

AN INEXPENSIVE MACROPHOTOGRAPHY SETUP  
FOR AMPHIBIAN EMBRYOS

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The relatively inexpensive macrophotography setup shown was devised for the purpose of producing high resolution photographs of objects as small as embryos with modest effort. The apparatus incorporates a 35 mm camera back, a bellows unit and extension tubes, various inexpensive, interchangeable macro lenses (Spiratone, Inc.), and paired electronic flash units synchronized to the focal plane shutter of the camera.

Focusing and magnification are accomplished by adjustments in the film to lens distance and in the lens to subject distance (using the bellows-extension tubes). The use of either fiber optics or a focused, low-wattage microscope illuminator aids sharp focusing without producing excessive heat. Paired electronic flash units mounted to an adjustable bracket on the ring stand and connected to the camera (set at 1/60 sec. shutter speed) through the synch receptacle (X) provide ample illumination. The angle of illumination and subject to flash distance can be modified by bracket adjustments. Brief flash duration (1/1,000 - 1/3,000 sec.) eliminates the usual problems of subject movement and vibration associated with long exposures at high magnification. Test strips of film should be made by photographing a ruler at regular, stepped magnifications (lens to film distances) and illumination levels (subject to flash distances). The test strips can then be contact-printed in series on a few sheets of photographic paper (marked frame by frame with the magnification and illumination "distance" data) and kept near the unit for quick exposure reference. Objects should be photographed on a neutral, texture-free background material. Close the lens one stop beyond reference value when photographing very light colored objects; open one extra stop for very dark objects.

Components are: 1) ring stand column, 2) 35 mm camera back, 3) shutter speed selector, 4) bellows unit, 5) cable release, 6) extension tubes, 7) synch cord, 8) "T" adapter, 9) flash bracket, 10) 75 mm macro lens, 11) electronic flash units, 12) AC-DC power cord, 13) stage, and 14) ring stand base.





