



US006374053B1

(12) **United States Patent**  
**Raposa et al.**

(10) **Patent No.:** **US 6,374,053 B1**  
(45) **Date of Patent:** **Apr. 16, 2002**

(54) **UNDERWATER STROBE LIGHT CONTROL CIRCUITRY**

(75) **Inventors:** **John R. Raposa; Daniel P. Thivierge,**  
both of Warren, RI (US)

(73) **Assignee:** **The United States of America as**  
**represented by the Secretary of the**  
**Navy, Washington, DC (US)**

(\*) **Notice:** Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **09/565,236**

(22) **Filed:** **Apr. 28, 2000**

(51) **Int. Cl.<sup>7</sup>** ..... **G03B 17/00**

(52) **U.S. Cl.** ..... **396/263; 396/429; 324/179**

(58) **Field of Search** ..... **396/4, 25, 28,**  
**396/155, 180, 263, 429; 324/178, 179**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

- 3,787,770 A \* 1/1974 Cote et al. .... 324/178
- 4,385,227 A \* 5/1983 Bridges ..... 377/2

\* cited by examiner

*Primary Examiner*—David M. Gray

(74) *Attorney, Agent, or Firm*—Michael J. McGowan;  
James M. Kasischke; Prithvi C. Lall

(57) **ABSTRACT**

A device for controlling a strobe light in underwater high speed photography in a first aspect includes a plurality of spaced break screen or sense coil members, a projectile for launch through the series of break screen or sense coil members, a camera having a shutter opened at a predetermined timing prior to release of the projectile and closing at a predetermined timing subsequent to release of the projectile, and a strobe light opposed to the camera for illumination at a time when the projectile passes in front of the camera. A trigger device, such as a break screen or sense coil, is positioned immediately up-range of the camera. With a time delay programmed into a Programmable Array Logic (PAL), a control circuit receives the trigger information and creates a timed signal to control the illumination of the strobe light. In accordance with another aspect of this invention, the control circuitry includes discrete logic devices programmed such that illumination is controlled by the control circuitry at the exact moment the projectile passes the lens of the camera.

**9 Claims, 3 Drawing Sheets**

