Circuit provides visual verification of IR pulses

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You can test an IR (infrared) link with a circuit that converts an IR-generated photocurrent to an amplified current that drives a standard LED. This approach provides a visual feedback to indicate that the transmitter is working. The circuit can be enclosed in a small plastic or metal box and requires just a 9V transistor battery for operation. Diode D_1 is a basic Everlight (www.everlight.com) PD333-3C/H0/L2 or equivalent IR photodiode in a T1¾ package.

You can configure amplifier IC_{1A} as a photovoltaic amplifier. When the IR-light energy impinges on photodiode D_1, it generates a small photocurrent that tries to pull the inverting input negative. Meanwhile, the output of IC_{1A} goes positive, maintaining the virtual-ground node on Pin 2 of the amplifier at 0V. The transfer function for the circuit is $V_{OUT}=I\times R_1$. If you set the gain high, IC_{1A} goes to the power-supply rail when the circuit detects light. Analog Devices' (www.analog.com) AD823AR JFET-input amplifier directly drives the LED through a 750Ω current-limiting resistor. C_1 compensates the amplifier, preventing it from oscillating due to capacitive load from D_1 and the input parasitic capacitance.

If the output of IC_1 oscillates, you may need to increase the value of C_1. You can determine the value of C_1 by using the following **equation** for a 45° phase margin: $C_1=\sqrt{(C_D/2\pi R_1 F_C)}$, where F_C is the unity-gain-crossover frequency of IC_{1A}—typically, 16 MHz for the AD823—and C_D is D_1's 0V junction capacitance, including any parasitic capacitance on that node. Adjust R_1 for optimum gain. For testing, the remote-control transmitter window should be as close as possible to photodiode D_1 for maximum signal transfer. EDN

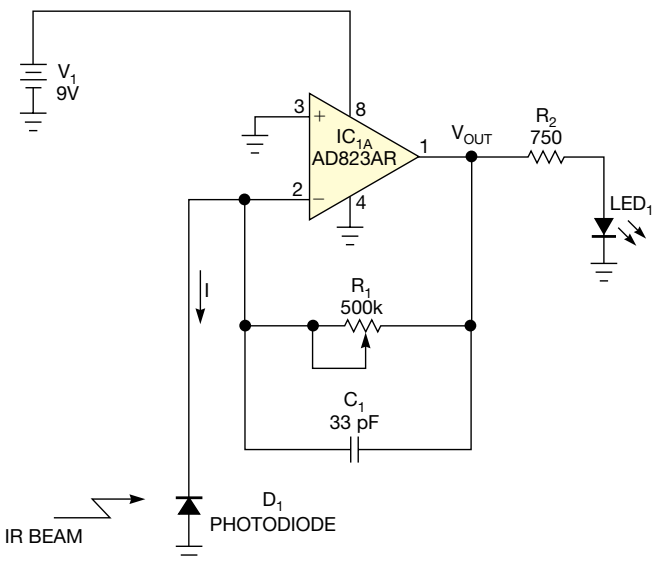

Figure 1 This circuit detects the transmitter in an IR communication link and provides a visual output from the LED.