



Application Note #: AN0007

Device: ICS1702

Description: LM317 Current Source Operation in the ICS1702EB/CR

The LM317 has an op-amp and a 1.25V reference inside of it. The op-amp controls the base of a power transistor inside the LM317. The op-amp turns on the transistor enough to maintain 1.25V between the LM317 "OUT" pin and "ADJ" pin. The schematic for the ICS1702EB shows a 1K potentiometer (R16), for adjusting the output current. If the wiper of R16 is adjusted fully toward R14, R14 and R16 equally divide the voltage drop across R15. Please note that R13 is a sense resistor which only carries the LM317 quiescent current (typically 50uA).

For a two to one change in output current, the voltage drop across R15 should be 2.5V with the maximum current you want flowing through R15. This determines the value of R1. For example $2.5V/2\Omega = 1.25A$. When the wiper of R16 is adjusted fully toward R14, the maximum desired output current will flow and 2.5V will be across R15. When the wiper of R16 is adjusted fully away from R14, the output current is reduced to about one half of the maximum current and the voltage drop across R15 will be about 1.25V. In the above example $1.25V/2\Omega = .625A$.

Please note that when the wiper of R16 is adjusted fully away from R14, the "ADJ" pin connects to one side of R15 through R13 since R13 serves as a sense resistor, and the other side of R15 is the LM317 "OUT" pin. This is why 1.25V is developed across R15 when the wiper of R16 is adjusted fully away from R14.