# Model SR540 Optical Chopper $1095 (U.S. List)
## - 4 Hz to 3.7 kHz -


### FEATURES

- VERY LOW PHASE JITTER
- SINGLE AND DUAL BEAM EXPERIMENTS
- SUM AND DIFFERENCE REFERENCE OUTPUTS
- SYNTHETIC CHOPPING TO 18.5 kHz
- BOLT CLAMP OR ROD MOUNTING

The model SR540 light beam chopper will handle common chopper requirements as well as dual beam and intermodulation experiments. The SR540 has a voltage control input, four-digit frequency display, ten-turn frequency control, and two reference outputs with selectable operating modes. These features were perviously available only in choppers costing much more. The SR540 can be mounted with bolts, clamps, or on a rod.

### SPECIFICATIONS

| | |
|---|---|
| **Chop Frequency** | 4 Hz to 400 Hz with 5/6 slot blade<br>400 Hz to 3.7 kHz with 25/30 slot blade |
| **Frequency Stability Long Term Frequency Drift** | 250 ppm/°C typical<br>< 2%, 100Hz < f < 3700 Hz |
| **Phase Jitter** | 0.2°rms from 50 Hz to 400 Hz<br>0.5°rms from 400 Hz to 3.7 kHz |
| **Frequency Display** | 4-digit, 1 Hz resolution, 1 Hz accuracy |
| **Frequency Control** | 10-turn pot with 3 ranges:<br>4 Hz to 40 Hz<br>40 Hz to 400 Hz<br>400 Hz to 3.7 kHz |
| **Input Control Voltage** | 0 to 10 VDC for 0-100% of full scale.<br>Control voltage overrides requency dial. |

| **Reference Modes** | **Switch** | **Left BNC** | **Right BNC** |
|---|---|---|---|
| | up | $f_{inner}$ | $f$ |
| | middle | $5 \times f$ | $f$ |
| | down | $f + f_{inner}$ | $f - f_{inner}$ |
| **Dimensions** | Controller 7.7" x 5.1" x 1.8"<br>Chopper Head 2.8" x 2.1" x 1.0"<br>Blade Diameter 4.0"<br>Control Cable Length 6 feet | | |
| **Power** | 100/120/220/240/ VAC<br>50/60 Hz<br>12 Watts | | |
| **Warranty** | One year parts and labor on materials and workmanship.<br>*90 days on motor. | | |

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# APPLICATIONS

## SINGLE BEAM EXPERIMENT

In this application, a single optical beam is chopped by the outer row of slots, and the reference output from the right BNC is used to lock the lock-in amplifier to a chop frequency (figure 1). Note that the inner row of slots could be used, in which case the reference from the left BNC would be used. In either case, the REFERENCE MODE switch is in the "up" position.

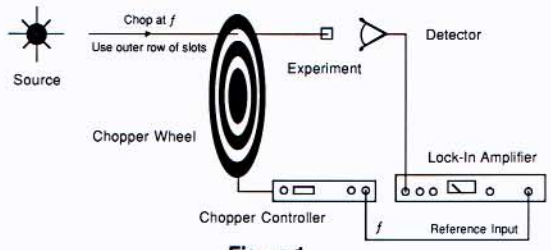



**Figure 1**

## DUAL BEAM EXPERIMENT

In this arrangement, the output from a single source is split in two and chopped at two different frequencies by the same chopper wheel (figure 2). One of the beams passes through the experiment, while the other beam, a reference beam, passes through a control arm. The beams are recombined and sent to the same detector.

Two lock-in's are used to detect the two signals which are at different frequencies. The signal at $f$ corresponds to the control arm, the signal at $f_{inner}$ is the response from the experimental arm. If the detected signal in the experimental arm is ratioed to the detected signal in the control arm, then effects due to charging source intensity and detector efficiency are removed.

Also note that each beam passes through one beam splitter, reflects on one beam splitter, and reflects off one mirror, so that effects due to these components are cancelled in the ratio output.

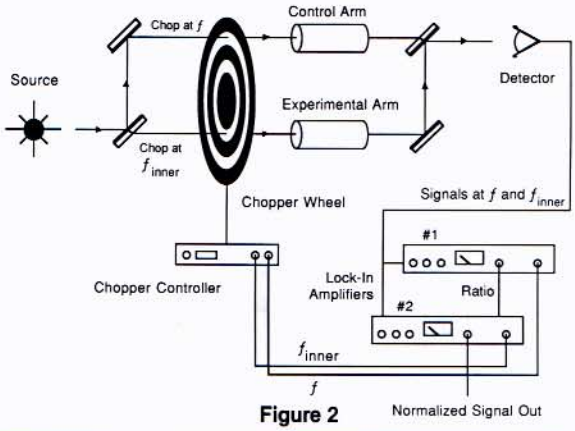
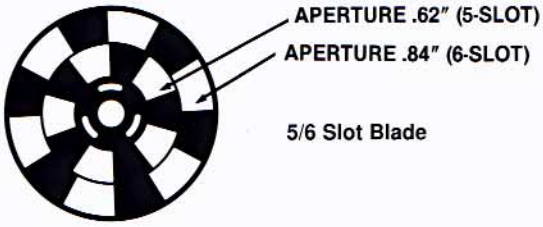
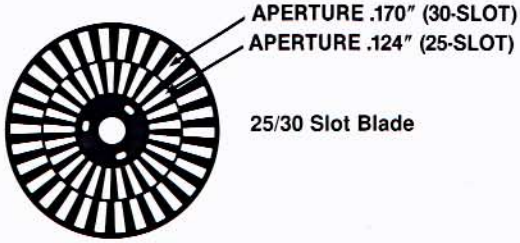
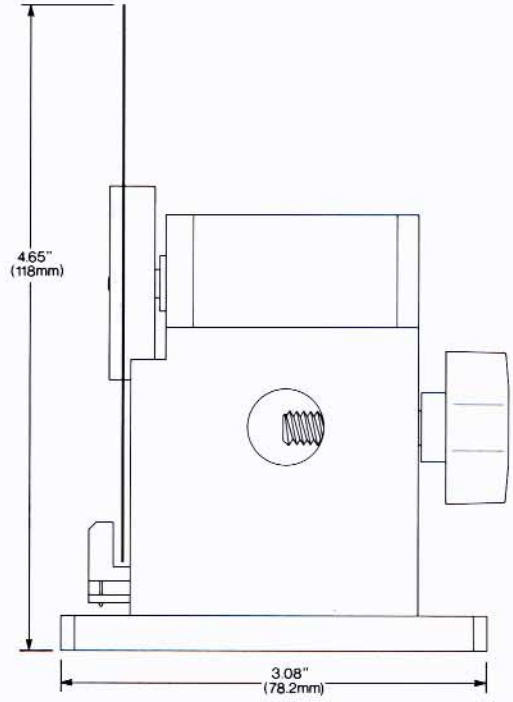



**Figure 2**




**Chopper base measures 2.70 x 3.08 x .25" with mounting slots on 2.0" centers.**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