



aperture to match the flashgun. A light meter in the flashgun cuts short the power of the flash when enough light has bounced back from the subject.

5) *Stopped-down aperture priority*: this is for old-style lenses and certain accessories that work with the lens aperture always 'stopped down' to the value used for taking the photograph. Modern lenses remain at the maximum aperture setting, other than at the instant the photograph is taken, so as to keep the viewfinder image as bright as possible.

6) *Manual*: both shutter speed and aperture are set by the photographer. This is useful for total control when a special effect or awkward lighting is involved.

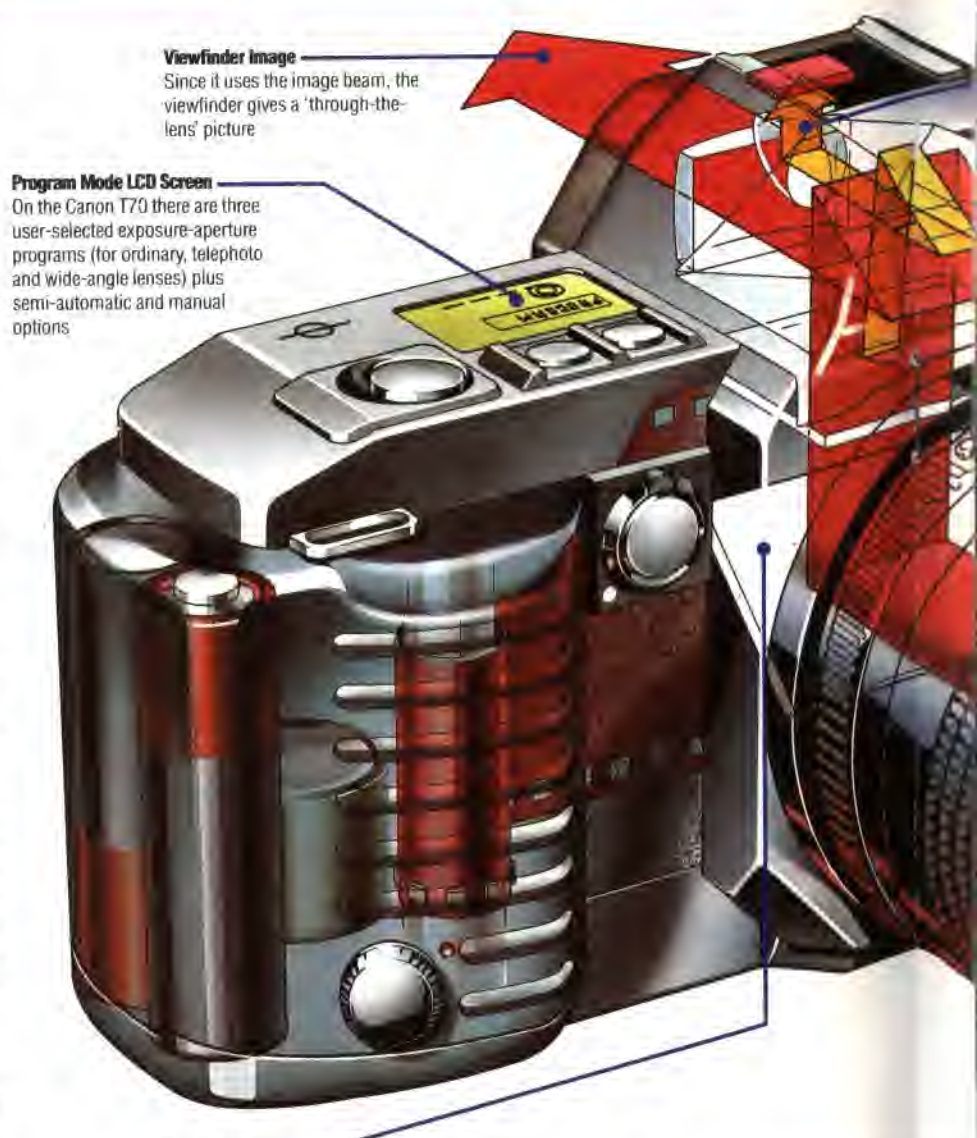
An electronic display inside the Canon A1's viewfinder tells the photographer what mode the camera is in and what values it has set for the shutter and aperture. The display uses LEDs so that it can still be seen in the dark.

Despite the general usefulness of the program mode on the Canon A1, it works to a fairly simple formula. This means, in a few cases, it does not pick quite the best possible combination. For example, if photographs were being taken in the late evening, the camera might select a shutter speed of 1/30 second and an aperture of f/2.8. Any photographs taken at a shutter speed slower than 1/60 second risk being spoiled by the slight movements of the photographer's hand (known as 'camera shake'). The camera flashes a warning of the danger of camera shake when its shutter speed goes below 1/60 second, yet the program does not select a larger aperture to allow the faster shutter speed.

### CANON'S COMPETITION

A number of rival companies have launched multi-mode cameras with built-in microprocessors. The Pentax Super A, retailing at £240, uses a slightly more sophisticated program than the Canon A1, which gives it a better combination of shutter speeds and apertures in both bright and dim light. In the 'late evening' situation we just described, the Pentax Super A would select a speed just below 1/60 second, so there would be less chance of camera shake. And the Nikon FA, manufactured by Canon's arch rival, automatically detects when a telephoto lens (135mm focal length or greater) is fitted, and accesses an alternative program. This is optimised to avoid camera shake with a longer lens by using faster shutter speeds and larger apertures.

Following the Nikon lead, Canon has used three alternative programs in its latest camera, the Canon T70. One is intended for ordinary lenses, one for telephoto lenses and the third for wide-angle lenses. However, the camera does not automatically recognise which lens is fitted, so the user has to select the appropriate program. This isn't necessarily a drawback, since it does allow a little extra creative control. For example, if you're shooting a fast moving subject with a wide-angle lens you can select the telephoto mode to get fast



**Viewfinder Image**  
Since it uses the image beam, the viewfinder gives a 'through-the-lens' picture

**Program Mode LCD Screen**  
On the Canon T70 there are three user-selected exposure-aperture programs (for ordinary, telephoto and wide-angle lenses) plus semi-automatic and manual options

**Spring Mirror**  
Directs the image beam into the viewfinder prism until shutter release is pressed

shutter speeds, and ensure that the action is frozen.

Another problem with automatic cameras is that they give an average exposure for the whole image, and the meter can be easily fooled by subjects with an extreme range of brightness in the image. For example, if a motorcycle is photographed against a sunset, the camera will tend to give the right exposure for the sun and make the bike much too dark. On the other hand, if the motorcycle were photographed against a black background, the camera would treat the subject as being much darker than it is and the photograph would probably be overexposed.

The Nikon FA, in a slightly higher price range at £410, uses a novel way to get around the problem. Instead of taking one measurement of the brightness of a scene, it measures five different parts of it. The FA then uses a microprocessor to compare the five readings with various 'standard

### Micro Photos

A purpose-built 8-bit CPU controls the overall operation of the Canon T70, assisted by metering and ISO chips. The crystal timing oscillator generates the clock synchron pulses and controls the length of the exposure. Spring-loaded contacts controlled by the metering IC set the aperture. An optional command module can be attached which gives automatic interval exposure (between one second and one day) and allows timing data to be written directly onto the negative

