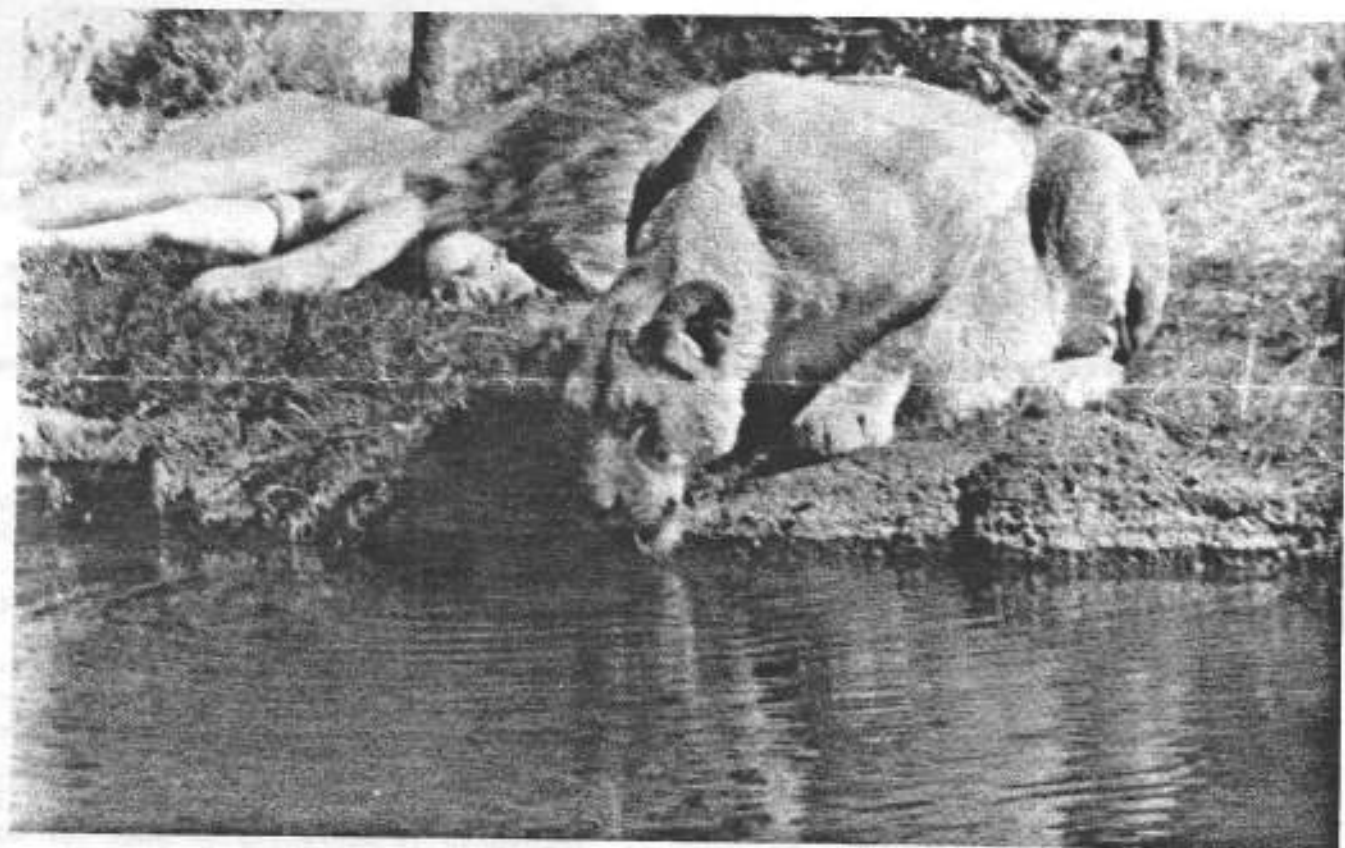


# THE SUBMINIATURE TIMES

The Subminiature Times is published monthly by Doylejet, P.O. Box 60311, Houston, TX. 77205 (713) 443-3409

Supporting 110, 17.5mm, 16mm, 9.5mm, 8mm, 4mm, 1mm, Microdot, and Electronic Still Photography.



Camera: Tasco 7800  
Film: Kodacolor II  
Developer: Edwal F8-7 1:31

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strating an ultra high resolution CCD image sensor array suitable for medical, surveillance, and reconnaissance applications. Stuttgart, Germany May 25 - 28.

**MINOX** Good news for clamp owners, "Bargain Basement" Intertech now has the new gyro stabilized binocs as well as unusual imaging specialties. Multiply the first number by the focal length of your camera to determine the total length of the system.

**INTERNATIONAL** Ident/Vision display of products not seen in Europe '93. Highlight the DALSA booth demonstrating

**TASCO** New owners are having difficulty getting good work from the model 7800 (newsletter #40). A recent letter asked if the CamBinox was much better..

The Tasco 7800 binocular/camera looks dirt simple. It has one shutter speed, no flash terminal, no rapid wind, no meter, or self timer; no built-in filters, or anything else to fiddle with. The apertures are from f/5.6 to f/32 on the 112mm lens. Focusing is done via a central ring which is coupled to the binocular. It takes 110 film. Drop it in, shoot the roll, open the door, the film drops out.

The symbols on the side suggest that you use f/16 on the beach with ASA 64-125 films. Normally that would indicate a 1/250th of a second shutter speed. But with the Tasco there's some light loss somewhere.

Your letters indicate that it is certainly possible to get crossed up with such a simple system, but not if you follow one rule: Always focus on infinity and align the eyepieces before attempting to focus on closer objects.

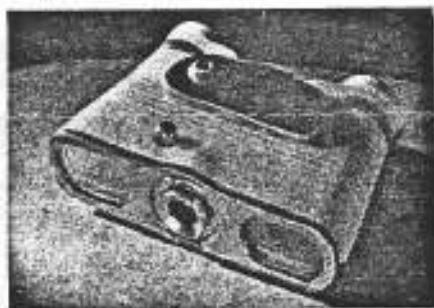
The CamBinox is supposed to be the best of the binocular cameras. It has interchangeable 35mm, 50mm, 90mm, 135mm, and 180mm lenses, with filters.

It uses any 16mm film, it has a variety of shutter speeds plus a flash synch. Quite a kit. But having finally learned to use the Tasco, we wouldn't trade. Primarily because of the larger 13 x 17mm format (vs 10 x 14mm for the CamBinox) and the coupled focusing. With the CamBinox the binocular is focused on the subject, then the distance must be set on the taking lens. Only one was offered for sale in "Shutterbug" during 1992 which makes it a collectible.

Others like the Teleca and Binoca should go directly into your showcase. Whereas you wouldn't mind letting a Tasco bounce around under the car seat because they are so easily replaced.

The Tasco despite all the plastic in it and the uninspired reviews it gets, is our favorite subminiature long lens.

A BINOCULAR CAMERA, the Binoca, distributed by Random Corp., 415 Lexington Ave., New York, N. Y., is announced. The



Binoculars include camera using 16-mm film.

unit is a pair of binoculars with a power of 2.5, and adjustable focusing. Fitted between them is a small 16-mm still camera. The camera has a 40-mm f/4.5 telephoto lens, with shutter speeds from 1/25 to 1/100 sec., and bulb. The camera takes in the same area that the binoculars show. Film is supplied in a special daylight loading magazine. Price of the unit is \$22.95, including P. E. T. For further information write the distributor.

Reprint from "Popular Photography" 2/51 submitted by S. Kessler, Burbank, CA.



KEYSTONE (WHERE'VE YOU BEEN?) IS BACK. The XR308 is at your local Eckerd Pharmacy. Good price for this entry level 110 telephoto. First roll processed free!

**RIGHT ANGLE PHOTOGRAPHY** Practice, practice, practice. Latest wrinkle: try to hit a target in a darkened room with a flashlight held at right angles to your face. As you get better try it at waist level. Sounds good. Should save film.

**SUBMINIATURE INFRA RED** and night photography are alive and well despite a little teasing last issue. High quality night vision equipment has become very inexpensive. See Intertech cover page.

The only film source we haven't listed lately, is Brooks. Infra red 35mm x 36 exposures is currently on sale for \$6.50 per roll. Brooks Photographic Center, 1 (800) 572-5339.

A student is looking for 120 IR film and a miniature flash circuit for several minoxes involved in a low budget project. Hope you've found a way to split it without touching it. 120 x 12 exp. IR \$7.95, S & H Photo, (303) 838-4848.

One of the unique problems associated with subminiature infra red flash photography is the amount of power required to put a light through the dark filter. A capacitor, battery, flash head, and case, can make a package larger than the camera.

If your subject is close, within 5 ft. or so, you don't always need megawatts to make acceptable exposures in total darkness.

The "Surface Mount IR Transmitter" submitted by R. Brenner, Grand Rapids, MI, is smaller than a credit card, and puts out an invisible circle of light at 725-Hz.

## SMT PROJECT: I-R REMOTE ON A KEYCHAIN

FORREST M. MIMS, III

ONE OF THE MAJOR CAPABILITIES OF SURFACE-MOUNT TECHNOLOGY is that experimenters and prototypers can assemble ultraminiature, fully functioning circuits only a few millimeters thin. For example, you can make an optoelectronic remote-control transmitter that is so small that it can be slipped inside a plastic identification-tag holder, yet it's powerful enough to activate a receiver located more than 10 feet away.

The transmitter, shown in Fig. 1, projects a pulse-modulated red or near-infrared beam. Although a 555 timer is often used as an LED driver in this kind of application, the simple two-transistor driver shown is a better choice because it can drive an LED with greater current. Moreover, it can be powered by a supply of less than one volt.

### How it works

Referring to Fig. 1, assume that Q1 and Q2 are initially off when power switch S1 is closed. Capacitor C1 then begins charging through resistors R1 and R2, and LED1. Eventually the charge on C1 becomes high enough to switch Q1 on, which then switches Q2 on.

When Q2 is on, LED1 is connected directly across battery B1 through Q2's emitter-collector junction. Meanwhile, C1 discharges to ground through Q1's base-emitter junction. Eventually the charge on C1 falls below that necessary to keep Q1 on. Transistor Q1 then switches off and, in turn, switches

Use surface-mount technology to build an infrared transmitter small enough to fit on your keychain.

Q2 off. The LED is then switched off. The charge/discharge cycle is then repeated at a frequency that is determined by C1's value. The circuit drives the LED with 725 pulses per second using the values given in the Parts List.

### Preparing the circuit board

An ultra-thin circuit board is required if the project is to fit inside the thin label space of a plastic ID-tag holder. A

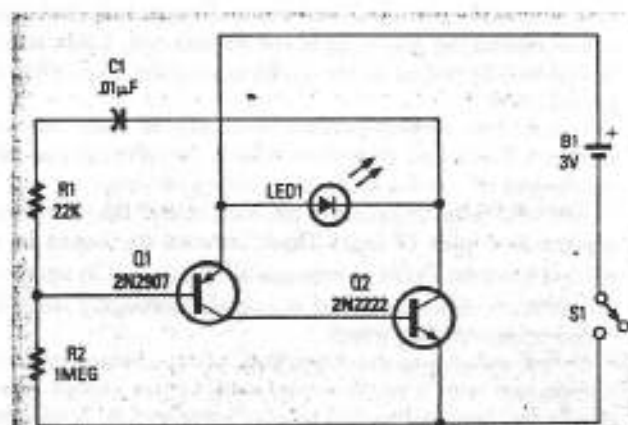


Fig. 1—THE KEY-CHAIN TRANSMITTER uses two transistors to generate a red or near-infrared beam that pulsates at approximately 725 Hz.



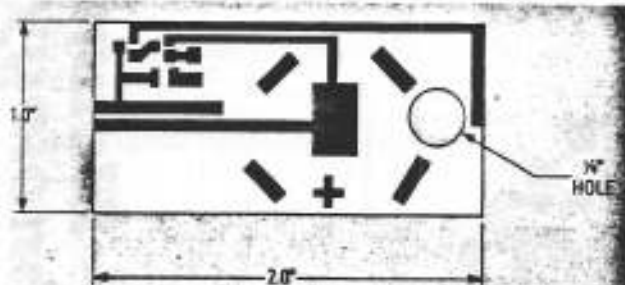


FIG. 2—USE THIS TEMPLATE as a general guide when making the printed circuit board.

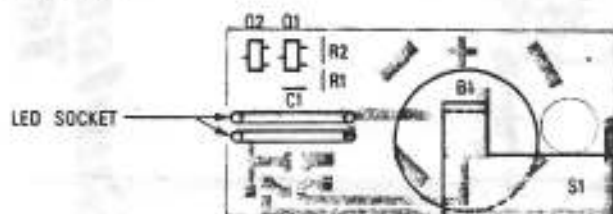


Fig. 3—THE COMPONENT LAYOUT is somewhat unusual because the LED's socket is made from thin tubing, while the battery is secured by four bumps of solder.

double-sided copper-clad board only 7-mils thick that is ideal for the project is available from the Edmund Scientific Co. (101 E. Gloucester Pike, Barrington, NJ 08007). A 12 × 18 inch sheet of the board, catalog number E35,652, sells for only \$2.50.

Although the transmitter is assembled on only one side of the board, keep in mind that SMC's can be mounted on both sides of a double-sided circuit board. The foil pattern for the board is shown in Fig. 2; use it as a general guide and apply the resist by hand using a small brush, which is a somewhat faster way to make a small board compared to using the photo-resist technique.

### Hand-made board

Use a pair of scissors to cut the board to size, then polish the foil with fine steel wool. Use a 1/4-inch hole punch to create the hole for the keychain, then place the various components including B1, a 2016 lithium coin cell, on the board in the approximate locations shown in Fig. 3. Mark their terminal or pin locations on the board with a pencil. Then remove the parts and pencil in the required terminal footprints and interconnection traces. Be sure to include four marks around the perimeter of the lithium cell. Later, solder bumps will be placed on the marks to keep the coin cell in its proper place.

Finally, use a sharp-pointed resist pen to trace over the penciled traces and footprints. Use a straightedge for best results and be careful to avoid smearing the ink.

After the resist dries, cover the back side of the board with a protective layer of tape. Then immerse the board in an etchant solution. Etching time can be speeded up by agitating the solution. After the board is etched, thoroughly rinse the board under running water.

Unless you plan to attach the SMC's to their footprints with conductive adhesive, the footprints of the etched board should be plated with a thin layer of solder or tin. A dip-and-dunk tin-plating solution is available from The DATAK Corporation (Guttenberg, NJ 07093). Alternatively, you can melt a thin layer of standard rosin-core solder over each footprint. For best results, the solder layer should be thin and flat.

### PARTS LIST—TRANSMITTER

R1—22,000 ohms, SMT size 1206  
R2—1 Megohm, SMT size 1206  
C1—0.1  $\mu$ F, SMT size 1206  
Q1—2N2907, PNP transistor, SOT-23 package  
Q2—2N2222, NPN transistor, SOT-23 package  
LED1—Light-emitting diode, near-infrared or super-bright red  
B1—3-volt lithium coin cell, type 2016  
Miscellaneous: circuit-board material, plastic keychain ID tag holder, solder, masking tape, wire, etc.

Therefore, after all the footprints are coated, use desoldering braid to remove excess solder and solder bridges.

### Installing the SMC's

The SMC's can be attached to the board with either conductive adhesive or solder. Both methods are described in detail elsewhere in this special section. If you use solder, the method of temporarily securing the SMC's in place with tape works best. Attach the SMC being soldered to the board with a bit of masking tape across one of its ends and solder the exposed terminal or pins with a small amount of solder. If necessary, make sure the SMC is flat against the board by pressing it down with a pencil eraser while the solder is still molten. Then remove the tape and solder the remaining terminal or pins.

After the SMC's are soldered in place, prepare a socket for the LED by cutting two 0.5- to 0.65-inch lengths of 62.5 mil (1/16 inch) O.D. brass tubing purchased from a hobby shop. Prepare the tubes for soldering by burnishing them with steel wool or fine sandpaper. Insert the wire from a bent paper clip in one end of one tube and melt a line of solder along its entire length. Repeat the procedure for the second tube. Then use the paper clip to hold one of the tubes in place over its footprint and remelt the solder on both the tube and the footprint until the tube is bonded in place. If necessary, apply some additional solder to the side of the tube away from the second tube's location. Repeat the procedure for the second tube. Be sure to keep solder from entering the open ends of

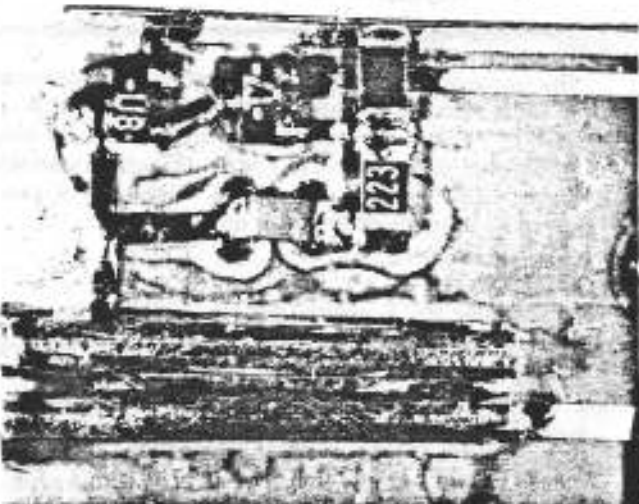


Fig. 4—THIS CLOSE-UP SHOWS how really small the components are. The transistor, labeled Q2, is actually smaller than the resistor and capacitor chips. The two "giant" horizontal tubes near the bottom are the LED socket.

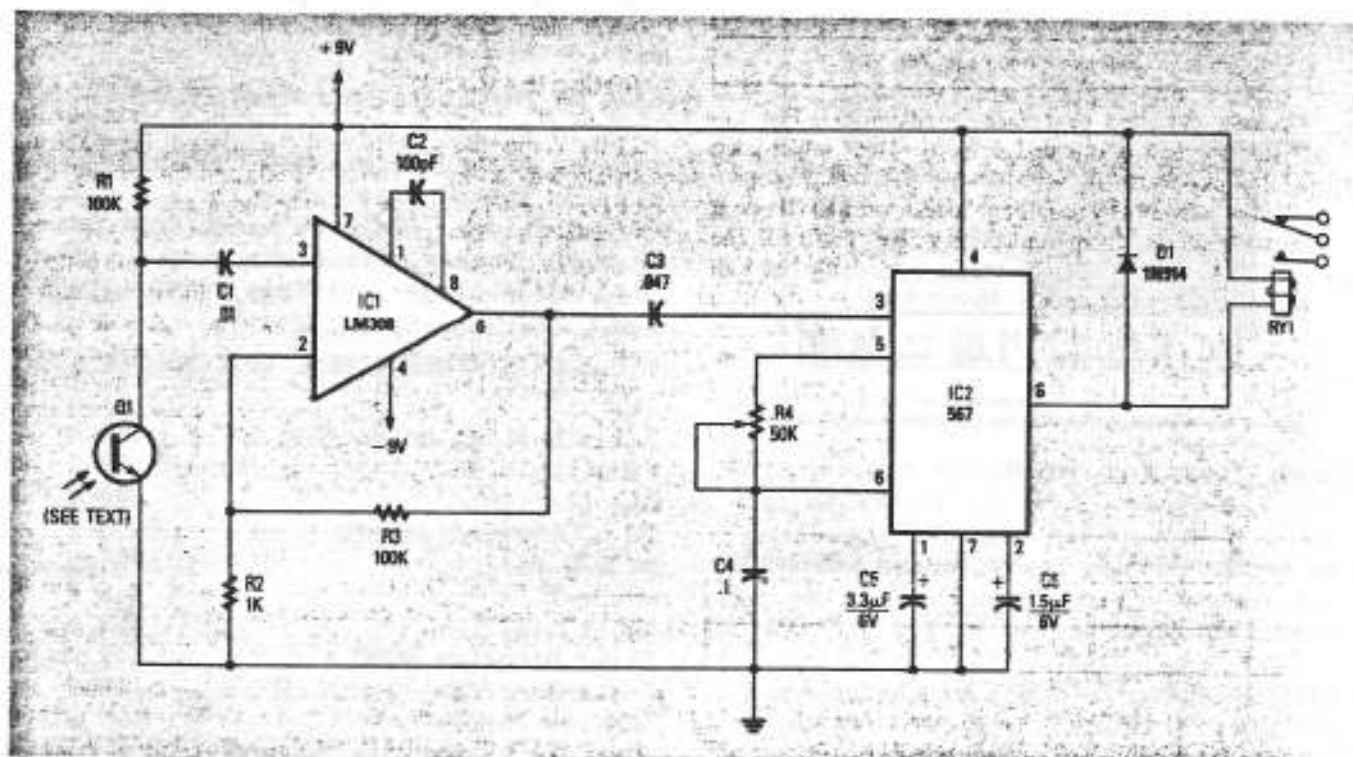


Fig. 5—IF YOU NEED A RED-LIGHT RECEIVER, try building this circuit. Most of what's needed is probably lying somewhere around your shop. Relay RY1 can be any low-current relay rated from 5 to 9-volts DC; such relays are called "sensitive relays."

the tube, especially the end closest to the edge of the circuit board. Fig. 4 shows the tubes, and the Q1/Q2 circuit soldered to the board.

Switch S1 is a *squeeze switch* made from an L-shaped piece of circuit board, as shown in Fig. 3. The exact shape of the switch is unimportant so long as it fits the allowed space. Solder a short length of wire-wrap wire to the lower side of the base of the L. With the exception of a narrow strip of exposed copper along the end of the lower side of the L (the dashed line in Fig. 3), cover both sides of the L with a clear tape. Solder the exposed end of the wrapping wire to the adjacent positive circuit-board foil. Then attach the copper L to the board with a hinge made from a strip of clear tape.

### Testing the circuit

Test the circuit before installing it in an ID-tag holder. First, insert the leads of a red AlGaAs super-bright LED into the LED socket (be sure to observe polarity). Then place B1 on the board (positive side down) and press the squeeze switch. The LED should glow. When the LED is pointed toward a phototransistor or solar cell connected to the input of an audio amplifier, a 725-Hz tone should be heard from the amplifier's speaker.

If the circuit is working properly, remove the LED and slip the circuit inside the ID-tag holder. You might want to first place a self-adhesive label on the back side of the board. You can leave the label blank or record the circuit's operating parameters on it. At least two kinds of plastic keychain ID-tag holders are available from office supply companies. The one used for this project, which has a retail cost of approximately 70 cents, has a 2-mm high slot at one end, opposite the hole for the keychain.

After the circuit is inside the holder, insert the LED into its holder through the 2-mm slot. The slot also simplifies removal of the circuit board: Simply push the board out with a

small screwdriver or a flat implement passed through the slot. Adjusting the squeeze switch can be tricky. If the LED stays on when the board is slipped inside the tag holder, bend the exposed copper end of the L slightly upward. If excessive pressure is required to close the switch, expose additional copper by removing a narrow strip of the tape with a knife.

### Suitable remote-control receivers

The keychain transmitter can be used to trigger various kinds of optoelectronic receivers. The circuit for a suitable receiver is shown in Fig. 5. The circuit uses a 567 tone decoder to help prevent triggering by any unauthorized transmitters.

In operation, pulsed infrared or visible light is received by Q1 and transformed into a pulsed voltage. Any NPN phototransistor can be used for Q1. The signal from Q1 is amplified 1,000 times by IC1, an LM308 high-input impedance operational amplifier, and is passed to IC2, a 567 tone decoder. Resistor R4 and capacitor C4 determine IC2's center frequency. Resistor R4 is a potentiometer rather than a fixed resistor to permit the receiver to be tuned. IC2's output drives RY1, a low-current relay.

The receiver can be assembled on a printed-circuit board using either conventional or surface-mountable components. Both IC1 and IC2 are available in small outline packages.

Test the receiver by pointing the transmitter at Q1 while carefully adjusting the receiver's R4. With R4's wiper set near its midpoint, the relay should pull in when Q1 is receiving the transmitter's signal. For best results, bright ambient light must not be allowed to strike Q1; otherwise, Q1 may become saturated and fail to respond fully, or at all, to incoming pulses from the transmitter. If ambient light proves to be a problem, place one or two pieces of developed color film in front of Q1 to serve as a near-infrared filter, and insert a near-infrared LED into the transmitter.

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**INTERNATIONAL** Lloyd's of London the world's pre-eminent insurer, rocked by huge losses from a series of man-made and natural disasters has become a poor investment. Until recently becoming a Lloyd's "name" or investor, was a virtual ticket into the upper crust of British society. Hundreds face the possible loss of their homes and nearly everything else they own. In the scramble to raise hard cash investors worldwide are turning to a special program to help names get the best price for their belongings, set up by Gurr Johns, the London appraisal house for art, jewelry, and antique cameras.

#### FREE CLASSIFIED

**WANTED:** Lens and mount for Minox Model II Enlarger. Also want original paper easel, reproduction attachment, and owner's manuals. Matthew Russel, 33 Woodridge Drive, Mendon, NY 14506. (716) 582-1319.

#### LETTERS

Dear Al,

I'd like to see 35mm subminis.

D. Waters

West Palm Bch, FL

Dear D. W.

There's so much information about them it would squeeze out the little guys. We'll try it now and then.

Al D.

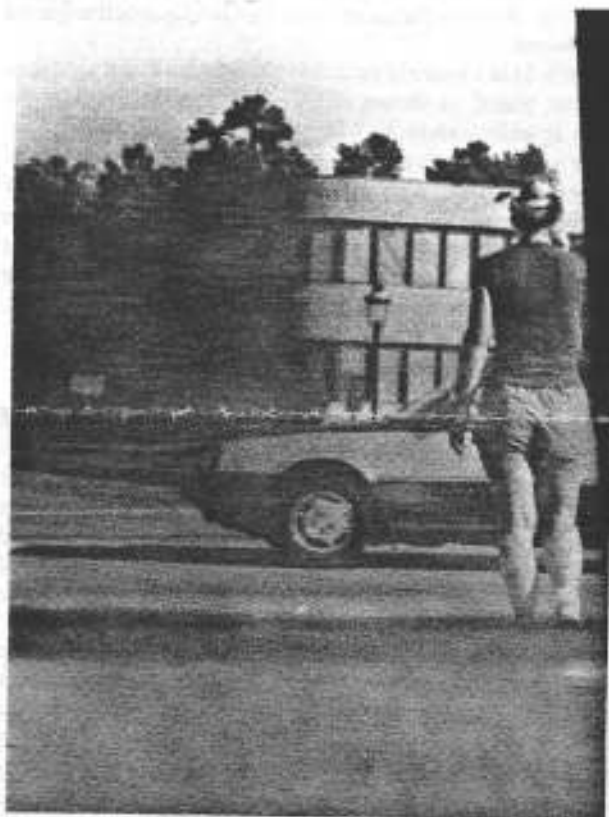
**COMING UP** PhotoProExpo, Washington, D.C., May 21 through 23.

**SEEN AT PMA** Photo Marketing Assn. trade show in Atlanta, two new high end 110 cameras from Vivitar, the Opus 10 and Opus 20. The 20 measures 4.3 x 2.2 x 1.3", weighs 3.5 oz. Features electronic programmed shutter, flash with auto-on auto-off, motor winder. Vivitar, 9350 DeSoto Ave., Chatsworth, CA. 91311.

#### THE SUBMINIATURE TIMES QUICKFINDER 6/93

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Minolta-16 QT	49 B
Minolta 110Z	99 K
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PK 420 kit	1595 B
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Tasco Bino/Cam	144 K
Tessina chrome	695 H

B Brooklyn Camera Exch. (718) 462-2892  
 H Hayden Photographics. (416) 862-8585  
 K KEH Camera Brokers. (404) 892-5522



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