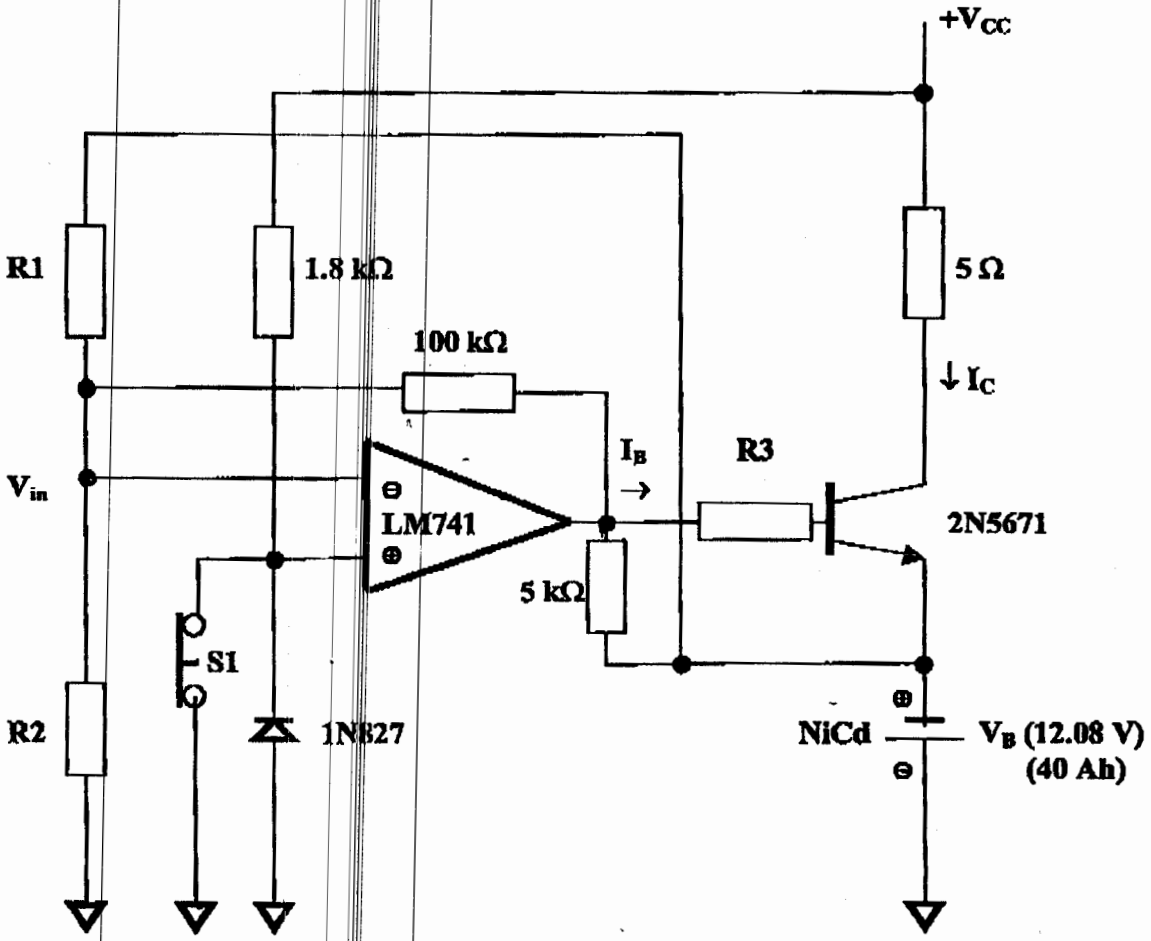
The simple circuit shown below is a battery-charge circuit. It operates from a DC power supply having V_{CC} = 22-V. The fully charged NiCd battery-pack exhibits V_B = 12.08 V. Operation starts when switch S1 is opened. After the batteries are fully charged switch S1 is closed. Define the appropriate values of R1, R2, and R3. Using the SPICE simulation or any other mean verify the operation of the circuit. (Note to recondition NiCd battery-packs are discharged to 0-V.)



For your information here are some important device parameters of the devices used by the project.

1N827	2N5671	LM 741
V_Z = 5.9–6.5 V @ I_Z = 7.5 mA Z_{ZL} = 15 Ω @ I_Z = 7.5 mA ΔV_Z = 0.001 %/°C ΔV_Z = 9 mV temperature range: -55 to +100°C	V_{CBO}: 120 V V_{CEO}: 90 V V_{EBO}: 7 V I_C: 30 A maximum h_{FE}: 20 minimum, V_{CE}: 2V, I_C: 15 A $V_{CE(Sat)}$: 0.75 V, I_C: 15 A, I_B: 1.5 A Power dissipation: 140 W, at T_{Case}: 25°C	Supply voltage: ± 22 V Input voltage: ± 15 V Input offset voltage: 3.0 mV max Bandwidth: 437 kHz minimum Input impedance: ≥ 1 MΩ Open loop gain: 100 dB typical Common mode rejection: ≥ 80 dB Temperature: -55 to +125°C