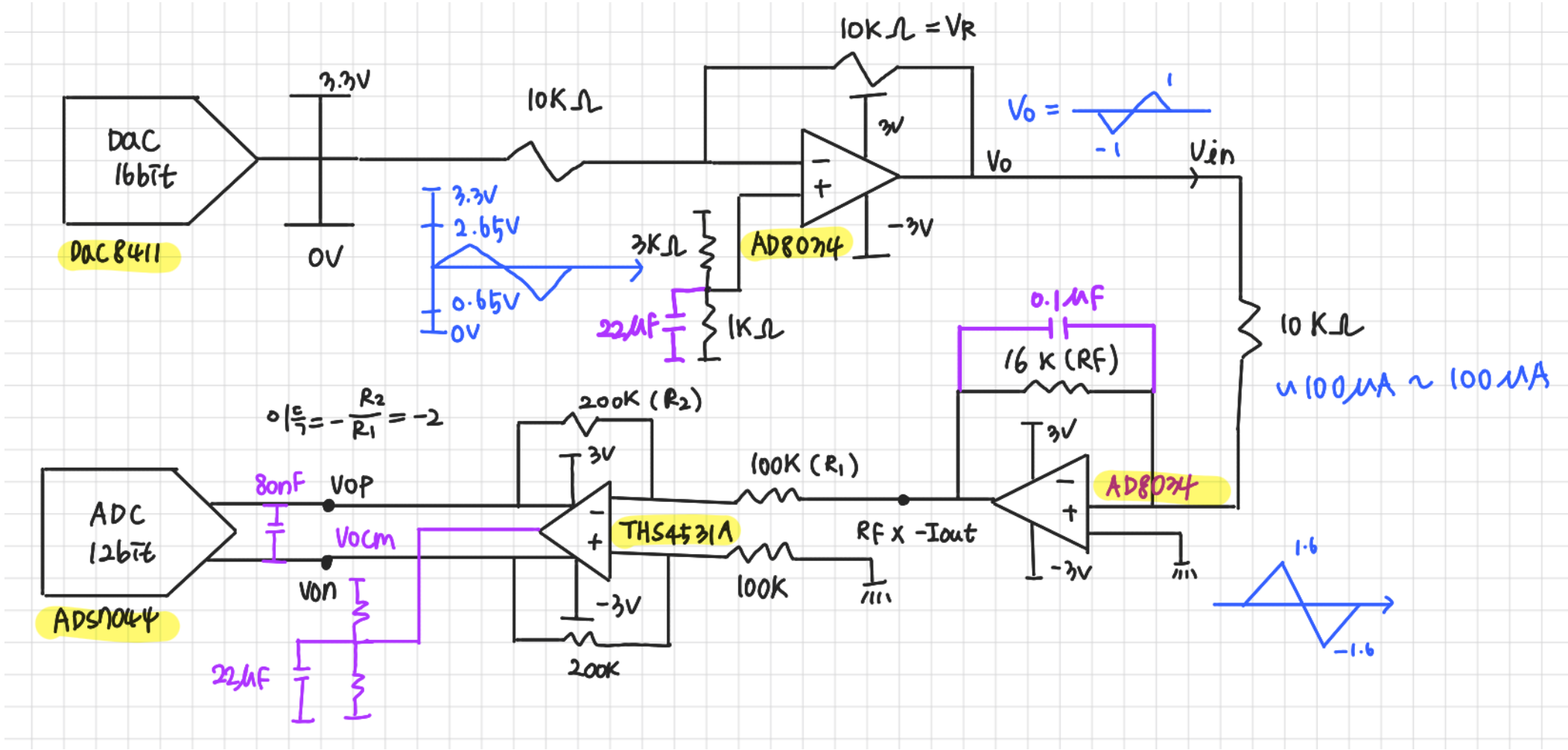
C-mod bio-sensor 회로 정리

2025_09_02

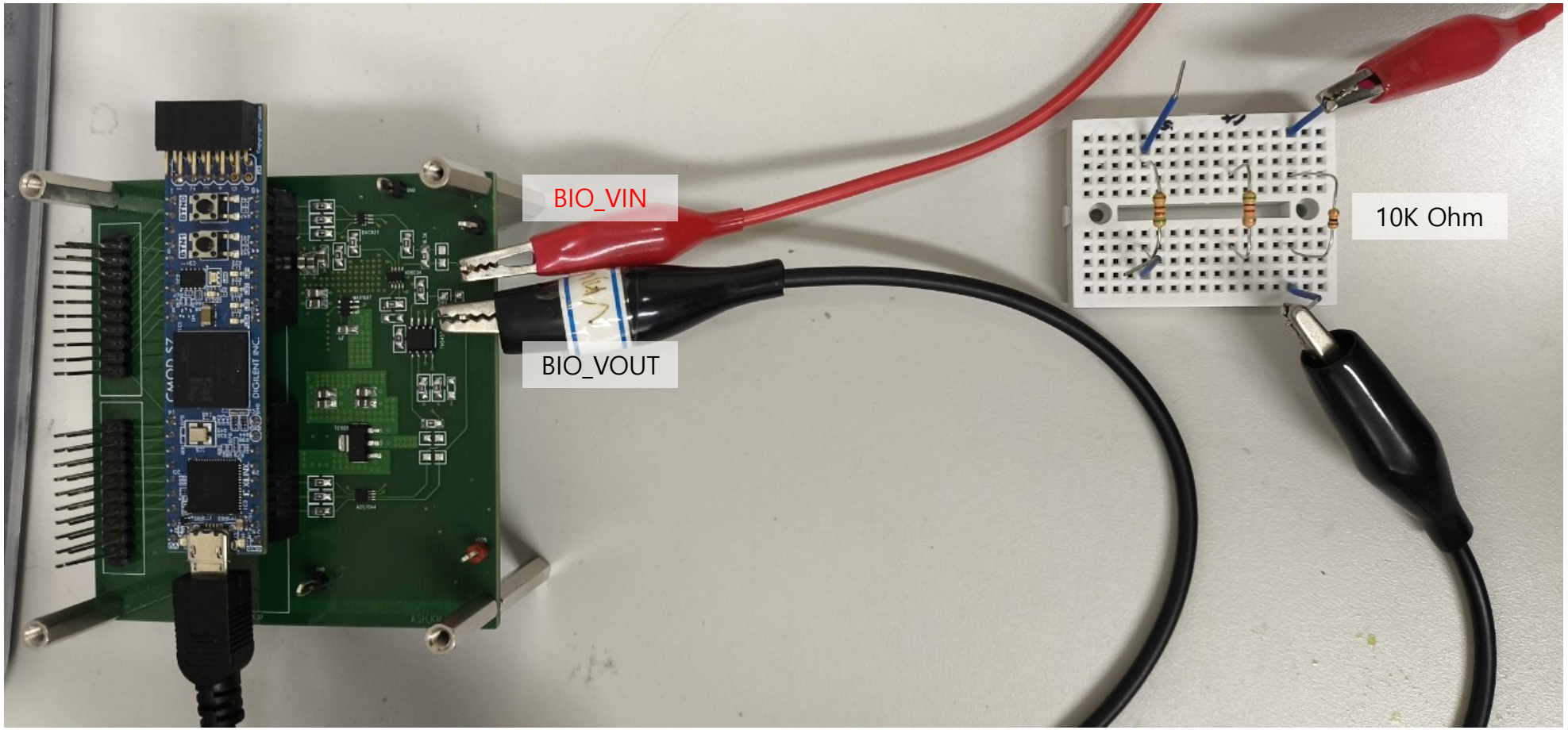
Verilog file : Project_final0515

Python code : test_CMOD_UART FINAL0509.py

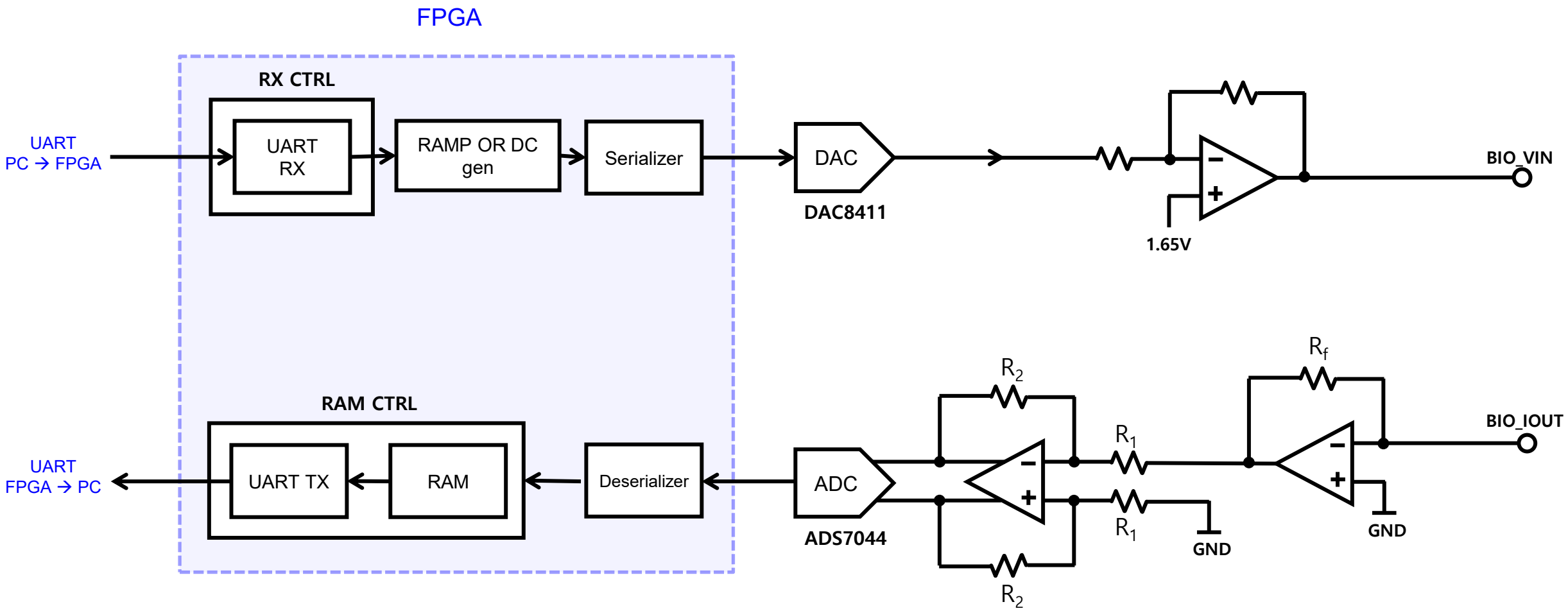
회로 구성


10KΩ = VR
3.3V
DAC
16bit
DAC8411
10KΩ
3V
Vo
Vin
-3V
AD8034
3.3V
2.65V
0.65V
0V
3KΩ
22μF
1KΩ
0.1μF
16 K (RF)
10 K Ω
≈ 100μA ~ 100μA
200K (R2)
100K (R1)
80nF
VOP
VOCM
VON
ADC
12bit
ADS7044
THS4531A
RF x -Iout
100K
200K
22μF
1.6
-1.6

회로 연결



Block diagram

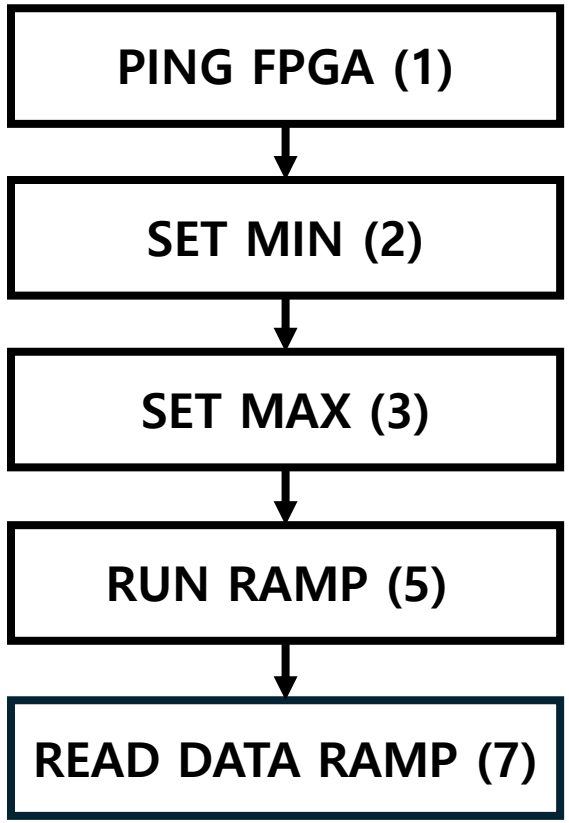


사용자 인터페이스 작동법

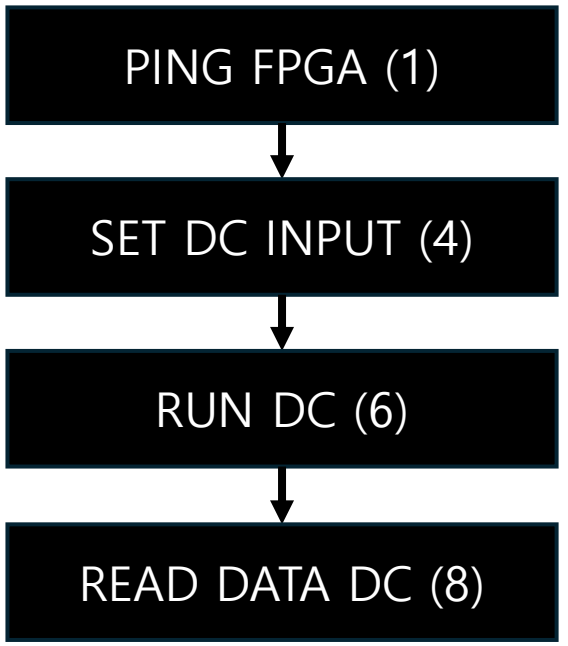
```
while True:
    try:
        menu = []
        while menu != 9 :
            print('##########################################')
            print('################## Menu ##################')
            print('##########################################')
            print('1. Ping FPGA')
            print('2. Set min')
            print('3. Set max')
            print('4. Set DC Input')
            print('5. Run Ramp')
            print('6. Run DC')
            print('7. Read Data Ramp')
            print('8. Read Data DC')
            print('9. Exit')

            menu = int(input("Choose number: "))
```

RAMP 작동법 (파형)



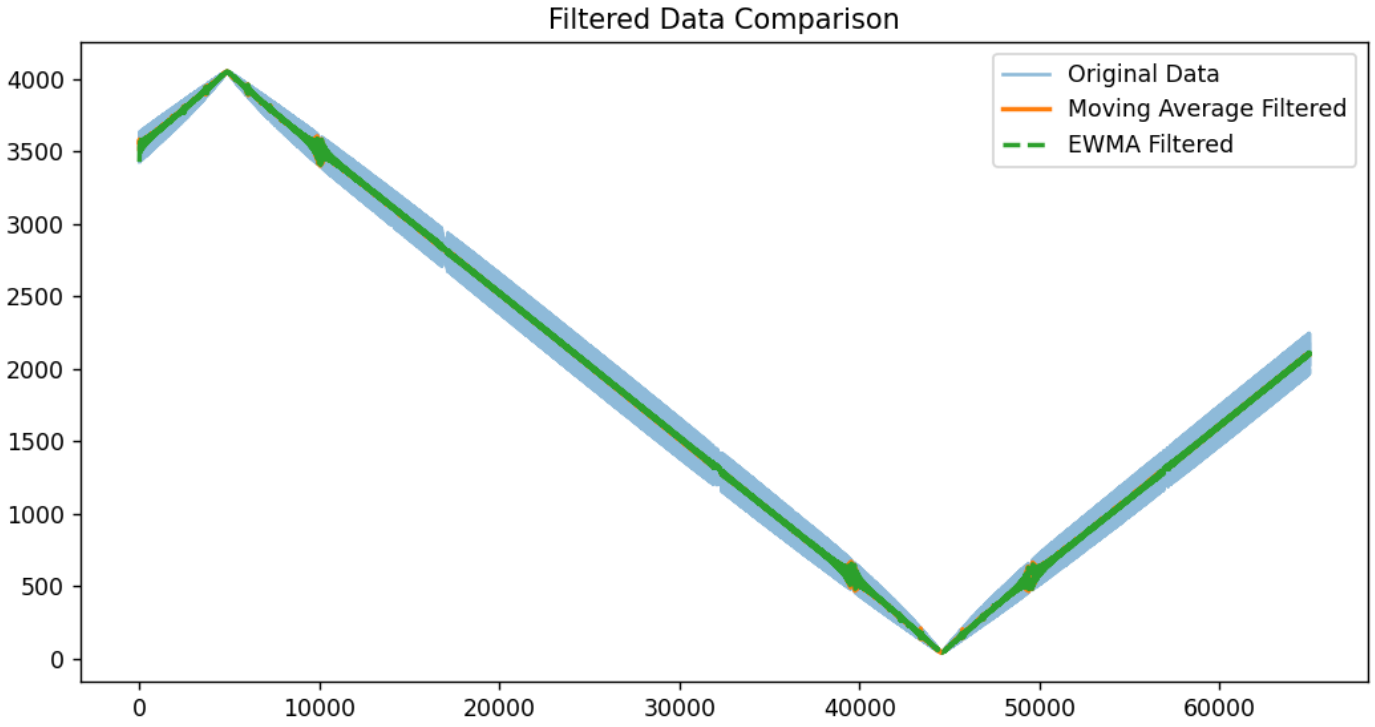
DC 작동법 (임피던스)



파이썬 결과

SET_MIN 12900 →

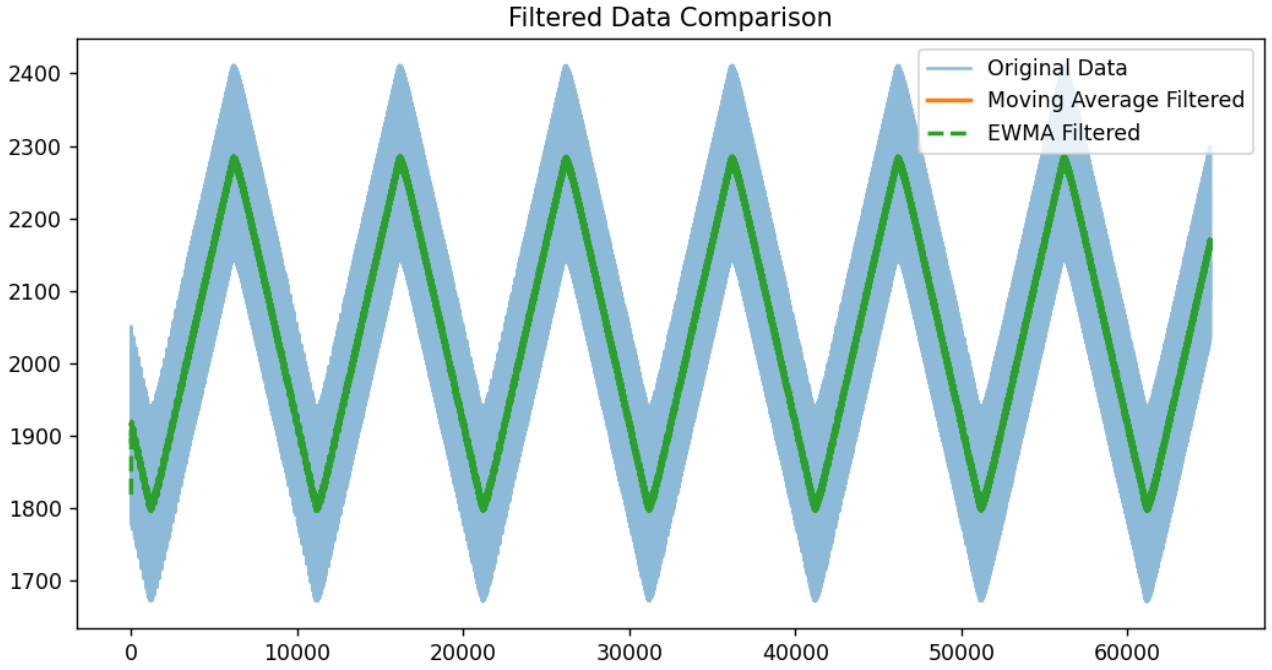
SET_MAX 52600

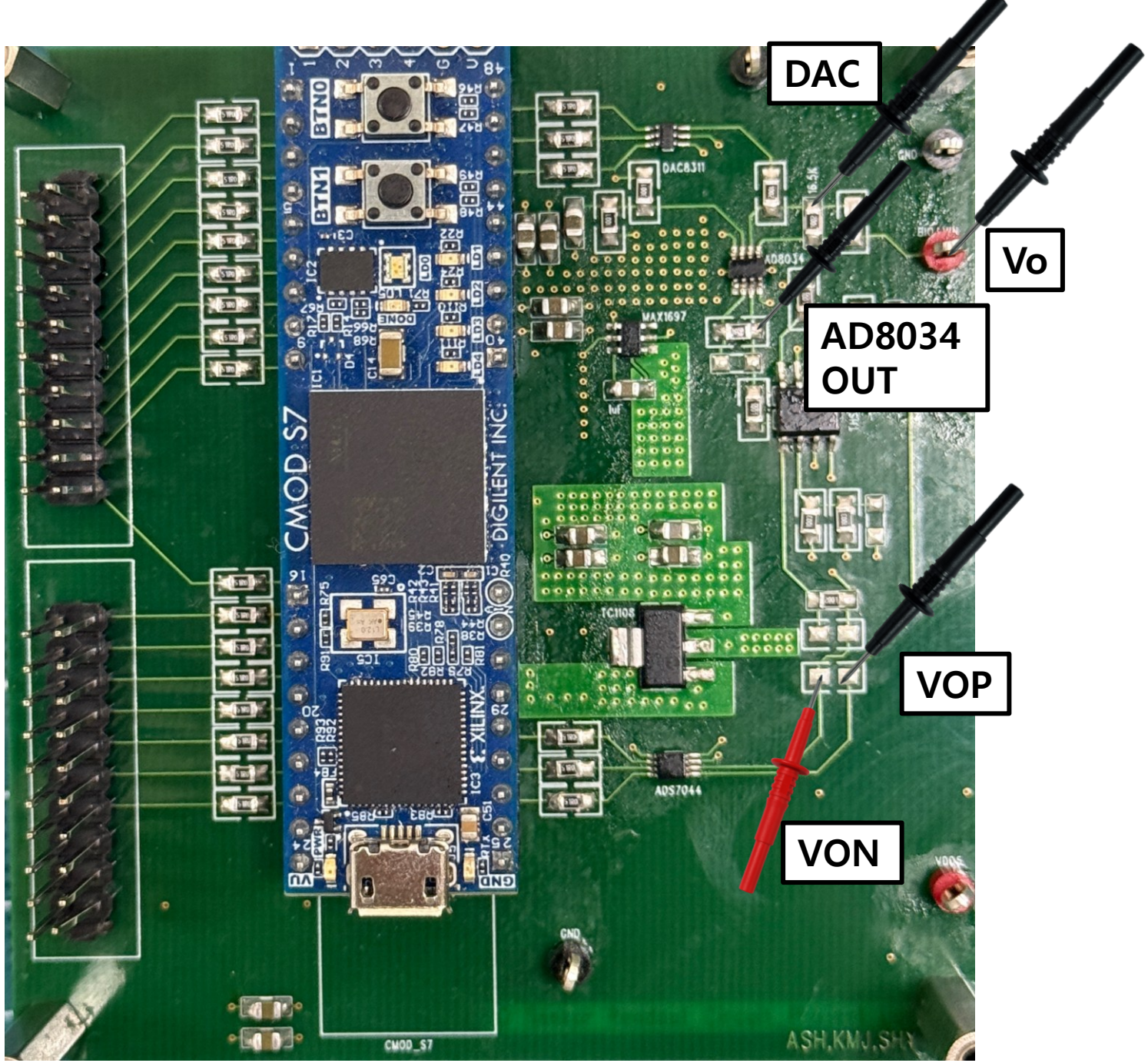


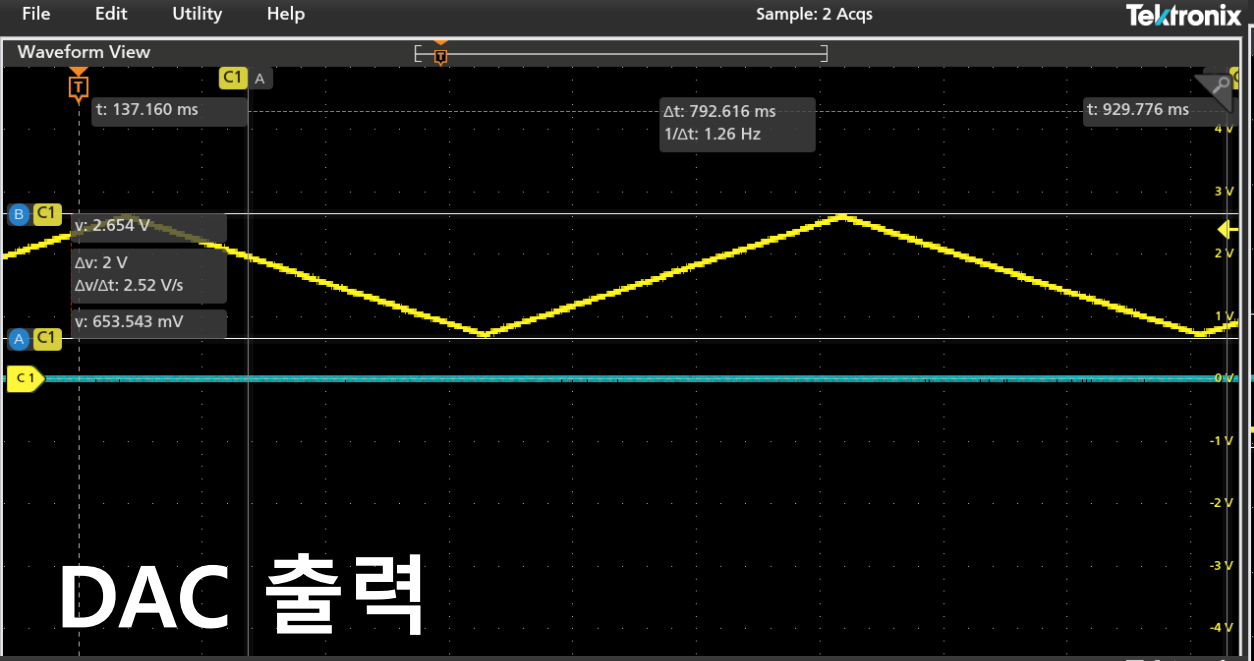
시뮬레이션으로 파형 보기 최적화

SET_MIN 30000 →

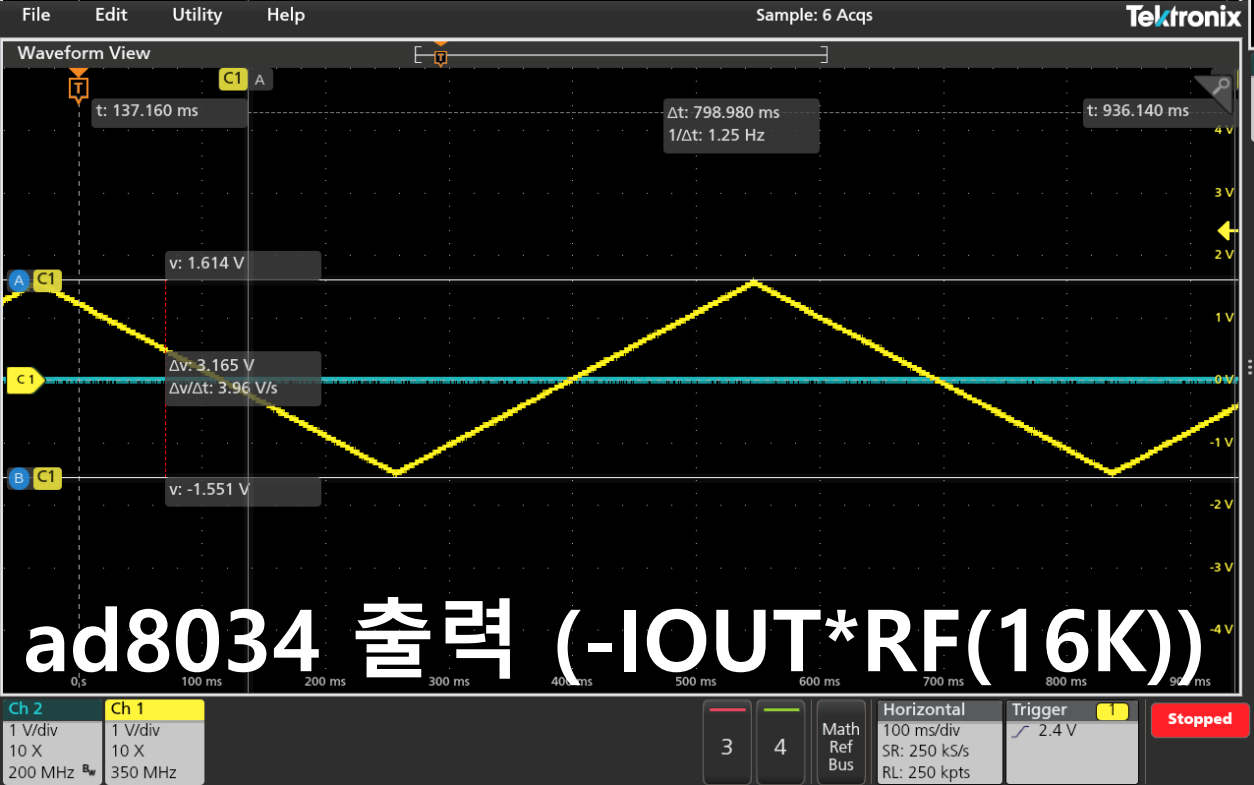
SET_MAX 35000

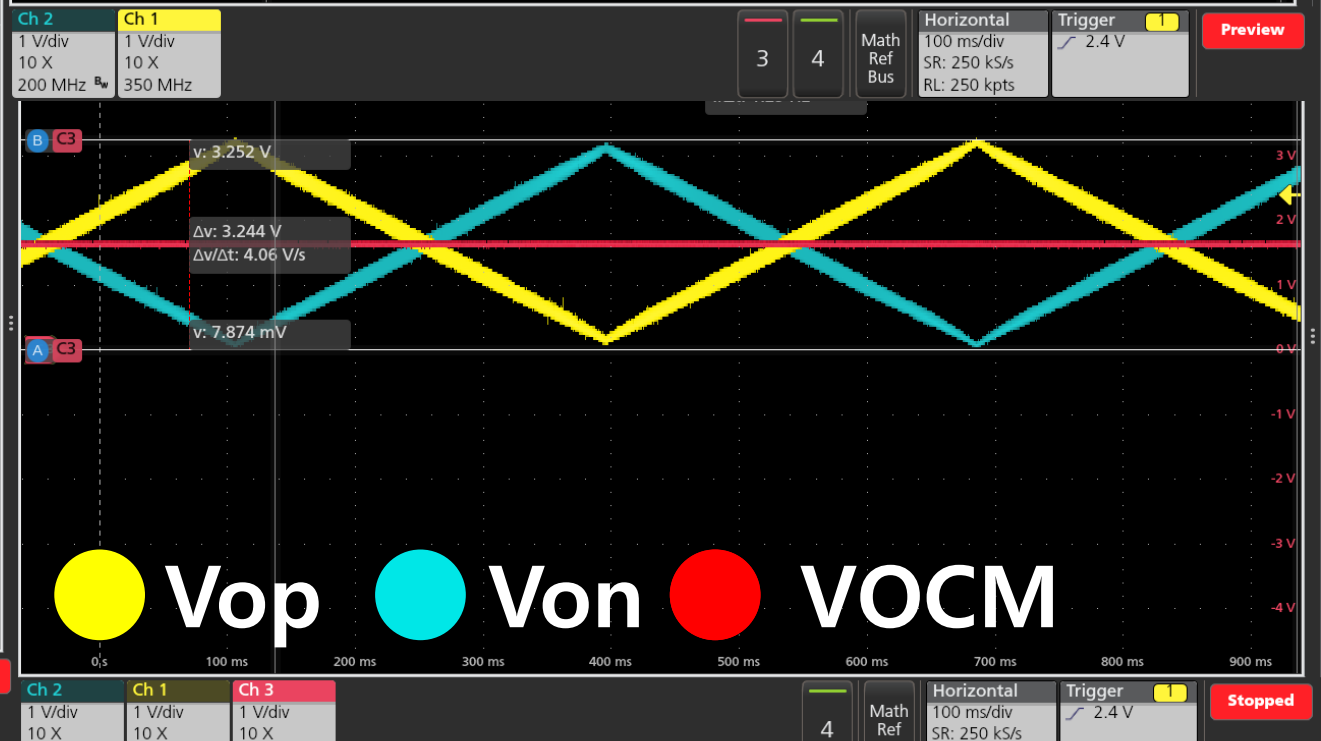



DAC
Vo
AD8034
OUT
VOP
VON
CMOD S7
DIGILENT INC.
XILINX
BTN0
BTN1
DAC8311
AD8034
MAX1697
TC1108
ADS7044
GND
CMOD_S7


File Edit Utility Help
Sample: 2 Acqs
Tektronix
Waveform View
t: 137.160 ms
Δt: 792.616 ms
1/Δt: 1.26 Hz
t: 929.776 ms
v: 2.654 V
Δv: 2 V
Δv/Δt: 2.52 V/s
v: 653.543 mV
DAC 출력


Waveform View
t: 137.160 ms
Δt: 792.616 ms
1/Δt: 1.26 Hz
t: 929.776 ms
v: 1000 mV
Δv: 2.063 V
Δv/Δt: 2.60 V/s
v: -1.063 V
Vo 출력


File Edit Utility Help
Sample: 6 Acqs
Tektronix
Waveform View
t: 137.160 ms
Δt: 798.980 ms
1/Δt: 1.25 Hz
t: 936.140 ms
v: 1.614 V
Δv: 3.165 V
Δv/Δt: 3.96 V/s
v: -1.551 V
ad8034 출력 (-IOUT*RF(16K))
Ch 2
1 V/div
10 X
200 MHz
Ch 1
1 V/div
10 X
350 MHz
Math Ref Bus
Horizontal
100 ms/div
SR: 250 kS/s
RL: 250 kpts
Trigger
2.4 V
Stopped


Ch 2
1 V/div
10 X
200 MHz
Ch 1
1 V/div
10 X
350 MHz
Math Ref Bus
Horizontal
100 ms/div
SR: 250 kS/s
RL: 250 kpts
Trigger
2.4 V
Preview
v: 3.252 V
Δv: 3.244 V
Δv/Δt: 4.06 V/s
v: 7.874 mV
Vop
Von
VOCM
Ch 3
Stopped