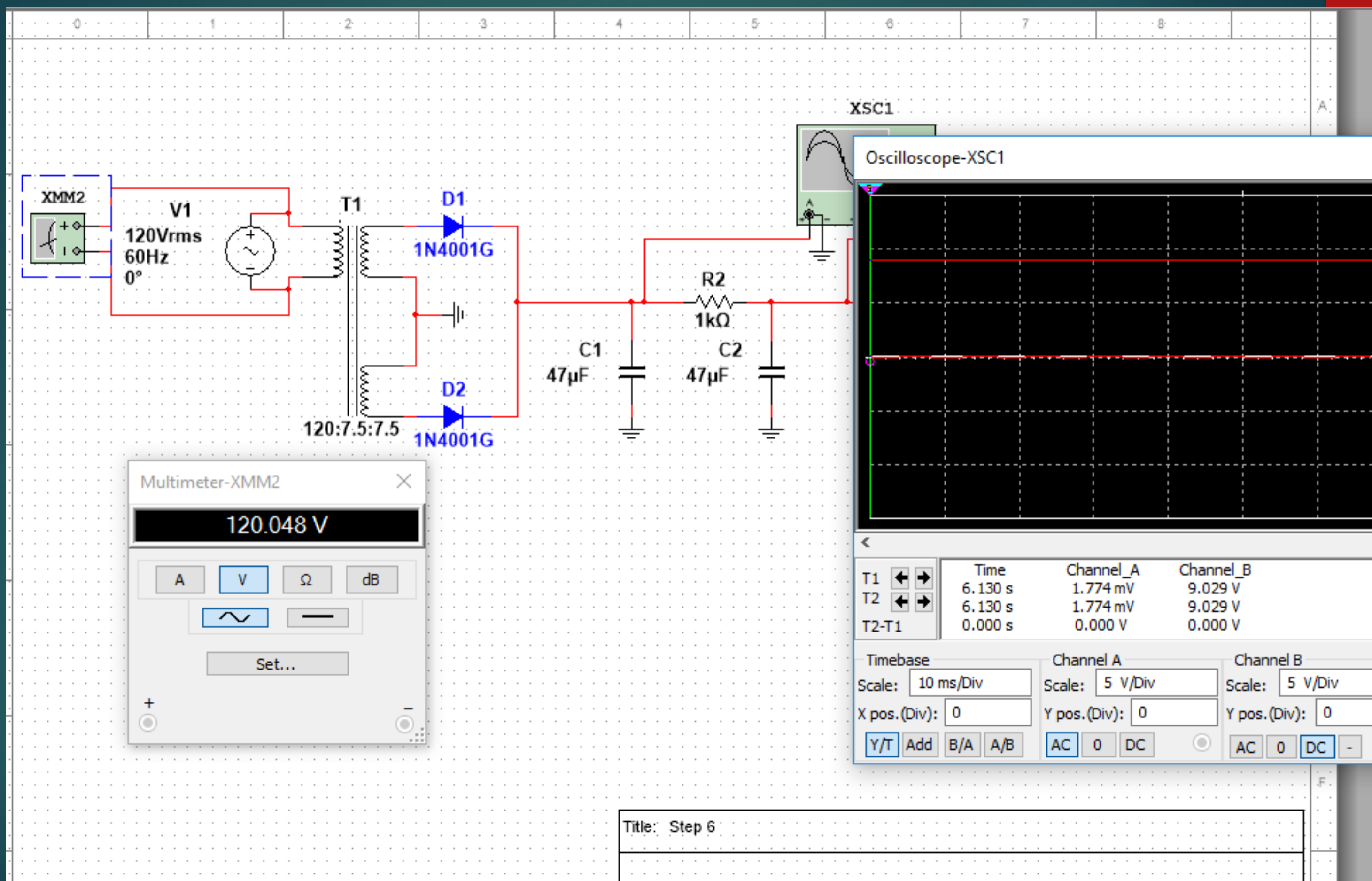
XMM2
V1
120Vrms
60Hz
0°
T1
120:4.5:4.5
D1
1N4001G
D2
1N4001G
XMM1
XMM3
XSC1
Ext Trig
R1
10kΩ
Multimeter-XMM3
1.862 V
3.591 V
Set...

Step 5



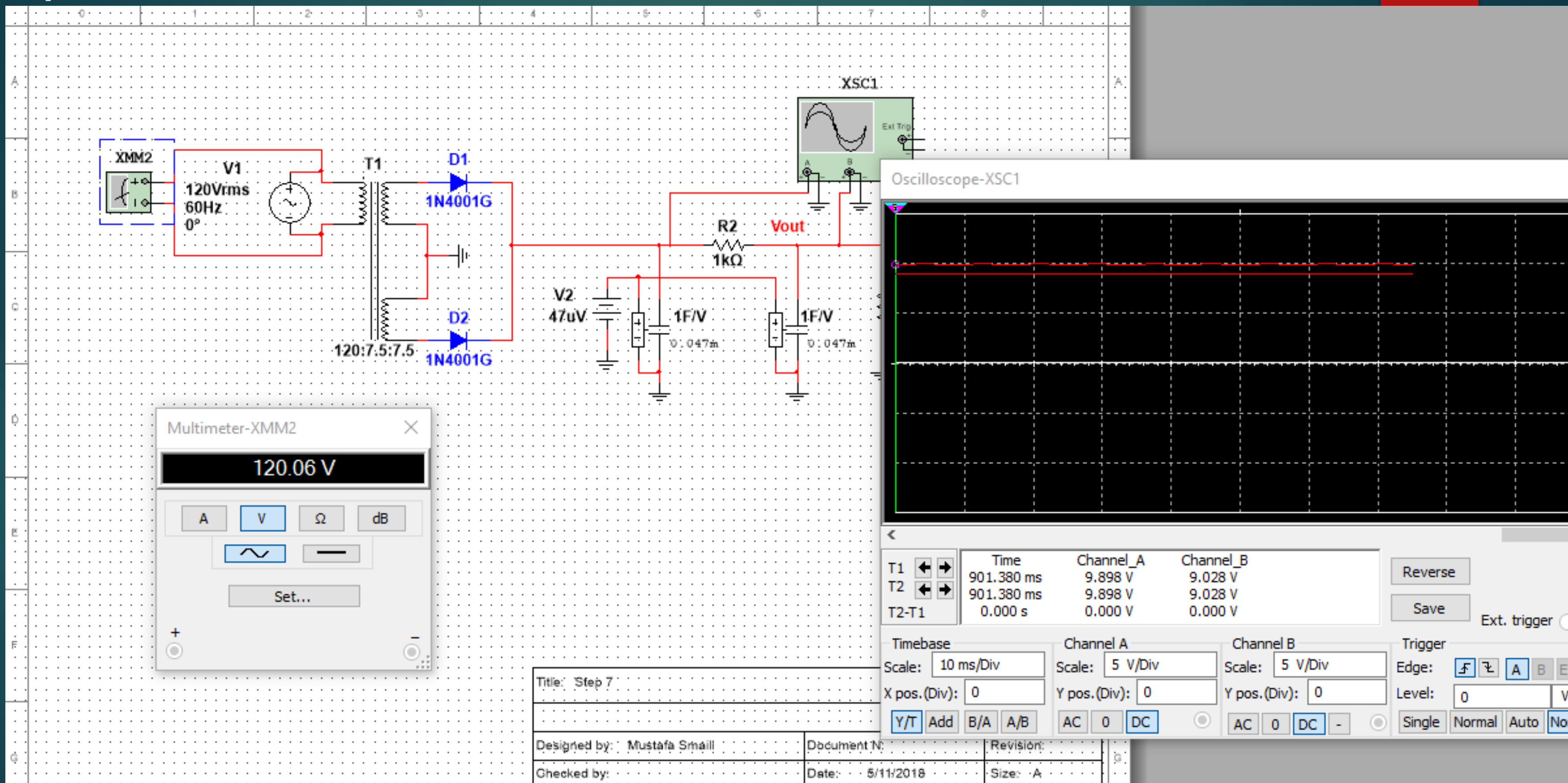
XBP1
IN
OUT
Vin
Vout
R1
1kΩ
V1
1Vpk
1kHz
0°
C1
100µF
C2
100µF
RL1
10kΩ
Bode Plotter-XBP1
Mode
Magnitude
Phase
Horizontal
Vertical
Log
Lin
F
1
kHz
I
1
mHz
0
dB
-80
Controls
Reverse
Save
Set...
1 mHz
-0.828 dB
In
Out
Designed by: Mustafa Smaill
Document N:
Revision:
Checked by:
Date: 5/11/2018
Size: A

Step 6



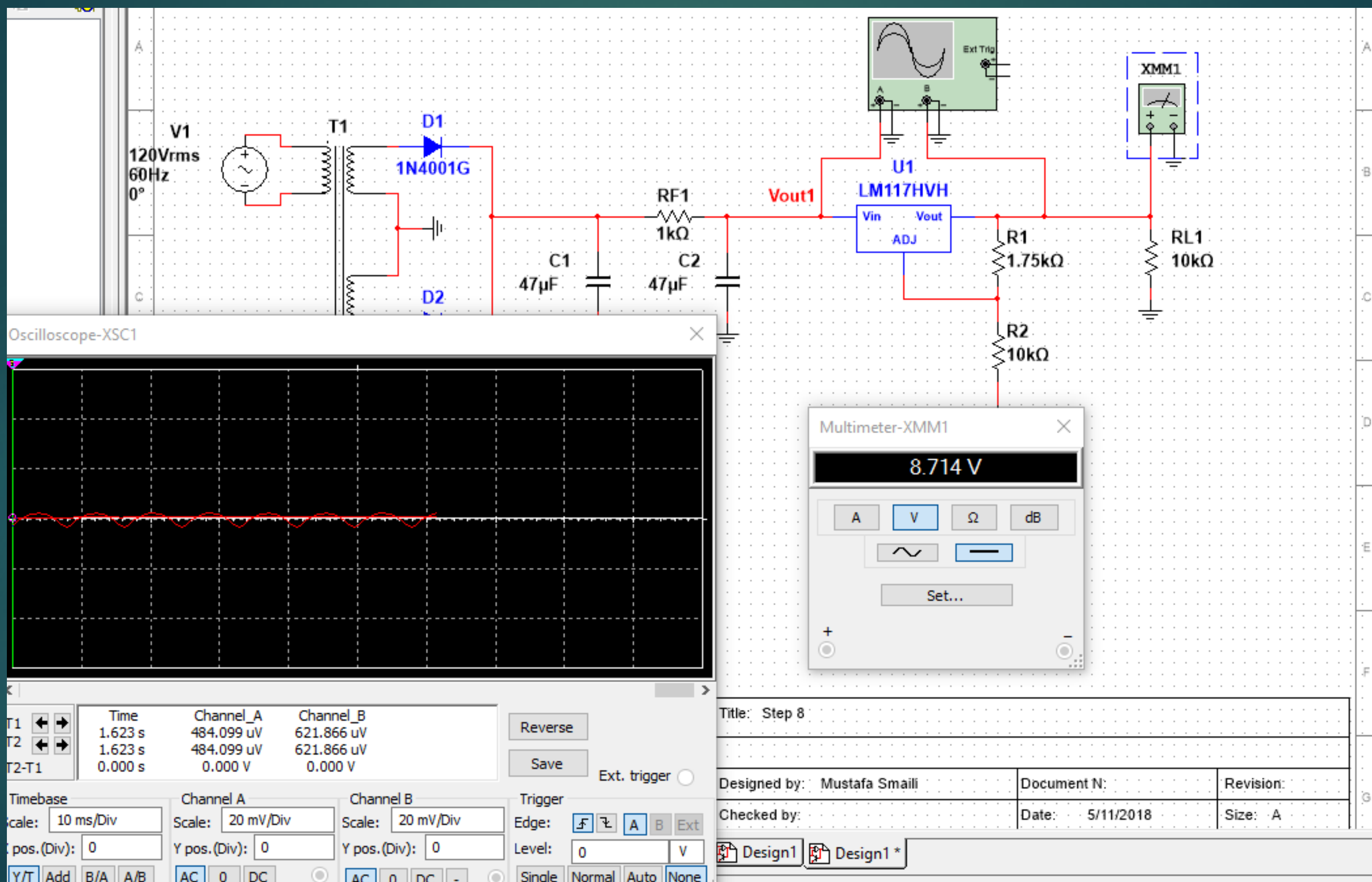
XMM2
V1
120Vrms
60Hz
0°
T1
120:7.5:7.5
D1
1N4001G
D2
1N4001G
R2
1kΩ
C1
47µF
C2
47µF
XSC1
Multimeter-XMM2
120.048 V
A
V
Ω
dB
Set...
Oscilloscope-XSC1
T1
T2
T2-T1
Time
6.130 s
6.130 s
0.000 s
Channel_A
1.774 mV
1.774 mV
0.000 V
Channel_B
9.029 V
9.029 V
0.000 V
Timebase
Scale: 10 ms/Div
X pos.(Div): 0
Y/T Add B/A A/B
Channel A
Scale: 5 V/Div
Y pos.(Div): 0
AC 0 DC
Channel B
Scale: 5 V/Div
Y pos.(Div): 0
AC 0 DC -
Title: Step 6

Step7



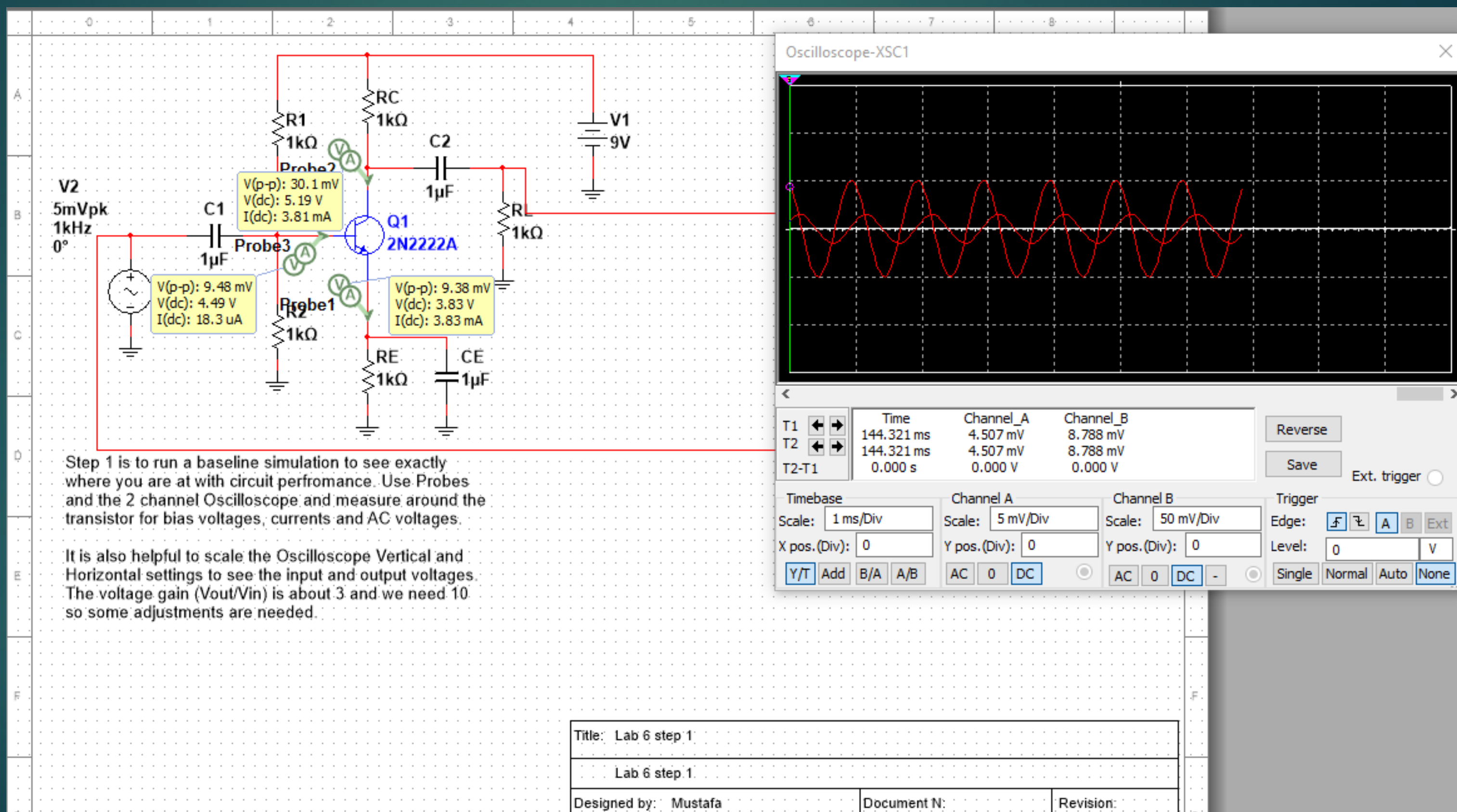
XSC1
XMM2
V1
120Vrms
60Hz
0°
T1
D1
1N4001G
D2
1N4001G
120:7.5:7.5
R2
1kΩ
Vout
V2
47uV
1F/V
1F/V
Multimeter-XMM2
120.06 V
A V Ω dB
Set...
Oscilloscope-XSC1
Time Channel_A Channel_B
T1 901.380 ms 9.898 V 9.028 V
T2 901.380 ms 9.898 V 9.028 V
T2-T1 0.000 s 0.000 V 0.000 V
Reverse
Save
Ext. trigger
Timebase
Scale: 10 ms/Div
X pos.(Div): 0
Y/T Add B/A A/B
Channel A
Scale: 5 V/Div
Y pos.(Div): 0
AC 0 DC
Channel B
Scale: 5 V/Div
Y pos.(Div): 0
AC 0 DC -
Trigger
Edge:
Level: 0 V
Single Normal Auto None
Title: Step 7
Designed by: Mustafa Smaill
Document N:
Revision:
Checked by:
Date: 5/11/2018
Size: A

Step 8

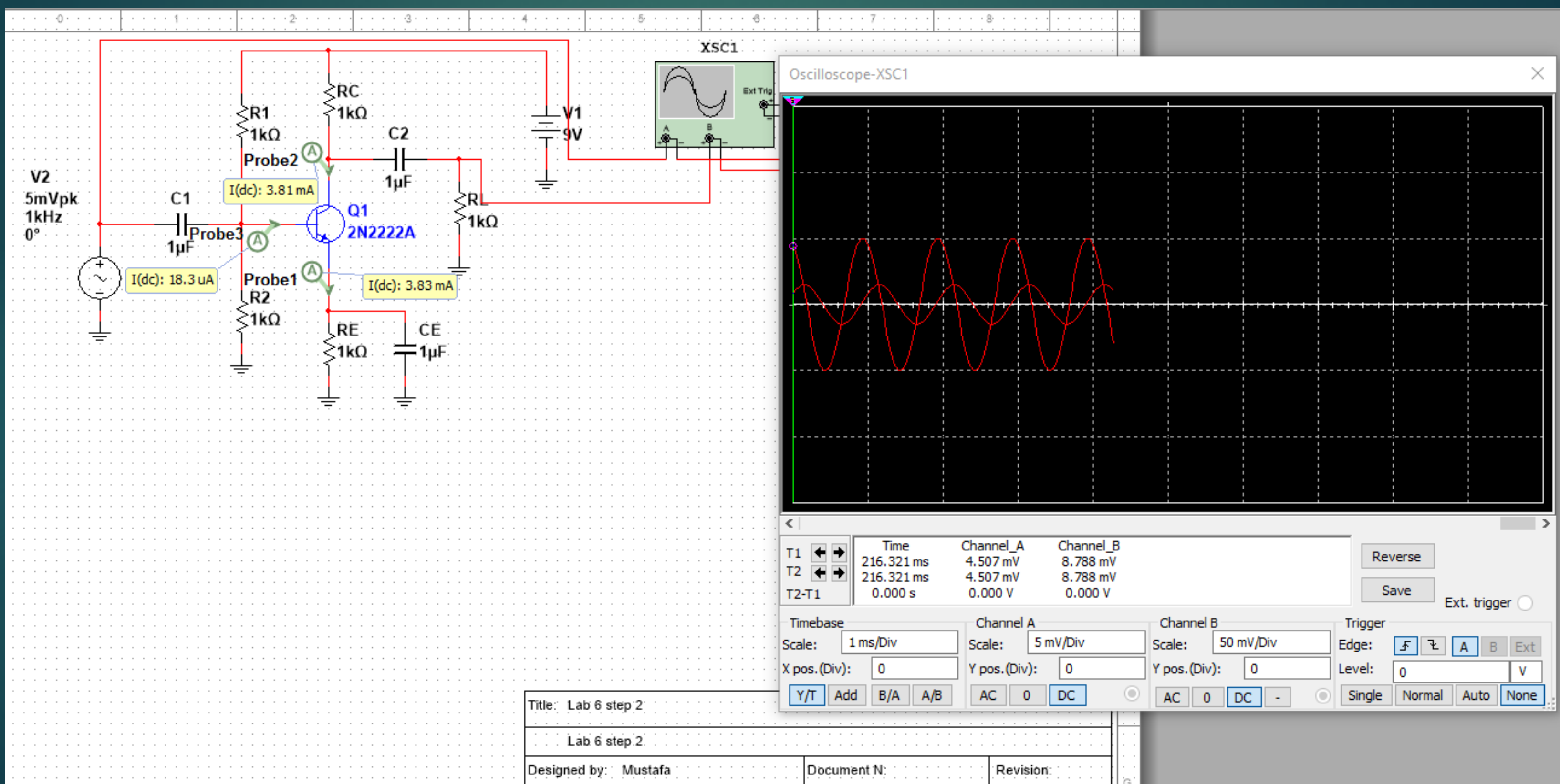


V1
120Vrms
60Hz
0°
T1
D1
1N4001G
D2
RF1
1kΩ
C1
47µF
C2
47µF
Vout1
U1
LM117HVH
Vin
Vout
ADJ
R1
1.75kΩ
R2
10kΩ
XMM1
RL1
10kΩ
Oscilloscope-XSC1
Time
Channel_A
Channel_B
T1 1.623 s 484.099 uV 621.866 uV
T2 1.623 s 484.099 uV 621.866 uV
T2-T1 0.000 s 0.000 V 0.000 V
Reverse
Save
Ext. trigger
Timebase
Scale: 10 ms/Div
X pos.(Div): 0
Y/T Add B/A A/B
Channel A
Scale: 20 mV/Div
Y pos.(Div): 0
AC 0 DC
Channel B
Scale: 20 mV/Div
Y pos.(Div): 0
AC 0 DC -
Trigger
Edge:
Level: 0 V
Single Normal Auto None
Multimeter-XMM1
8.714 V
A V Ω dB
Set...
Title: Step 8
Designed by: Mustafa Smaili
Document N:
Revision:
Checked by:
Date: 5/11/2018
Size: A
Design1
Design1 *

Lab 6-6 Step Approach
Step 1

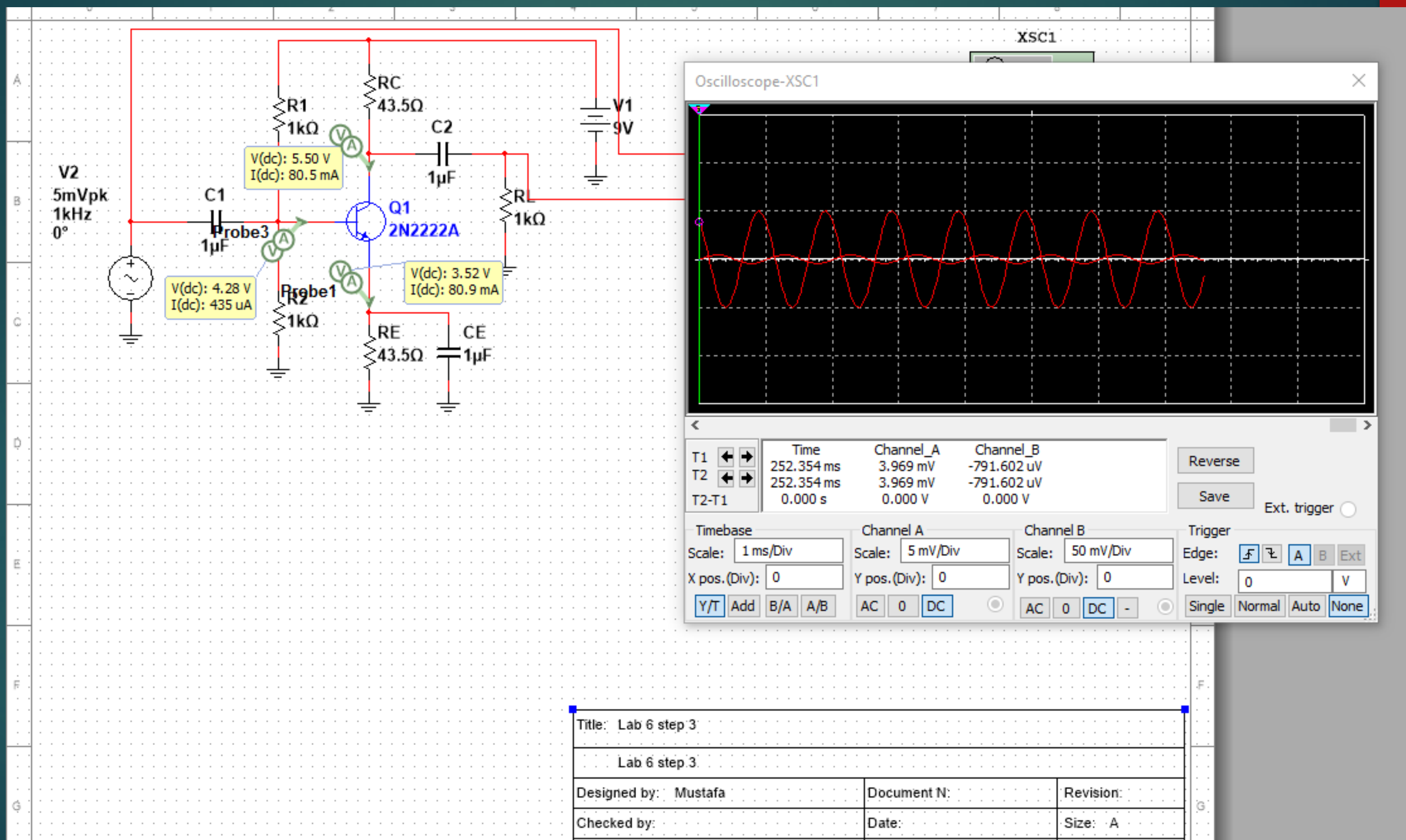


Step 2

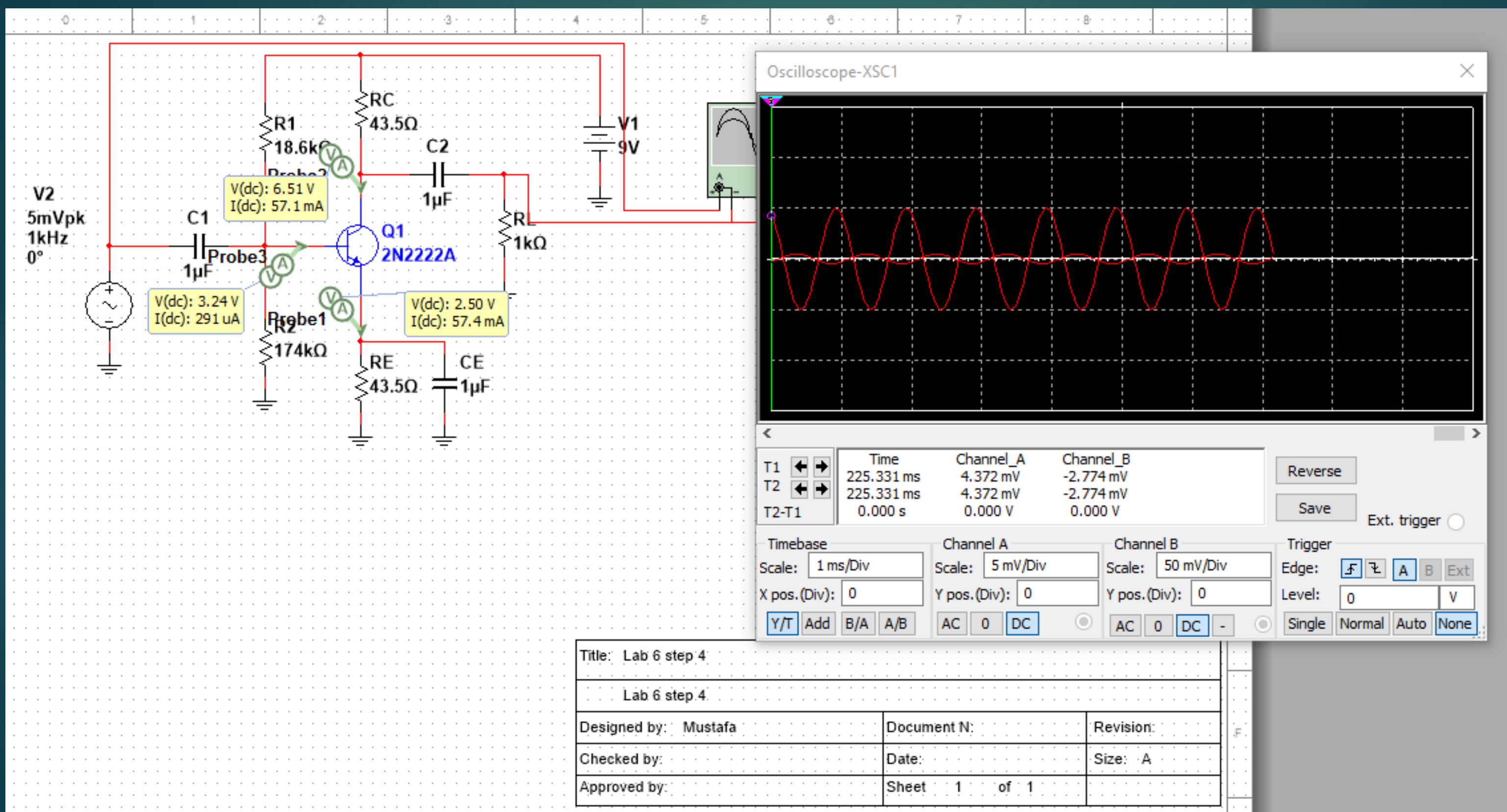


XSC1
RC
1kΩ
R1
1kΩ
V1
9V
C2
1µF
Probe2
I(dc): 3.81 mA
RL
1kΩ
V2
5mVpk
1kHz
0°
C1
1µF
Probe3
Q1
2N2222A
I(dc): 18.3 uA
Probe1
I(dc): 3.83 mA
R2
1kΩ
RE
1kΩ
CE
1µF
Oscilloscope-XSC1
Time
Channel_A
Channel_B
T1
216.321 ms
4.507 mV
8.788 mV
T2
216.321 ms
4.507 mV
8.788 mV
T2-T1
0.000 s
0.000 V
0.000 V
Reverse
Save
Ext. trigger
Timebase
Scale: 1 ms/Div
X pos.(Div): 0
Y/T Add B/A A/B
Channel A
Scale: 5 mV/Div
Y pos.(Div): 0
AC 0 DC
Channel B
Scale: 50 mV/Div
Y pos.(Div): 0
AC 0 DC -
Trigger
Edge:
A B Ext
Level: 0 V
Single Normal Auto None
Title: Lab 6 step 2
Lab 6 step 2
Designed by: Mustafa
Document N:
Revision:

Step 3

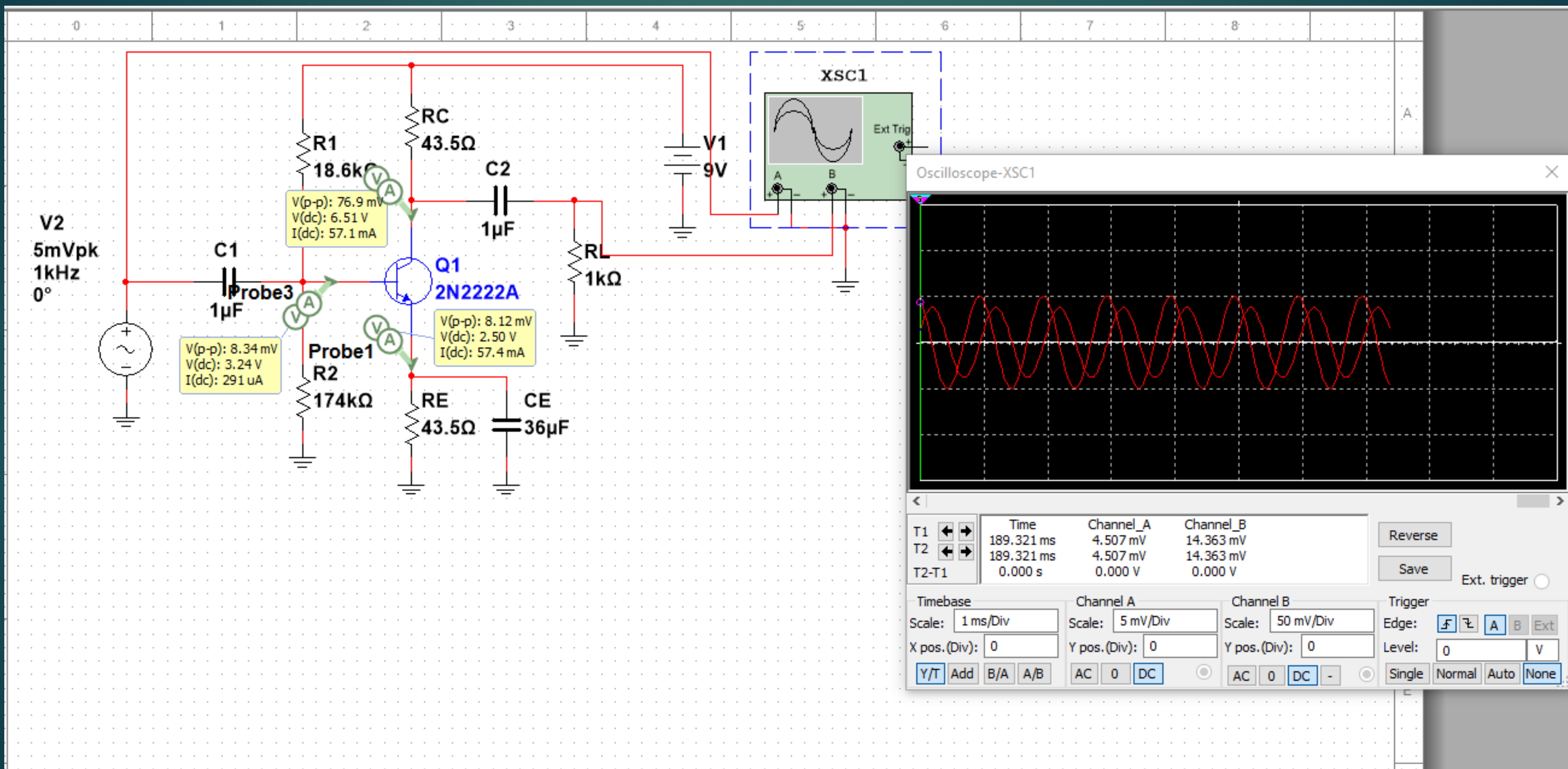

XSC1
V1
9V
RC
43.5Ω
R1
1kΩ
C2
1µF
V(dc): 5.50 V
I(dc): 80.5 mA
V2
5mVpk
1kHz
0°
C1
1µF
Probe3
Q1
2N2222A
RL
1kΩ
V(dc): 4.28 V
I(dc): 435 uA
Probe1
R2
1kΩ
V(dc): 3.52 V
I(dc): 80.9 mA
RE
43.5Ω
CE
1µF
Oscilloscope-XSC1
Time
Channel_A
Channel_B
T1
252.354 ms
3.969 mV
-791.602 uV
T2
252.354 ms
3.969 mV
-791.602 uV
T2-T1
0.000 s
0.000 V
0.000 V
Reverse
Save
Ext. trigger
Timebase
Scale: 1 ms/Div
X pos.(Div): 0
Y/T Add B/A A/B
Channel A
Scale: 5 mV/Div
Y pos.(Div): 0
AC 0 DC
Channel B
Scale: 50 mV/Div
Y pos.(Div): 0
AC 0 DC -
Trigger
Edge: A B Ext
Level: 0 V
Single Normal Auto None
Title: Lab 6 step 3
Lab 6 step 3
Designed by: Mustafa
Document N:
Revision:
Checked by:
Date:
Size: A

Step 4



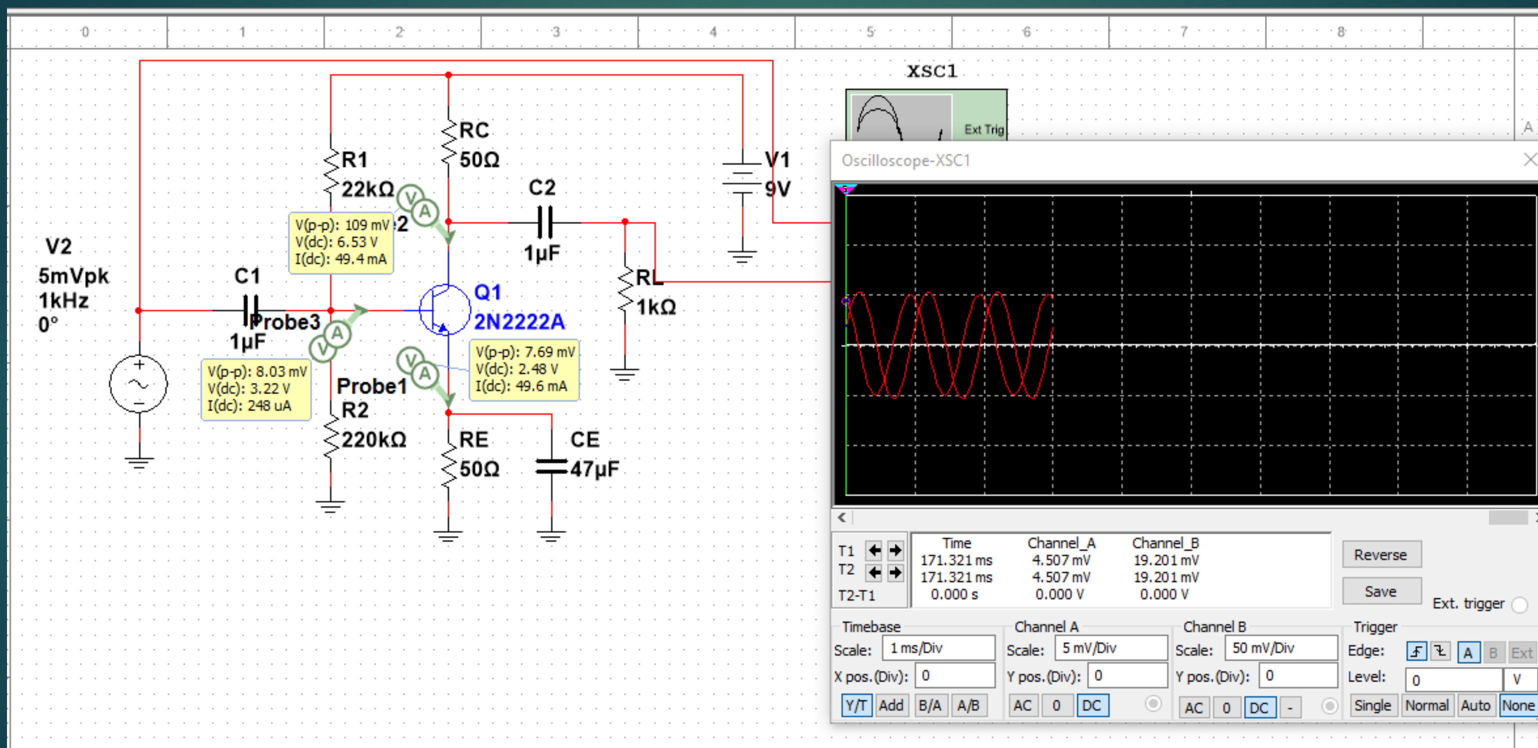
V2
5mVpk
1kHz
0°
C1
1µF
R1
18.6kΩ
R2
174kΩ
RC
43.5Ω
C2
1µF
V1
9V
Q1
2N2222A
RL
1kΩ
RE
43.5Ω
CE
1µF
Probe3
Probe1
V(dc): 6.51 V
I(dc): 57.1 mA
V(dc): 3.24 V
I(dc): 291 uA
V(dc): 2.50 V
I(dc): 57.4 mA
Oscilloscope-XSC1
Time
Channel_A
Channel_B
T1
T2
T2-T1
225.331 ms
225.331 ms
0.000 s
4.372 mV
4.372 mV
0.000 V
-2.774 mV
-2.774 mV
0.000 V
Reverse
Save
Ext. trigger
Timebase
Scale: 1 ms/Div
X pos.(Div): 0
Y/T Add B/A A/B
Channel A
Scale: 5 mV/Div
Y pos.(Div): 0
AC 0 DC
Channel B
Scale: 50 mV/Div
Y pos.(Div): 0
AC 0 DC -
Trigger
Edge:
A B Ext
Level: 0 V
Single Normal Auto None
Title: Lab 6 step 4
Lab 6 step 4
Designed by: Mustafa
Document N:
Revision:
Checked by:
Date:
Size: A
Approved by:
Sheet 1 of 1

Step 5



V2
5mVpk
1kHz
0°
C1
1µF
Probe3
R1
18.6kΩ
RC
43.5Ω
C2
1µF
Q1
2N2222A
RL
1kΩ
V1
9V
XSC1
Ext Trig
Probe1
R2
174kΩ
RE
43.5Ω
CE
36µF
V(p-p): 76.9 mV
V(dc): 6.51 V
I(dc): 57.1 mA
V(p-p): 8.34 mV
V(dc): 3.24 V
I(dc): 291 uA
V(p-p): 8.12 mV
V(dc): 2.50 V
I(dc): 57.4 mA
Oscilloscope-XSC1
Time Channel_A Channel_B
T1 189.321 ms 4.507 mV 14.363 mV
T2 189.321 ms 4.507 mV 14.363 mV
T2-T1 0.000 s 0.000 V 0.000 V
Reverse
Save
Ext. trigger
Timebase
Scale: 1 ms/Div
X pos.(Div): 0
Y/T Add B/A A/B
Channel A
Scale: 5 mV/Div
Y pos.(Div): 0
AC 0 DC
Channel B
Scale: 50 mV/Div
Y pos.(Div): 0
AC 0 DC -
Trigger
Edge:
A B Ext
Level: 0 V
Single Normal Auto None

Step6


XSC1
V2
5mVpk
1kHz
0°
C1
1µF
Probe3
R1
22kΩ
RC
50Ω
C2
1µF
V1
9V
RL
1kΩ
Q1
2N2222A
Probe1
R2
220kΩ
RE
50Ω
CE
47µF
V(p-p): 109 mV
V(dc): 6.53 V
I(dc): 49.4 mA
V(p-p): 8.03 mV
V(dc): 3.22 V
I(dc): 248 uA
V(p-p): 7.69 mV
V(dc): 2.48 V
I(dc): 49.6 mA
Oscilloscope-XSC1
Time Channel_A Channel_B
T1 171.321 ms 4.507 mV 19.201 mV
T2 171.321 ms 4.507 mV 19.201 mV
T2-T1 0.000 s 0.000 V 0.000 V
Reverse
Save
Ext. trigger
Timebase
Scale: 1 ms/Div
X pos.(Div): 0
Y/T Add B/A A/B
Channel A
Scale: 5 mV/Div
Y pos.(Div): 0
AC 0 DC
Channel B
Scale: 50 mV/Div
Y pos.(Div): 0
AC 0 DC -
Trigger
Edge:
Level: 0 V
Single Normal Auto None