some passive components implement the PWM circuit. One half of the TLC556,  $R_1$ ,  $R_2$ , and  $C_2$  form a freerunning, 1-kHz oscillator that has a very low duty cycle. This signal triggers a one-shot comprising the other half of the TLC556,  $R_3$ ,  $R_4$ , the 100k potentiometer, and  $C_3$ .  $Q_1$  and  $Q_2$  provide the saturated output drive. These transistors can carry 1A with a  $V_{CE}(SAT)$ 

of 0.25V. Thus, no heat sinking is required.  $D_1$  prevents  $Q_2$  from dumping charge onto  $C_1$  when  $Q_2$  is on. (EDN BBS /DI\_SIG #967)

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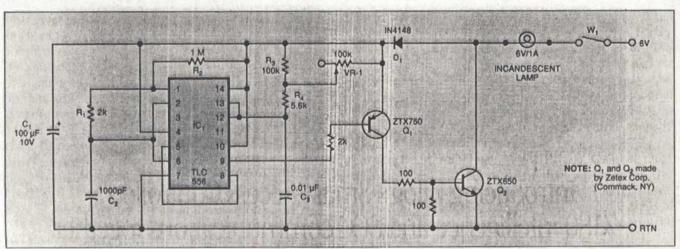


Fig 1—IC,, a CMOS 555 timer, and associated components form a PWM circuit that adjusts the duty cycle of this lamp dimmer between 20 and 100%.

## Current source scrounges parts

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Fig 1 uses readily available parts to implement a 0-to 200-nA current source. The circuit borrows a PMOS transistor from the input stage of a CD4007A, a device easier to obtain than a discrete PMOS transistor. The CA3130 op amp operates as a follower so that its positive input sets the current that flows through R<sub>2</sub>. The MOSFET input stage of this op amp exhibits low-input current. The op amp must be able to produce an output voltage high enough to turn the CD4007A's internal FET off. Thus, the op amp requires a positive supply voltage of 5V. The circuit presents an output voltage from 0 to 3V, and R<sub>1</sub> controls the amount of output current. (EDN BBS /DI\_SIG #970)

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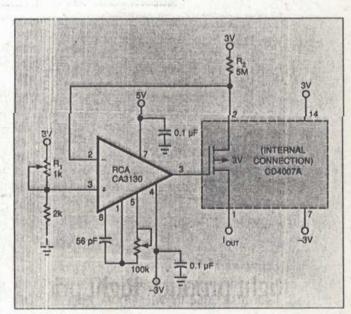


Fig I.--This low-drift current source makes use of an input PMOS transistor inside a readily available CD4007A.

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