

## Free Space Acousto-Optic Q-Switches



### KEY FEATURES

- High Damage Threshold
- High Laser Peak Powers
- Lower Noise Performance
- Up to 80 MHz RF Frequency
- Analog Light Intensity Modulation
- Digital Switching On/Off
- Water or Thermoelectrically cooled
- Custom Configurations Available

### APPLICATIONS

- Laser Marking, Laser Cutting
- Pulsed Holography
- Lithography
- 3D Microfabrication
- Medical (Surgery)
- Optical Data Storage
- OEM Designs

### Free Space Acousto-Optic Q-Switches



Brimrose offers the most complete line of Acousto-Optic Q-switching systems for industrial and laboratory applications. The Brimrose free space Q-switches are designed for the highest conversion efficiency of RF energy into acoustic energy by attaching the transducer to the crystal with an advanced vacuum metallized process.

Q-switches are special modulators designed for use inside laser cavities. They are fabricated from high optical quality Fused Quartz, Flint Glass, and Tellurium Dioxide, or other acousto-optic materials with Brewster cut optical faces or durable hard oxide AR coatings for high optical power applications.

The Q-Switch Driver is an RF generator utilizing a micro-controller based phase-locked loop (PLL) synthesizer. The frequency can be varied within the RF bandwidth of the AO Q-Switch.



**Brimrose Corporation of America**

## Free Space Acousto-Optic Q-Switches Specification

Model #	FSQ-24-2-BC	FSQ-27-5-BC	FSQ-80-5-BC	TEQ-27-4-BC	TEQ-80-20-BC	
<b>Substrate</b>	SiO <sub>2</sub>			Tellurium Dioxide (TeO <sub>2</sub> )		
<b>Laser Wavelength (nm)</b>	Brewster Cut			Brewster Cut		
	1064 nm		1060 nm	2940 nm	800 nm	
<b>Active Aperture (mm)</b>	2 mm		1 mm	1.5 mm	3mm	
<b>Center Frequency (MHz)</b>	24	27	80	27	80	
<b>Digital Modulation Bandwidth (MHz)</b>	2	5	6.5	3dB Bandwidth		
				4	20	
<b>Optical Transmission (%)</b>	99.8		>99.5			
<b>Maximum Diffraction Efficiency (%)</b>	30		25	>50	>65	
<b>Rise Time (nsec)</b>	100		85	150/630	80/400	
<b>Acoustic Velocity</b>	5.96E+3 m/sec			4.2E+3 m/sec		
<b>Wave Front Distortion</b>	$\lambda/10$					
<b>Separation Angle</b>	Separation Angle @1064 nm			1° @ 2940 nm	0.9° @ 800 nm	
	5 mrad		14mrad			
<b>Input Impedance</b>	50 ohms					
<b>Optical Polarization</b>	Linear (Perpendicular to acoustic wave)			Linear	Perpendicular to Acoustic Wave	
<b>V.S.W.R.</b>	2.1:1					

Other materials and models are available.

For more information, please check the Brimrose website or contact us at [office@brimrose.com](mailto:office@brimrose.com).

## Fixed Frequency Driver Specification

Driver Model #	FFH-XX-B2-FY	FFH-XX-B3-FY
<b>Frequency (MHz)</b>	XX MHz (compatible with the AO Device)	
<b>Frequency Control</b>	Quartz crystal referenced phased locked loop.	
<b>Frequency Accuracy (%)</b>	0.015%	
<b>Harmonic Content (dBc)</b>	≤ - 15	≤ - 10
<b>Frequency Stability</b>	0.0015% minimum after 15 minutes warm-up	
<b>Output Power</b>	Power level is optimized for compatible AO device.	
<b>Output Protection</b>	Power amplifiers used will tolerate an infinite V.S.W.R. without damage. Rated power is available only when a proper RF load is connected.	
<b>Internal Pulse Generator</b>	N/A	Pulse width: 100 to 500 nsec ± 10% adjustable, pulse generator with 5000 Hz to 100 KHz rep rate adjustable. Front panel switch for pulse/standby operation.
<b>Modulation</b>	TTL Compatible	Pulse modulation, pulse monitor output via front panel BNC connector.
<b>Rise/Fall Time</b>	To match AO Q-switch requirements	
<b>External Modulation Input</b>	330 Ω; 0-5 V	Internal or external trigger
<b>Operating Power</b>	90-240 VAC ± 25% 50-60Hz; 55W max.	
<b>Enclosure</b>	The unit will be packaged in a 190 mm (7.5 inch) wide by 90 mm (3.5 inch) high by 220 mm (8.75 inch) deep instrument case. The internal components are fan-forced air-cooled. The size is exclusive of connectors. A detachable AC line cord and RF cable are provided.	
<b>Environmental</b>	Nominal Laboratory Conditions: Maximum temperature is +35° C. The unit is not sealed against moisture or condensing humidity.	

The AO Q-Switch is provided with the associated RF drivers, and can be customized according to user requirements. OEM Packaging is also available.

In addition to the standard product shown, customer configurations are available for specialized applications.

If there are any questions, please contact Brimrose at [office@brimrose.com](mailto:office@brimrose.com).