1430,
TRANSISTORS
EXPERIMENT 4,
COLLECTOR-FEEDBACK RESISTOR
OBJECTIVE

To measure the effectiveness of voltage feedback.
INTRODUCTION

The base of the transistor can be biased from the collector as shown in the following schematic, for Experiment 4. The base is biased through $R_2$ so that a change in collector current causes a change in base current.
If the collector current rises due to heating, the voltage drop across $R_1$ increases, thus decreasing the collector voltage. This decreases the voltage drop across $R_2$, which in turn decreases the base current. Voltage feedback is defined as: An increase in collector current causes a decrease in base current and the collector current is decreased.
In this experiment, you will construct a circuit which uses voltage feedback and compare its performance with the previous circuits which used current feedback.
REQUIRED PARTS

1 220Ω 2 W resistor (red-red-brown)
1 1kΩ ½ W resistor (brown-black-red)
1 10kΩ ½ W resistor (brown-black-orange)
1 2 MΩ potentiometer
1 2N2431 Germanium transistor
PROCEDURE

1. Solder 2” leads to the potentiometer
2. Set the potentiometer to the middle of its range
3. Construct the circuit of Experiment 4
4. Bend the leads of the transistor, so that its case is away from the 220Ω resistor
5. Turn the trainer on.
   a) Adjust the positive supply to 15V
   b) Adjust the negative supply to -10V

6. Adjust the 2 MΩ potentiometer so that the voltage drop across $R_1$ is 5V

7. Bend the leads of the transistor so that the case now touches the 220Ω resistor.
a) Allow the transistor to heat for 5 minutes.

8. Measure the voltage across $R_1$, and calculate the current through $R_1$.

a) Record the current calculation in the lab book.
CIE RESULTS

8. 8mA
FINAL DISCUSSION

• The collector current changed by 60%. Compared to the previous two circuits, the voltage feedback circuit alone isn’t very stable.
  • This is because the base-emitter voltage of the transistor changes as the transistor heats up.
This changes the voltage drop of the base-bias resistor $R_2$, and spoils the negative feedback’s stability.
QUESTIONS?
THE END

Developed and Produced by the Instructors in the CIE Instruction Department.

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