

## 14510 HAND STROBOSCOPE, 3 ROW

### Purpose:

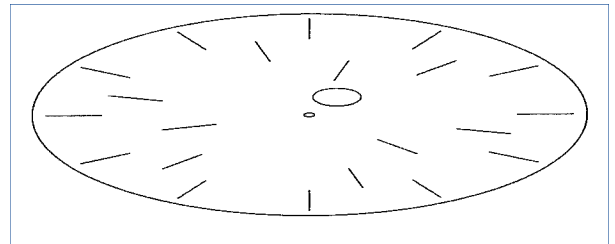
To examine repetitive motion in such a way as to make the object viewed appear to be stationary.

### Required Accessories

Flap of tape, timer

### Assembly:

Place one washer from the hardware package over the screw and then insert the screw through the hole in the center of the strobe disk. Place the second washer over the tip of the screw. Place the pilot hole in the end of the handle over the screw then, with a screwdriver, tighten the screw into the handle. Do not over tighten. The disk should be free to spin about the shaft of the screw.



### Operation:

To use the Hand Stroboscope, hold the unit in one hand so the handle points away from you. With the other hand, place your index finger in the round hole in the disk and begin to spin the disk at a constant speed while looking at a particular motion under investigation. When the rotational speed is correct, oscillatory (or periodic) motion will appear to "slow down" or even "stop".

The frequency of the strobe can be adjusted by changing the rate of rotation and also by moving the viewing eye up and down to find a convenient row. The top (outer) row has 12 slots, the next has 6, and the inner one has 3 slots. There is no need to stop to make other adjustments. The slots are evenly spaced around the disk, so only a constant rate of rotation is required for satisfactory operation.

### Procedure:

Viewing an object at twice the frequency of its characteristic behavior will result in seeing two images of the object. Slowing down from that disk rotation to the very next occurrence of a stationary image, assures the operator that the strobe frequency is properly synchronized and matches the frequency of the object. Viewing at a sub-multiple of the frequency of the object will still present a stationary image, but it will not be as bright, and the frequency of the strobe does not match the frequency of the object. It is best to work with a partner who can find the number of seconds that it takes for some number of revolutions of the disk while the operator keeps the disk synchronized with the behavior of the object. Sometimes a flap of tape helps the partner in counting revolutions.

### Calculations:

The frequency of the properly synchronized strobe when multiplied by the number of slots in use gives the frequency of the object viewed, or:

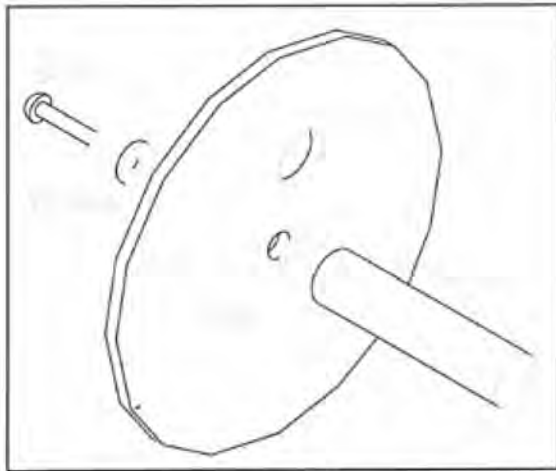
$$\text{Freq. of object} = \frac{\text{Revs} \times \text{Slots}}{\text{Seconds}}$$

**Time Allocation:**

To prepare this product for an initial experimental trial should take less than five minutes. Actual experiments will vary with needs of students and the method of instruction, but are easily concluded within one class period.

**Feedback:**

If you have a question, a comment, or a suggestion that would improve this product, you may call our toll free number.



**Figure 1**

**Exploded diagram of the Hand Stroboscope.**

