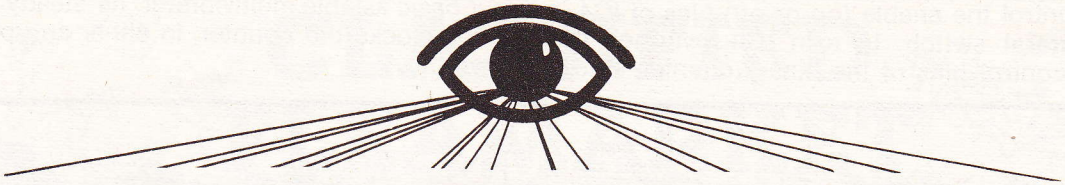
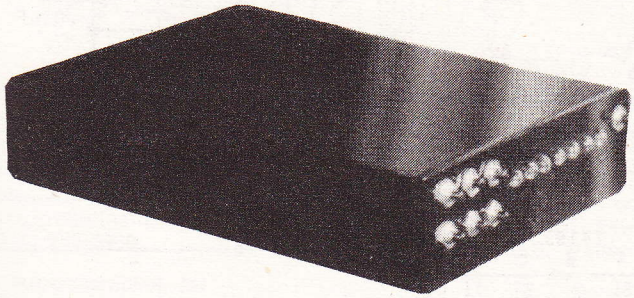


ELECTRONIC CYCLOPS



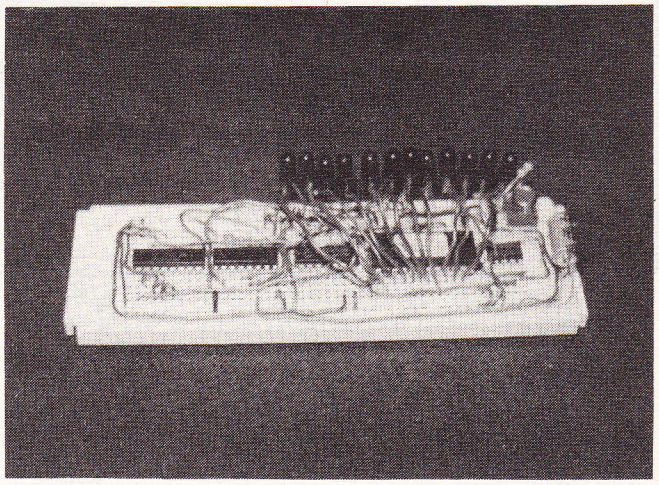
By Roger D. Secura

If you are like the author, there are times when you'll see an electronic gadget or project and wonder how difficult it would be to design and build your own version.

That is exactly what happened one evening as I watched a rerun of that popular TV series "Knight Rider." For those viewers who watch this series, you may recall, the front of Michael Knight's car had a red light that scanned back and forth like some kind of an electronic cyclops. It's like a variation of the type of circuitry that was used in the headgear of those hostile "Klingons" in the series "Battlestar Galactica."

This article describes how to build your own "Electronic Cyclops." The design is quite simple and the circuit in Figure 1 could have some practical applications. For example, many people, who can't afford an elaborate (and expensive) burglar alarm for their home, frequently buy and use alarm window stickers. The sticker acts as a camouflage, since the home owner knows that he didn't install an alarm but the potential thief doesn't. Well, why not put this electronic cyclops in a black box and place it strategically so that is faces out of your bedroom window. Who's to know what's in the box? It might persuade that would-be burglar to go elsewhere for his loot.

With a small modification (7805 voltage regulator), you could attach the black box to your car's dashboard, plug it into the cigarette lighter receptable for power and then wait for your friends to ask you where you purchased the fancy car alarm.

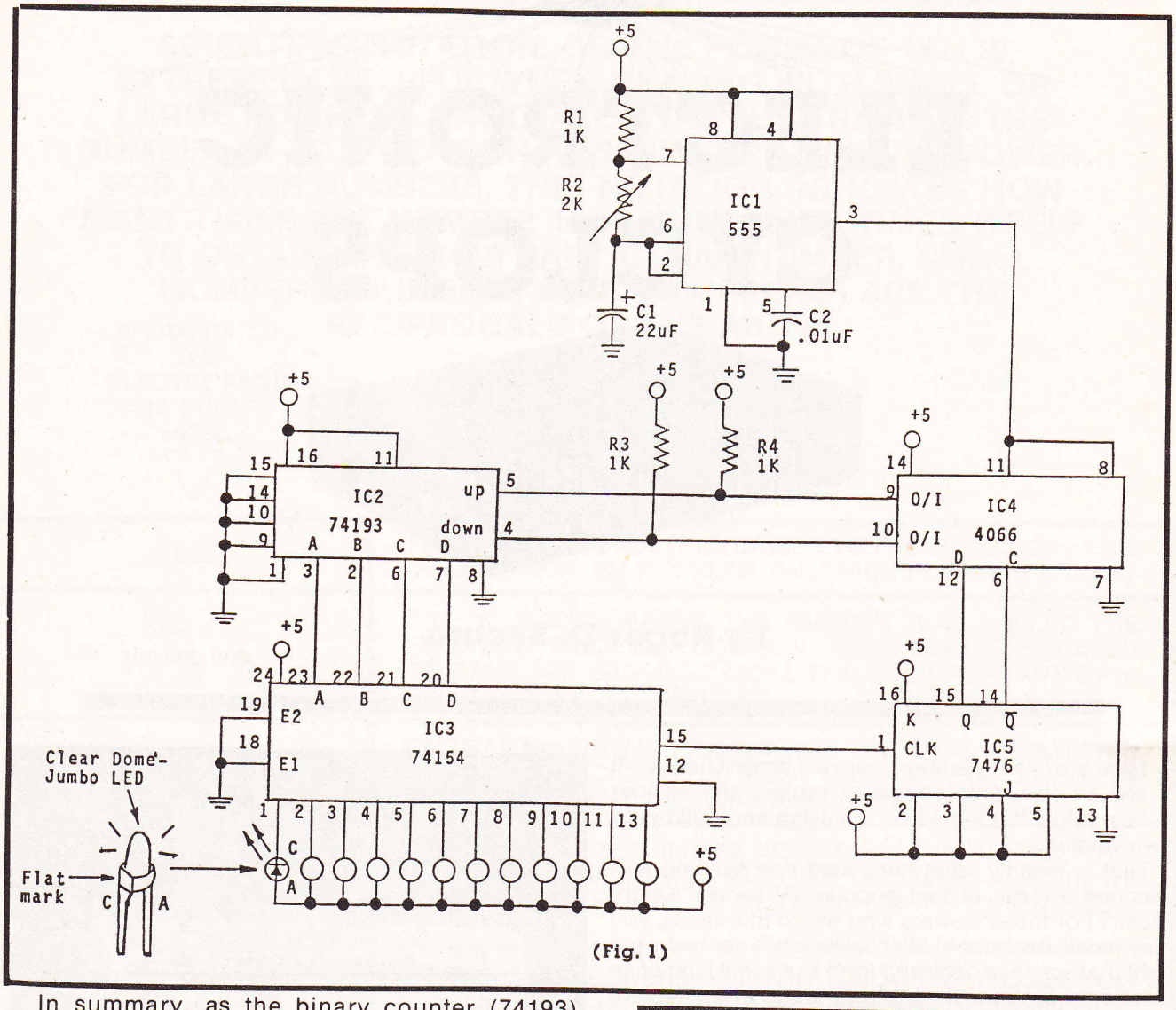


Breadboard Layout of Electronic Cyclops.

Circuit Operation

IC2 in figure 1 is a four bit up/down binary counter. Pins 4 and 5 of this IC determine the direction of the count. The purpose of IC2 is to present a binary count (0-15 or 15-0) to a 4-line to 16-line decoder (IC3). Depending on the direction of the counter, only one output of this decoder will go low at a time. Since 12 discrete jumbo LEDs are connected to the outputs they will light up sequentially as the count proceeds. IC4 and IC5 control the direction of the binary counter. IC5 is a dual J-K flip-flop. It is wired in a J-K toggle configuration. The outputs of this flip-flop (Q

and Q) control the enable (on or off) pins of IC4, a quad bilateral switch. In turn IC4 switches the up/down control pins of the binary counter. IC1 is your basic astable multivibrator. Its' steady stream of pulses clocks the counter, in either an up or down direction.



(Fig. 1)

In summary, as the binary counter (74193) sequence begins, it forces one output of the decoder (74154) to go low. After 12 clock pulses from the 555, the output of the decoder toggles the output of the J-K flip-flop bilaterial switch (4066) to reverse the up/down sequence of the binary counter. As the count continues, each LED is illuminated in order, giving the display the appearance of a scanning red light. R2 controls the scanning rate. The author will concede that there is probably a single IC chip (somewhere) that performs the same function as the "Electronic Cyclops" described in this article. However, it wouldn't help the beginner to understand the basic electronic building blocks used in today's sophisticated electronic equipment and that's the objective of the "fun way to learn electronics...."

If your supply of ICs is limited and you're interested in saving some money (who isn't) on this project, try:

JDR Microdevices
110 Knowles Drive
Los Gatos, CA 95030
1-(800) 538-5000

AND /OR

Budget Electronics
P.O. Box #1477
Moreno Valley, CA 92337
(714) 653-1663

PARTS LIST FOR ELECTRONIC CYCLOPS

SEMICONDUCTORS:

IC1—555 timer
IC2—74193 synchronous 4-bit up/down counter
IC3—74154 4-line-to-16-line decoder
IC4—4066 quad bilaterial switch
IC5—7476 dual J-K flip-flop

RESISTORS:

R1—1000 ohm, ¼ watt
R2—2000 ohm, ¼ watt, potentiometer
R3—1000 ohm, ¼ watt
R4—1000 ohm, ¼ watt

CAPACITORS:

C1—22-uF, 16 WVDC, electrolytic
C2—.01-uF, ceramic

LED—(light emitting diode)
LEDs—12, clear dome-jumbo LEDs

■