

HSCMS -

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Design Steps

- The full transfer function of the circuit is provided below.

$$V_o = I_{in} \times R_1 \times \frac{R_5}{R_4}$$

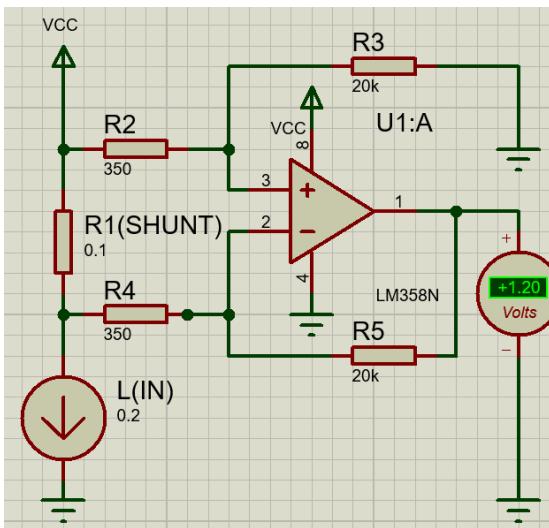
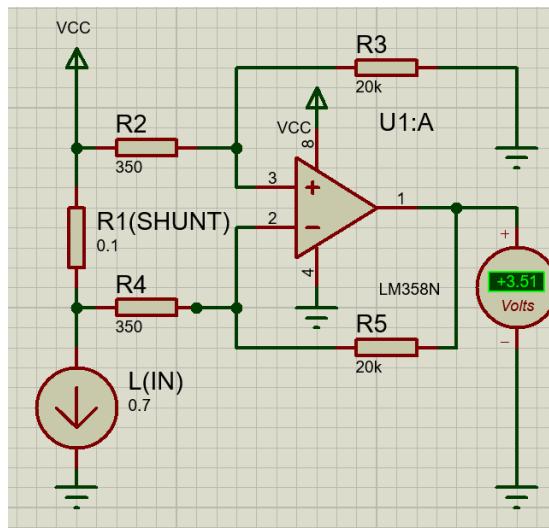
Given $R_2 = R_4$ and $R_3 = R_5$

Full transfer udregning

I(in)	R1 (shunt)	R5	R4	V _o
0,2	0,1	20000	350	1,142857143
0,7	0,1	20000	350	4

20k (R5)	LM358N	MCP6002	NE5532
0,2 A	1,2 v	1,09 v	3,01 v
0,7 A	3,51 v	3,94 v	1,9 v

LM358N

0,2 A	0,7 A
	

MCP6002

0,2 A - 1,09 v	0,7 A 3,94
<p>Circuit diagram for MCP6002 at 0.2 A. The circuit uses a shunt resistor R1 (0.1 ohm) connected between the input current source L(IN) and ground. The non-inverting input of the op-amp U1:A (MCP6002) is connected to the shunt resistor through a 350 ohm resistor R2. The inverting input is connected to ground through a 350 ohm resistor R4. The output of the op-amp is connected to a 20k ohm resistor R3, which is connected to VCC. The output voltage is measured across R3 and is +1.09 Volts.</p>	<p>Circuit diagram for MCP6002 at 0.7 A. The circuit is identical to the 0.2 A version, but the input current source L(IN) has a higher value of 0.7. The shunt voltage measurement remains +3.94 Volts.</p>

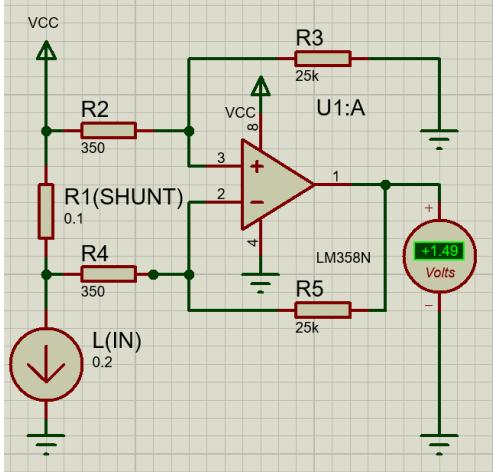
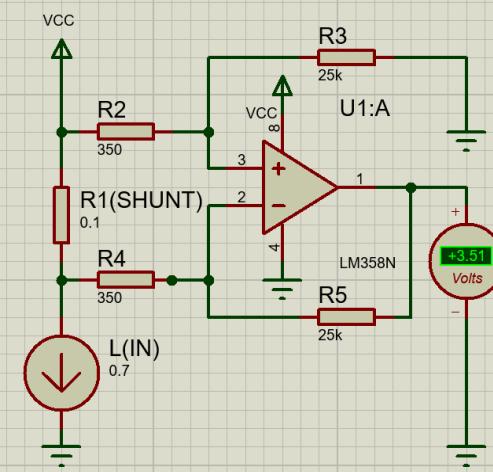
NE5532

0,2 A	0,7 A
<p>Circuit diagram for NE5532 at 0.2 A. The circuit is identical to the MCP6002 circuit, with a shunt resistor R1 (0.1 ohm) and a 350 ohm feedback resistor R2. The output voltage is +3.01 Volts.</p>	<p>Circuit diagram for NE5532 at 0.7 A. The circuit is identical to the MCP6002 circuit, with a shunt resistor R1 (0.1 ohm) and a 350 ohm feedback resistor R2. The output voltage is +1.99 Volts.</p>

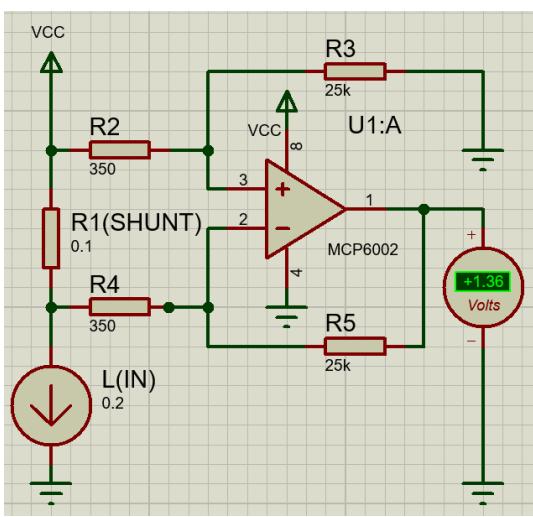
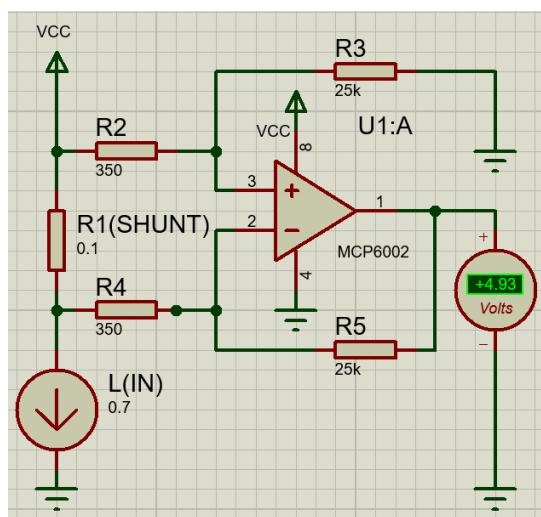
I(in)	R1 (shunt)	R5	R4	V _o
0,2	0,1	25000	350	1,428571429
0,7	0,1	25000	350	5

25k (R5)	LM358N	MCP6002
0,2 A	1,49 v	1,36v
0,7 A	3,51 v	4,93 v

LM358N

0,2 A	0,7 A
	

MCP6002

0,2 A	0,7 A
	

En anden design løsning kunne være:

I(in)	R1 (shunt)	R5	R4	V _o
0,2	0,5	5000	350	1,428571429
0,7	0,5	5000	350	5

