॥ सा विद्या या विमुक्तये ॥

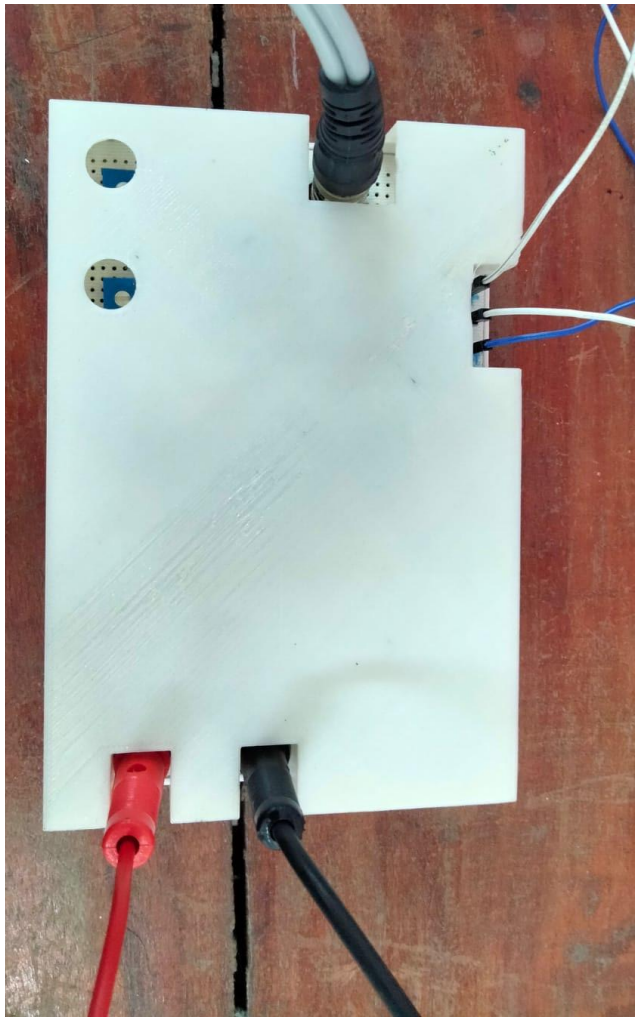
भारतीय प्रौद्योगिकी संस्थान धारवाड़

Indian Institute of Technology Dharwad

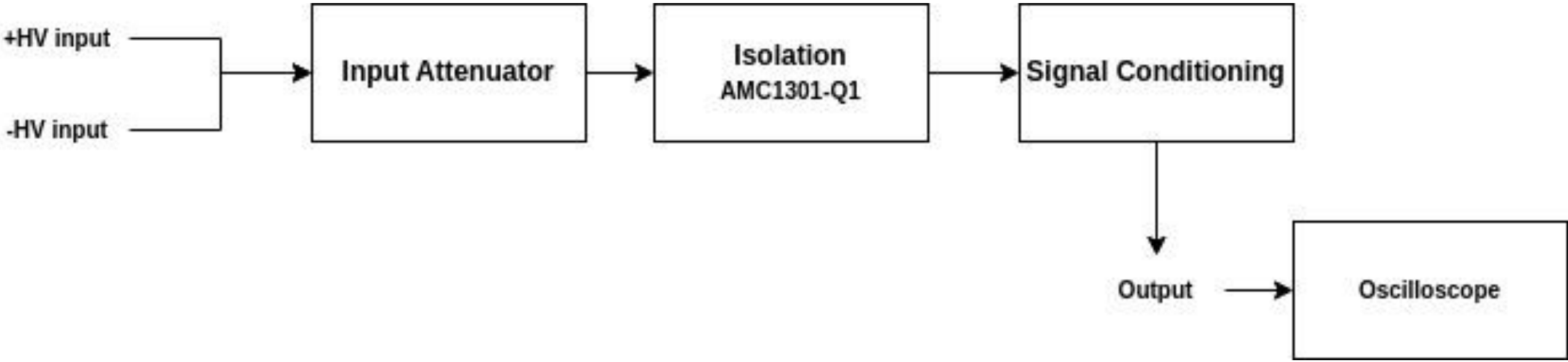
High Voltage Isolated Differential Probe

Wish specifications:

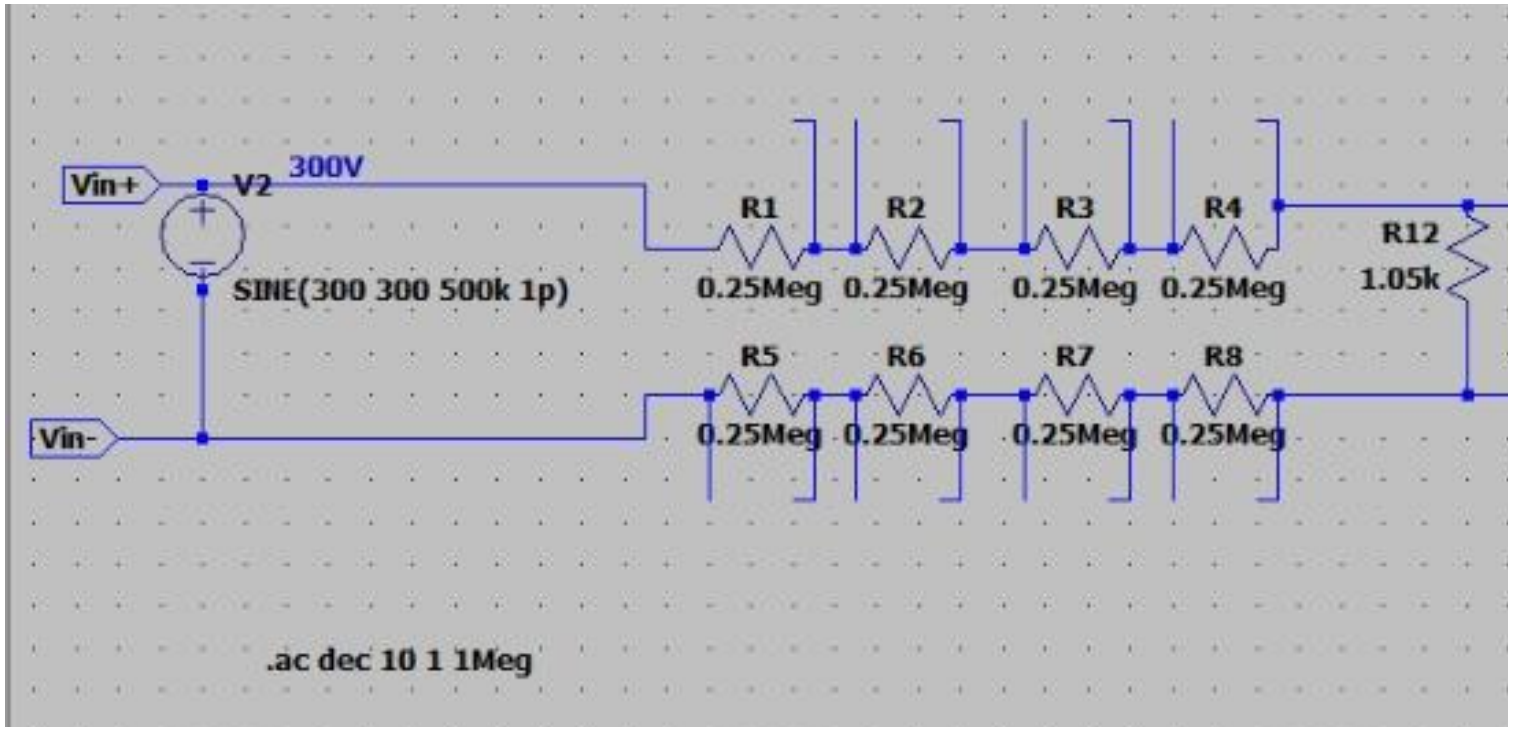
- Voltage Range: **0-600V**
- Bandwidth: **DC-125KHz**
- Isolation Voltage Rating: **1000V**
- Input Connector: **Banana jack type**
- Output Connector: **BNC**
- Operating Temperature: **10°C to 50°C**
- Power Source: **External,Batteries**



System Block diagram

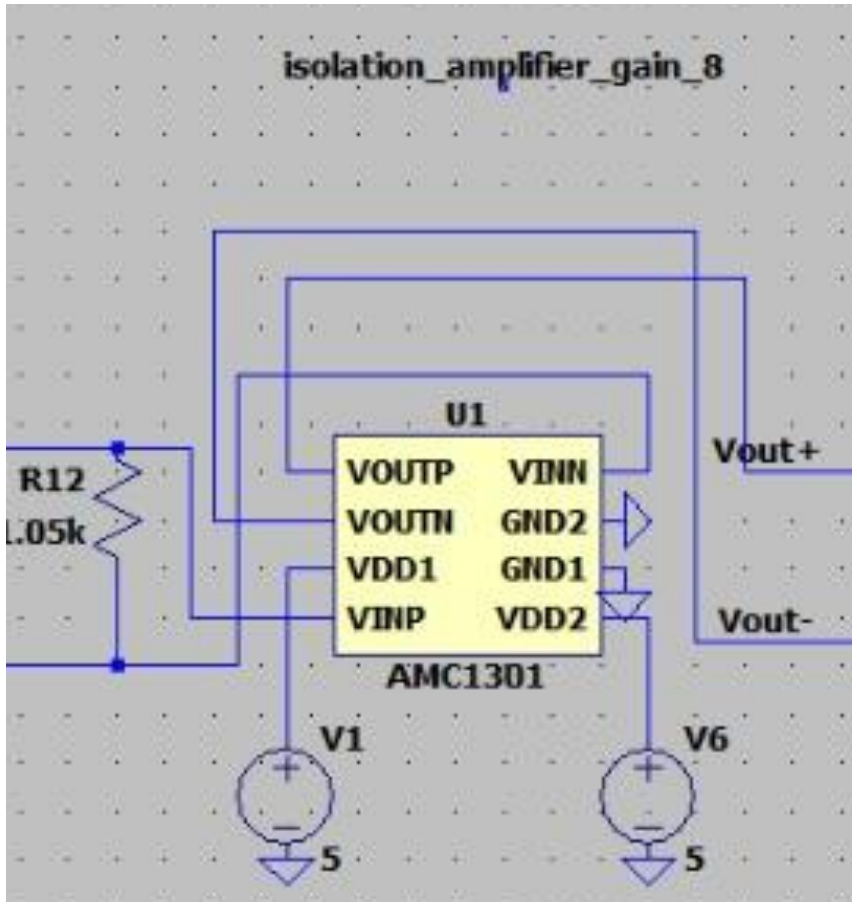


Input Attenuator Stage



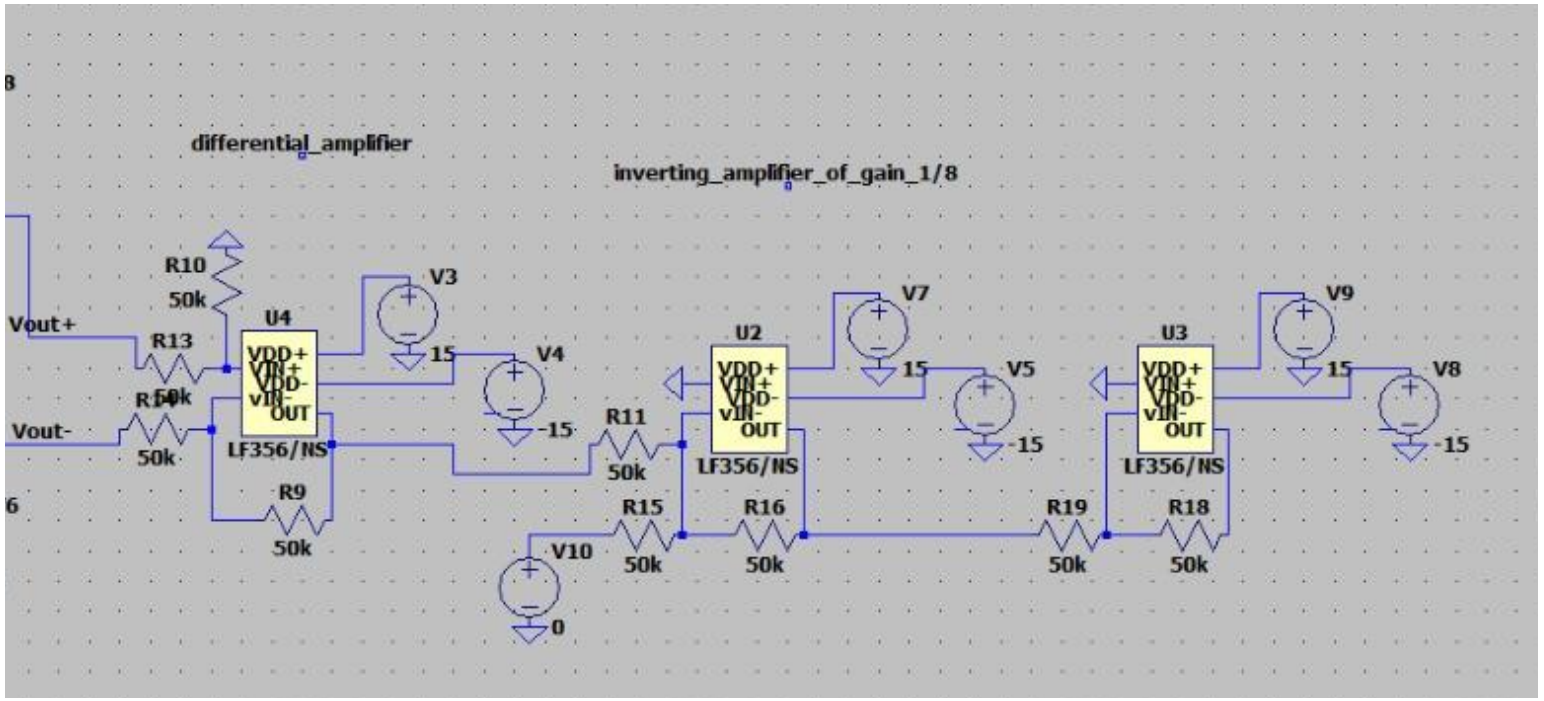
Attenuation: 1/2000

Isolated Amplifier Stage

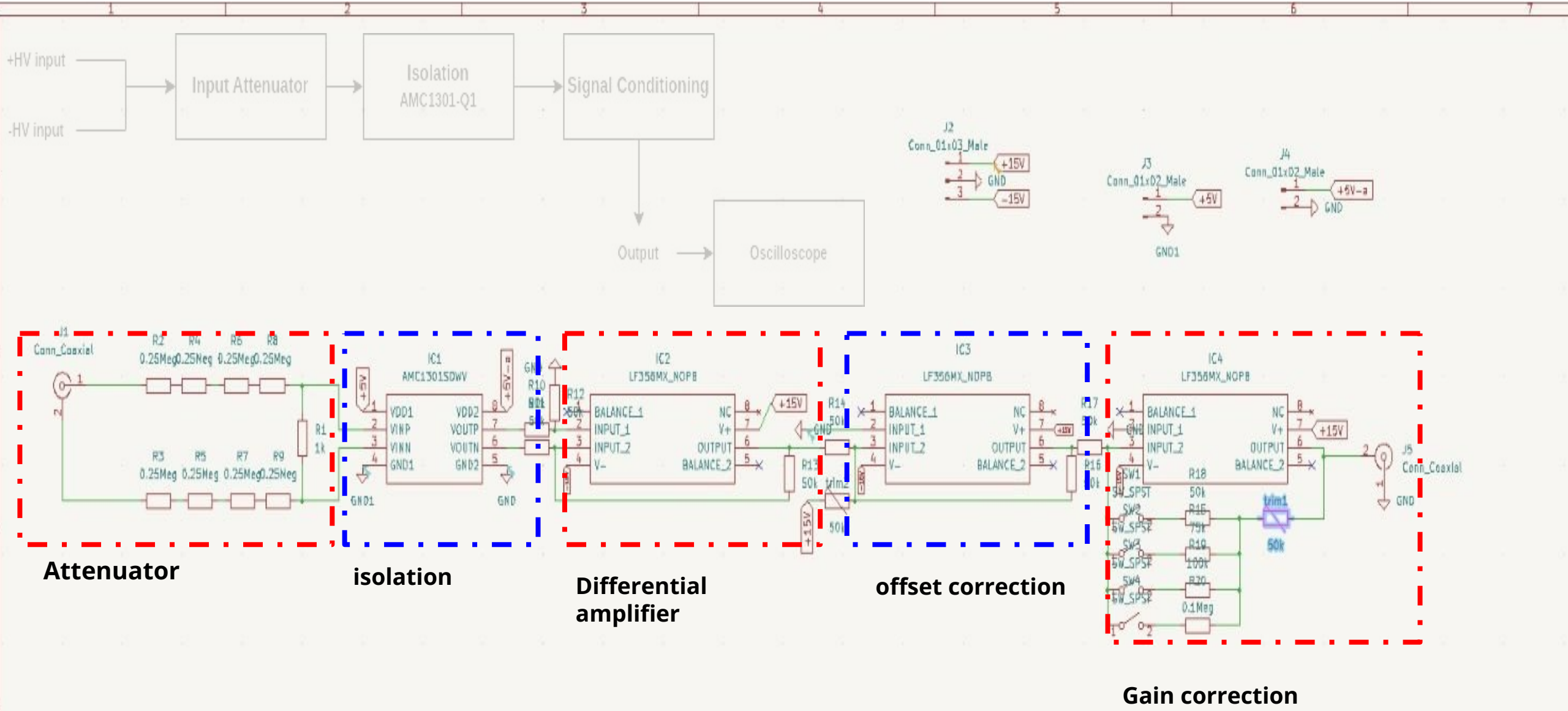


Bandwidth: 1MHz
gain: 8
Vdd: -0.3 to 7V
Input voltage range : 330mV (calculated by simulations)

Signal Conditioning

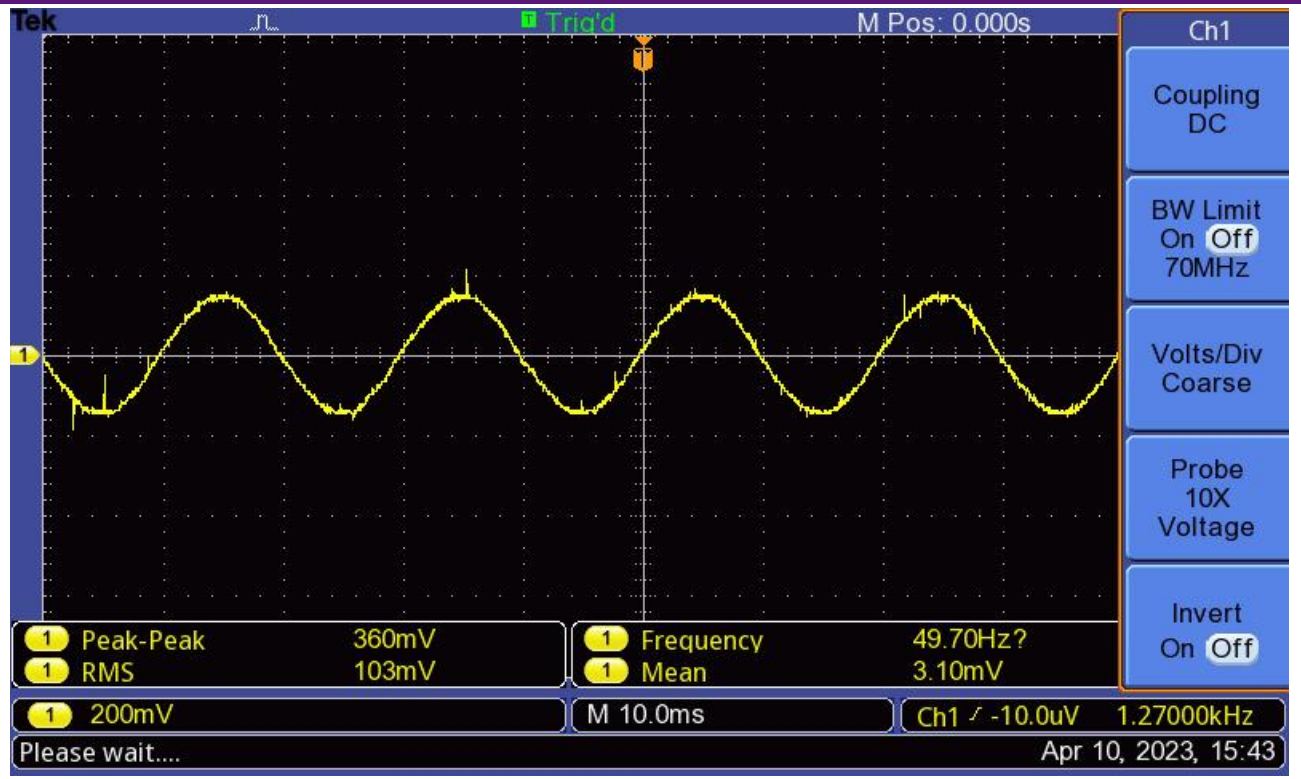


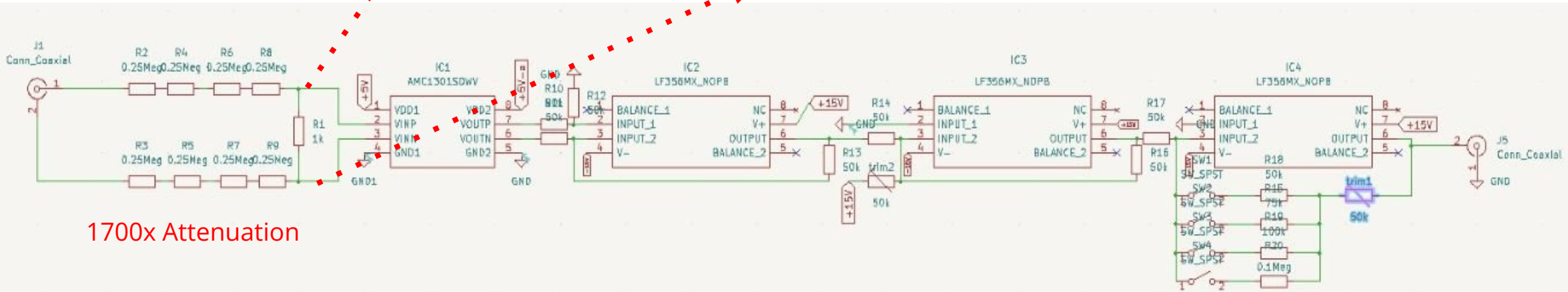
IC (LF356)
Differential amplifier : making output single ended
Inverting amplifier : used for trimming of gain and offset correction


+HV input
-HV input
Input Attenuator
Isolation
AMC1301-Q1
Signal Conditioning
Output
Oscilloscope
J2
Conn_01x03_Male
+15V
GND
-15V
J3
Conn_01x02_Male
+5V
GND1
J4
Conn_01x02_Male
+5V-a
GND
J1
Conn_Coaxial
R2 R4 R6 R8
0.25Meg 0.25Meg 0.25Meg 0.25Meg
R1
1k
R3 R5 R7 R9
0.25Meg 0.25Meg 0.25Meg 0.25Meg
IC1
AMC1301SDWV
VDD1 VDD2
VINP VOUTP
VINN VOUTN
GND1 GND2
+5V
+5V-a
GND1
GND
IC2
LF356MX_NOPB
BALANCE_1 NC
INPUT_1 V+
INPUT_2 OUTPUT
V- BALANCE_2
+15V
GND
R12
R10
R13
50k
trim2
IC3
LF356MX_NOPB
R14
50k
R17
50k
R16
50k
IC4
LF356MX_NOPB
SW1
SW_SPST
SW2
SW_SPST
SW3
SW_SPST
SW4
SW_SPST
R18
50k
R15
75k
R19
100k
R20
0.1Meg
trim1
50k
J5
Conn_Coaxial
Attenuator
isolation
Differential amplifier
offset correction
Gain correction

At an input of 200rms

Expected = 200V / 1888 =105mV
Obtained = 103mV

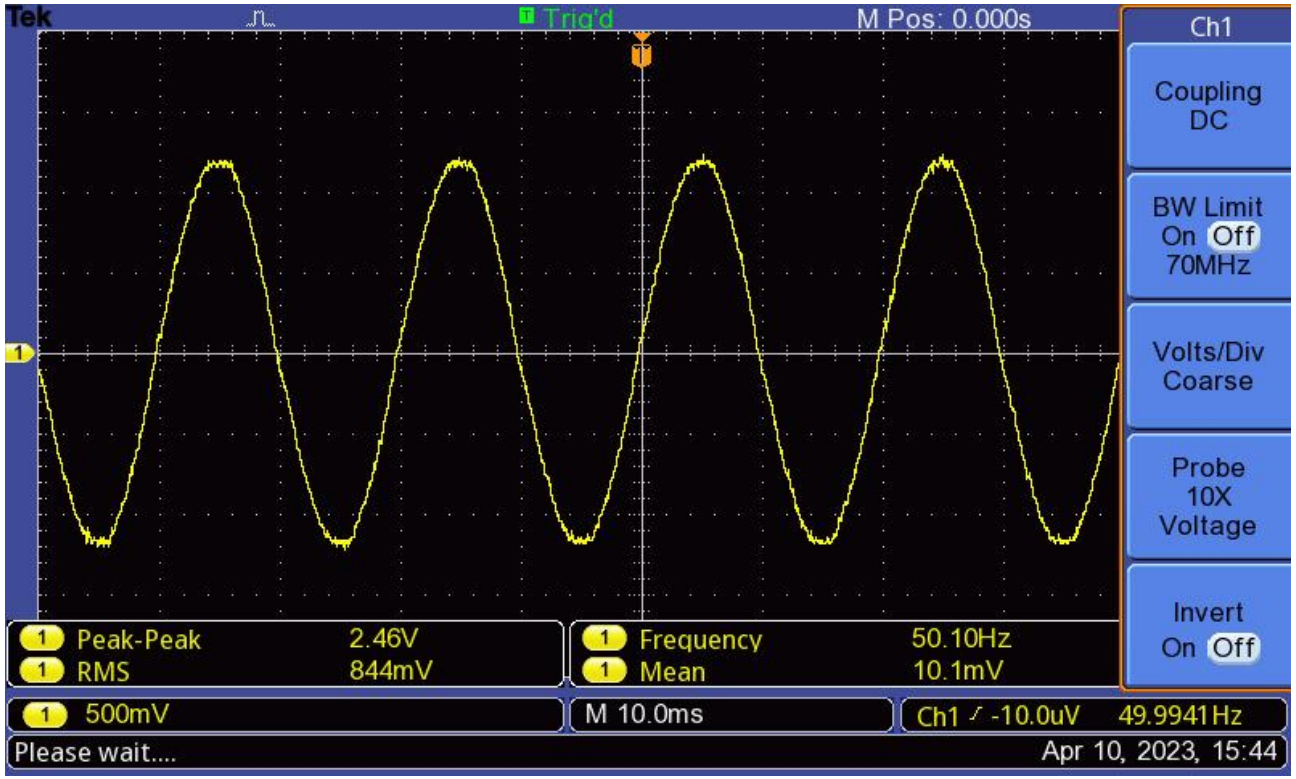


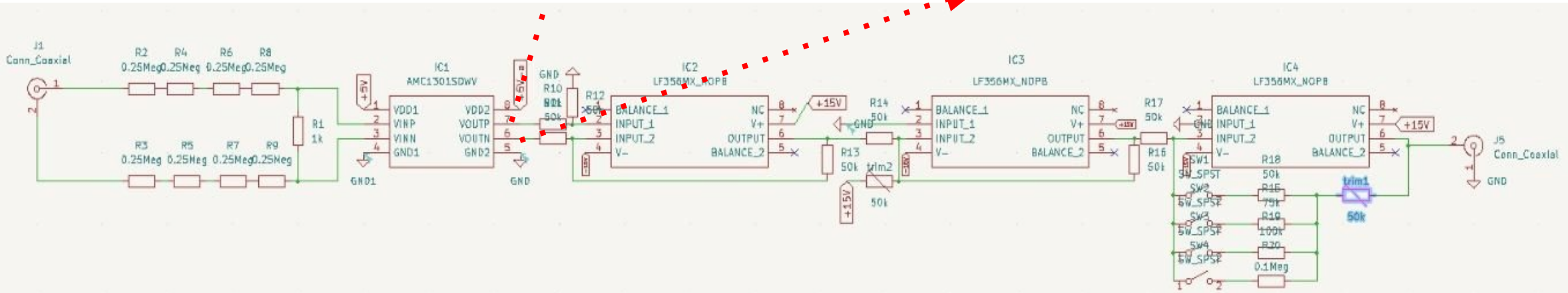


1700x Attenuation

At an input of 200 mv pp to isolation amplifier at 2 kHz

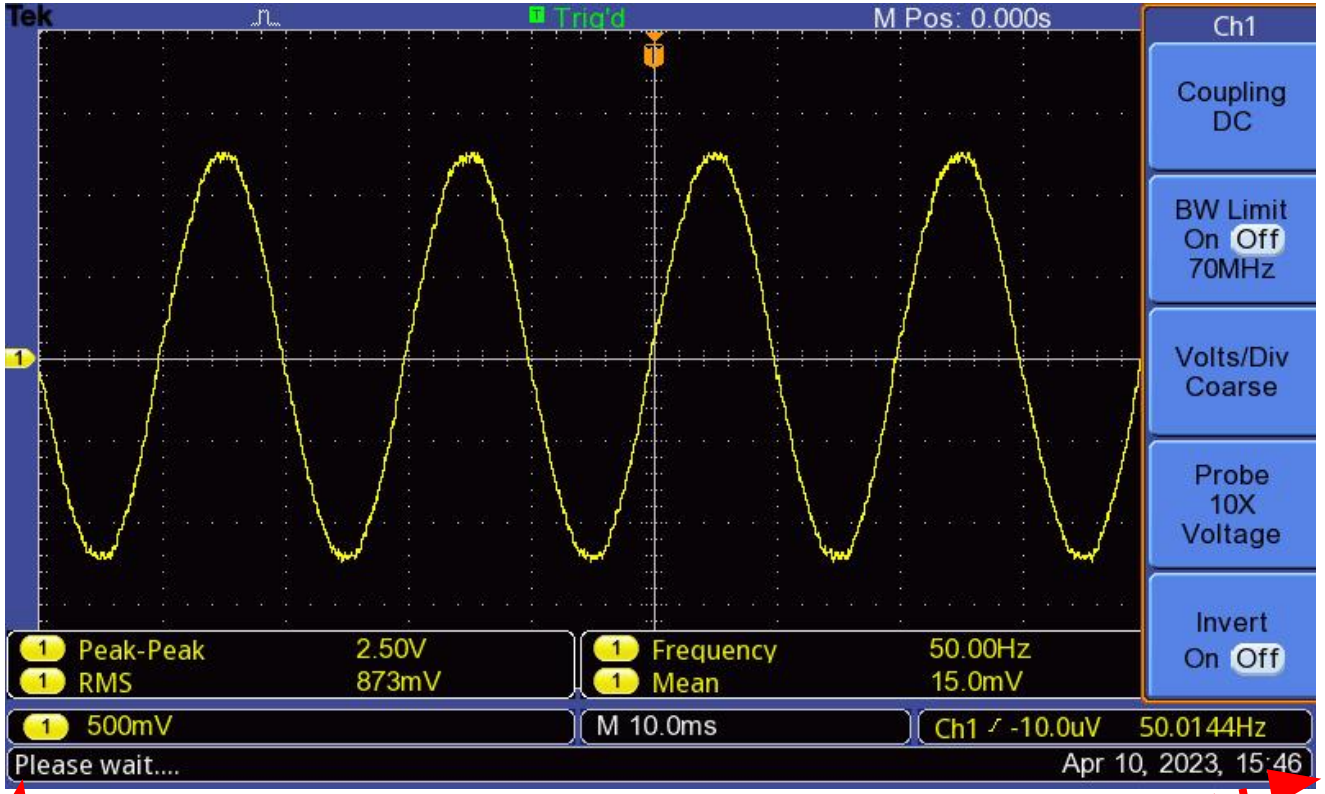
Expected gain = 8
expected output = 824mV
obtained output = 844mV

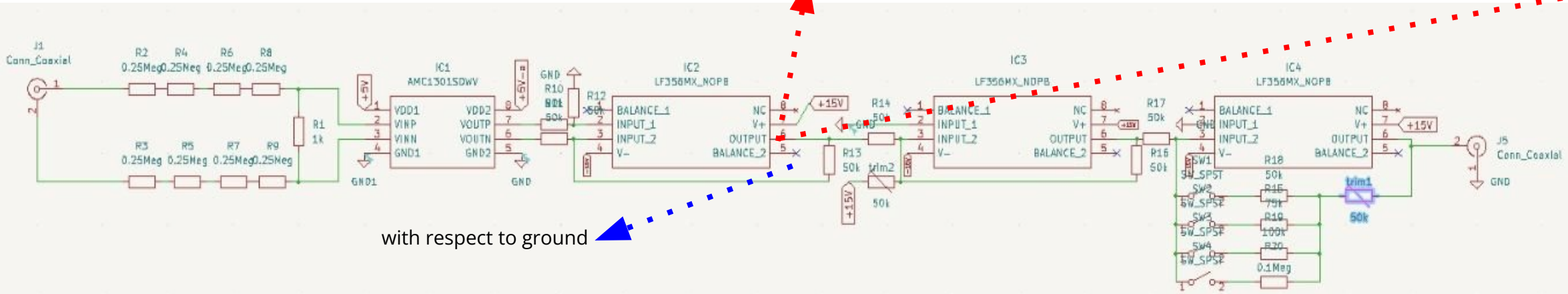




Differential Amplifier

Gain = 1
expected output = 844mV
obtained output = 873mV



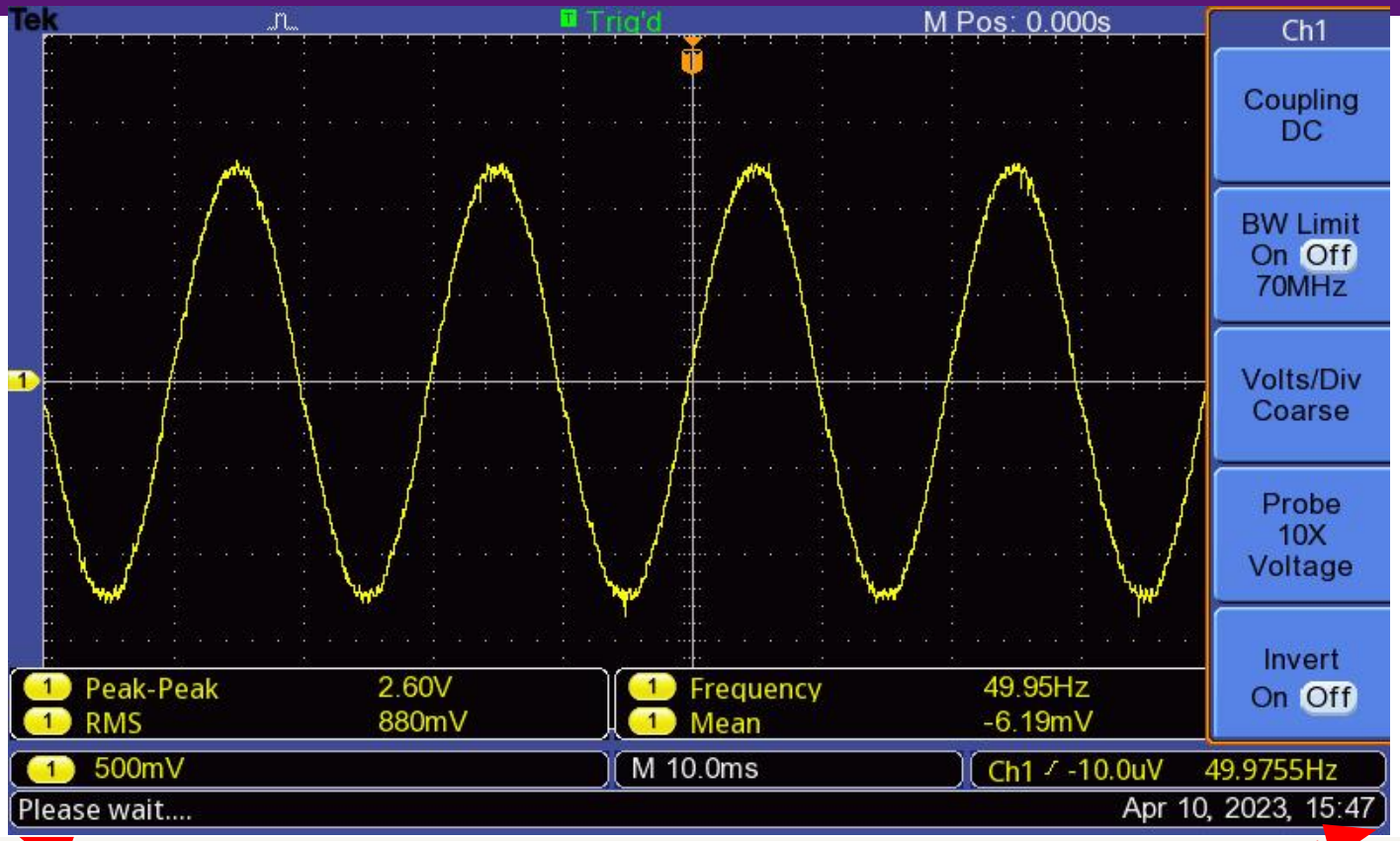


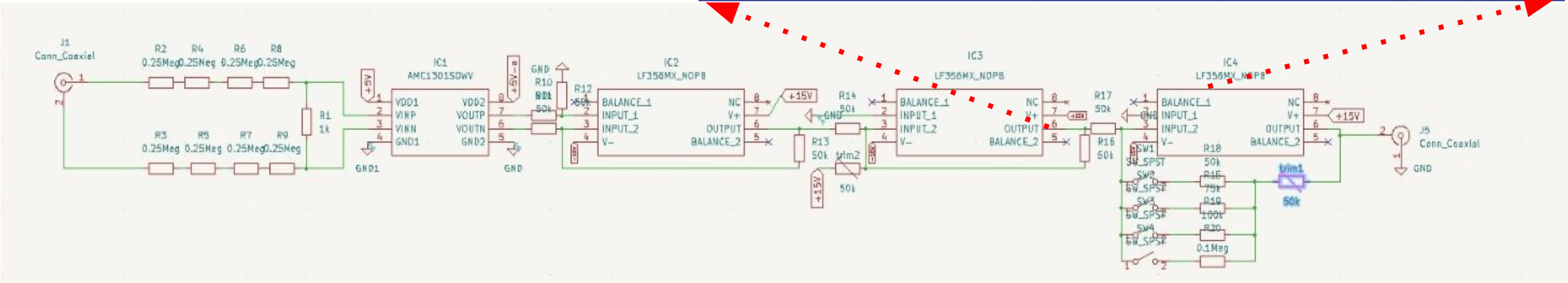
with respect to ground

Summing amplifier(offset correction)

Gain = 1
expected output = 873mV
obtained output = 880 mV

NEGATIVE AND POSITIVE OFFSET CORRECTION CAN BE DONE.

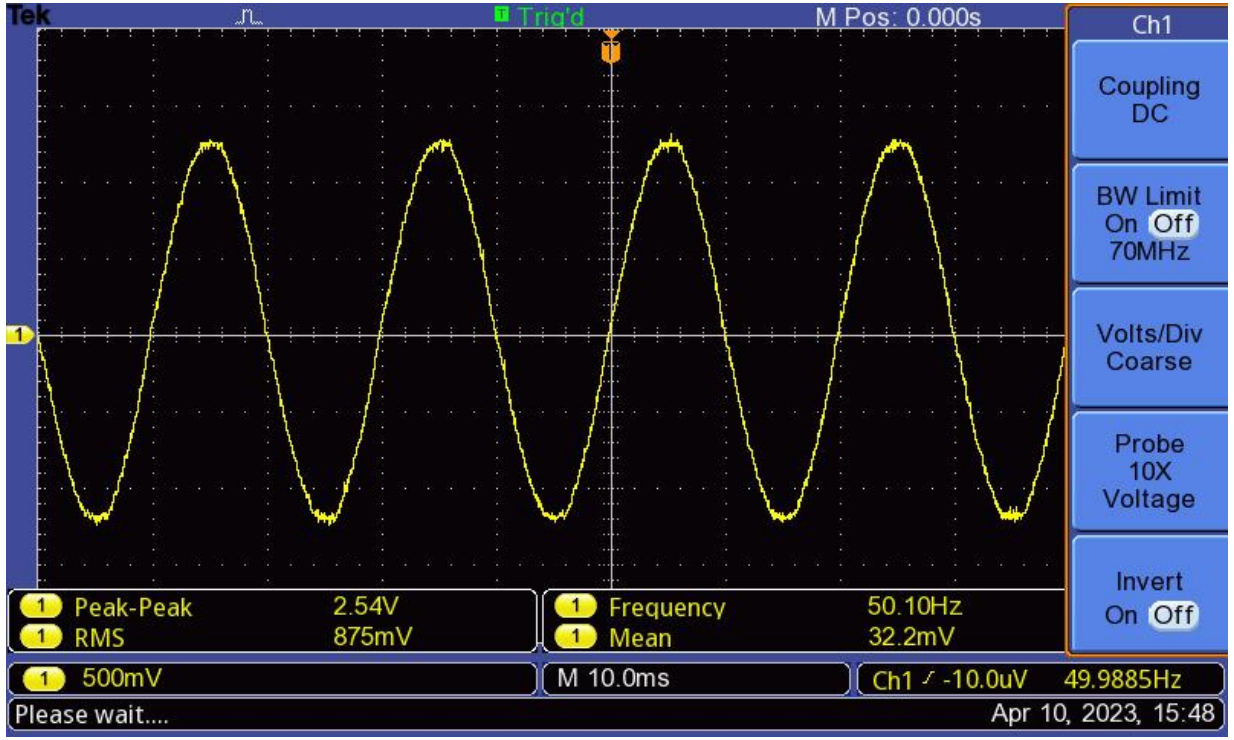


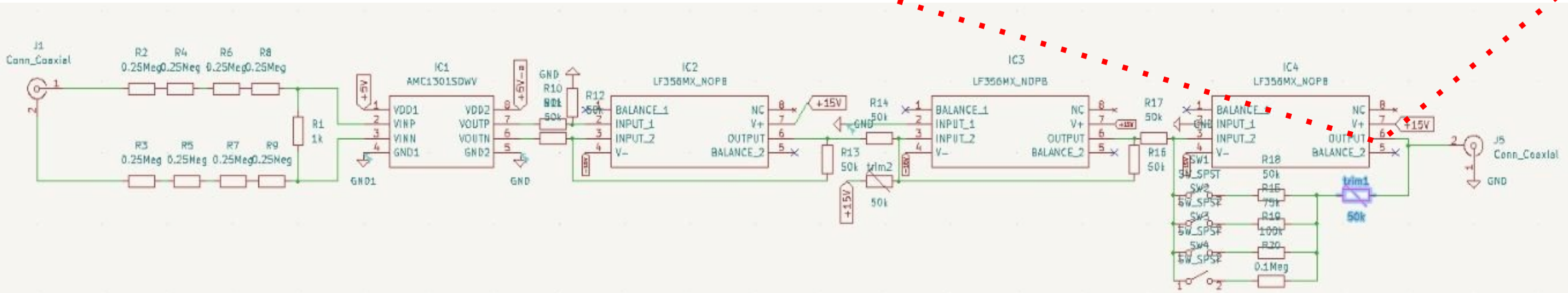


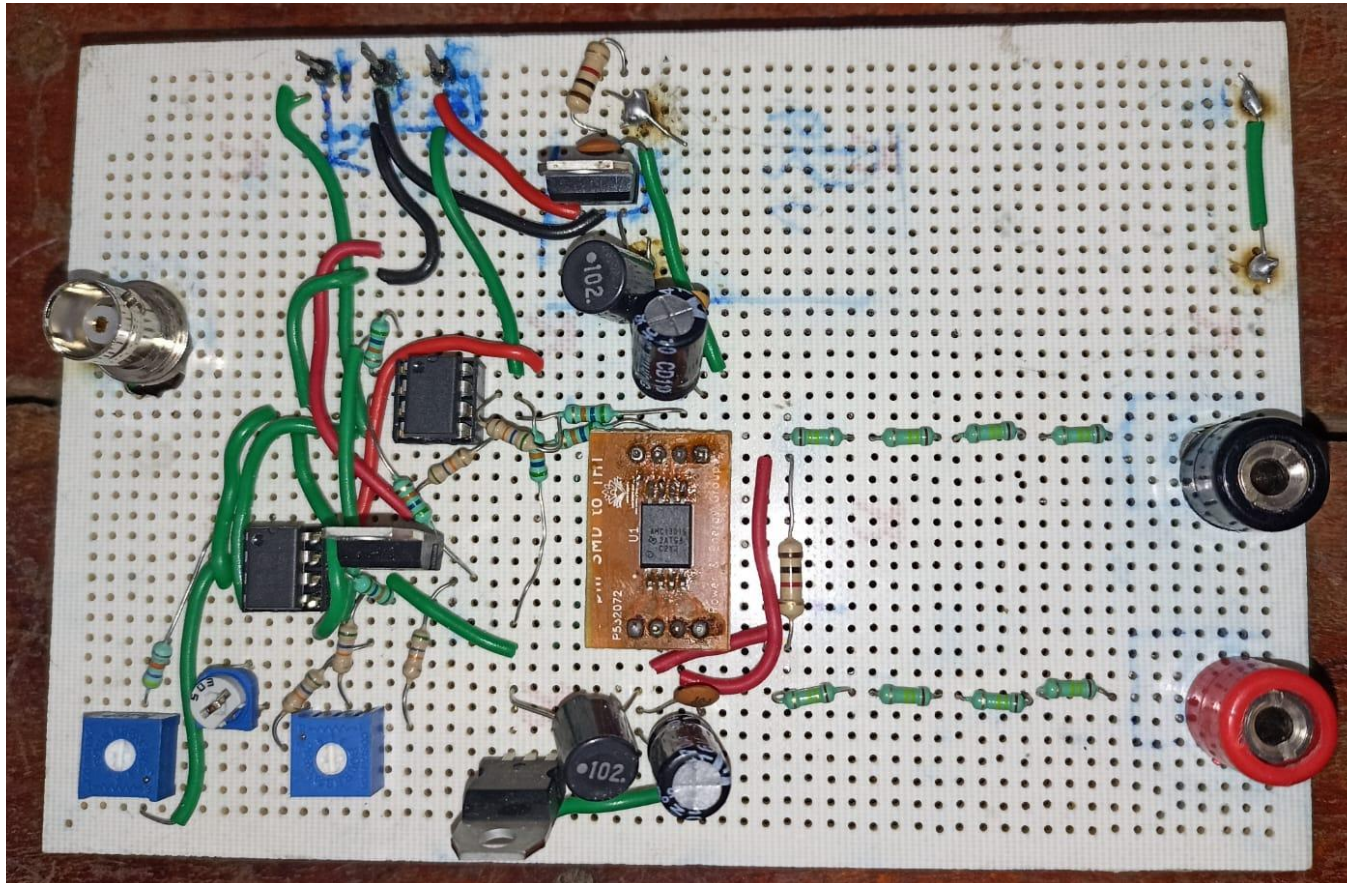
Inverting amplifier (Gain Correction)

Gain = adjustable.
expected output = 880mV
obtained output = 875mV

NEGATIVE AND POSITIVE GAIN CORRECTION CAN BE DONE.







Front Side

Back Side

THANK YOU