

Free Space Acousto-Optic Cavity Dumpers/Pulse Pickers



KEY FEATURES

- Free Space
- High Diffraction Efficiency
- Small Size
- UV-VIS Optical Range
- Brewster Angle Incidence
- High Modulation Bandwidth
- Up to 400 MHz Frequency
- Higher Repetition frequencies
- Laboratory Version
- Custom Configurations Available

APPLICATIONS

- Mode-Locked Lasers for Generating Ultrashort Pulses with Higher Pulse Energies
- Injection and Extraction of Pulses in a Regenerative Amplifier
- OEM Designs

Acousto-Optic Cavity Dumpers/Pulse Pickers



The Brimrose Free Space Cavity Dumper is typically used in a mode-locked laser cavity to separate a single optical pulse from the pulsed energy circulating. As a result, nearly all the laser energy is dumped out of the resonant cavity in the form of a single optical pulse. A cavity-dumper offers high peak power and higher repetition frequencies.

The Brimrose high-speed Pulse Picker is used typically in high-speed optical pulse picking external to a laser cavity and is designed to extract single pulses from a fast train of laser pulses up to 100 MHz – few GHz pulse repetition rate, and re-direct the pulse into a different optical path. A cavity-dumped laser, a pulse picker is often called a cavity dumper, extracts the circulating pulse from the cavity in only every N^{th} round trip. The Pulse Picker is in most cases either an electro-optic modulator or an AO Modulator, combined with a suitable fast electronic driver.

The Brimrose cavity dumper/pulse picker RF driver is designed to provide a pulse of RF energy to an AO modulator used either internal to a laser cavity (Cavity Dumper) or external to a laser (Pulse Picker) and is used to efficiently divert a train of light pulses onto a different chosen path.



Brimrose Corporation of America

Free Space Acousto-Optic Cavity Dumper Specification

Model #	TECD-380-95-543	TECD-380-50-780	TECD-380-95-800	FSCD-250-54-BR-400	FSCD-380-92-BR-800
Substrate	Tellurium Dioxide (TeO ₂)			Fused Silica (SiO ₂)	
Laser Wavelength (nm)	543	780	800	250-450	800
Active Aperture (mm)	0.30		0.10		
Center Frequency (MHz)	380			250	380
3dB Modulation Bandwidth (MHz)	95	50	95	54	92
Optical Transmission (%)	>95		>98		
Maximum Diffraction Efficiency (%)	70% @ 1W	40% @ 1W	60% @ 2W	70% @ 5W	30% @ 10W
Rise Time (nsec)/ Beam Spot (μm)	10 nsec/31 μm	20 nsec/62 μm	5.8 nsec/29 μm	10 nsec/72 μm	6 nsec/42 μm
Acoustic Velocity	4.2E+3 m/sec			5.96E+3 m/sec	
Wave Front Distortion	λ/10				
Bragg Angle	1.4 mrad	2.0 mrad	36 mrad	9 mrad@ 450 nm	25 mrad
Input Impedance	50 ohms				
Optical Polarization	Linear	Linear	Linear	Linear (Vertical)	Linear (Vertical)
V.S.W.R.	2.1:1				
Case Type	#120				

For more information, please check the Brimrose website or contact us at office@brimrose.com.

Free Space Acousto-Optic Pulse Picker Specification

Model #	TEPP-200-40-BR	FSPP-380-76-BR
Substrate	Tellurium Dioxide (TeO ₂)	Fused Silica (SiO ₂)
Laser Wavelength (nm)	700 - 1200	
Active Aperture (mm)	0.10	
Center Frequency (MHz)	200	380
Digital Modulation Bandwidth (MHz)	40	80
Optical Transmission (%)	> 99.8	
Diffraction Efficiency (%)	~ 40-50	> 25
Rise Time (nsec)	14	6
Acoustic Velocity (m/sec)	4.2E+3	5.96E+3
RF Power Level (Watt)	2 (50% duty cycle max.)	10 (10% duty cycle max.)
Bragg Angle / Separation Angle (mrad)	29/59	25/50
Wave Front Distortion	$\lambda/10$	
Input Impedance (ohms)	50	
Optical Polarization	Linear	
V.S.W.R. (%)	2:1	
RF Connector	SMA	

Both case types allow for Brewster angle adjustment of the input optical beam. The device should operate only with pulsed RF power. The max CW RF power that can be used without damage is 1 Watt.

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Fixed Frequency Driver Specification

Driver Model #	FFJ-XX-B3-FY
Frequency (MHz)	XX MHz (compatible with the AO Device)
Frequency Control	Quartz crystal referenced or externally referenced phase locked loop, user selectable.
Frequency Accuracy (%)	0.015%
Harmonic Content (dBc)	≤ -15
Frequency Stability	0.0015% minimum after 15 minutes warm-up
Output Power	Power level is optimized for compatible AO device.
Output Protection	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.
Modulation	Pulse modulation is via an internal pulse generator with adjustable pulse delay. Pulse generator may be set for internal or external trigger mode with a rep rate of 50 KHz to 12 MHz. Pulse width is variable from 7 nsec to 150 nsec. Pulse delay is adjustable from 0 to 10 nsec.
Rise/Fall Time	To match AO Cavity Dumper/Pulse Picker requirements
Modulation Type	Analog amplitude modulation or TTL compatible
External Modulation Input	50 Ω ; 0-1 V or 330 Ω ; 0-5 V
Operating Power	90-240 VAC \pm 25% 50-60Hz; 55W max.
Enclosure	The unit will be packaged in a 190 mm (7.5 inch) wide by 100 mm (4 inch) high by 220 mm (8.75 inch) deep instrument case. The rear panel heat sink increases the depth to a maximum of 240 mm (9.75 inches). The size is exclusive of connectors. A detachable AC line cord and RF cable are provided.
Environmental	Nominal Laboratory Conditions: The maximum temperature is +35° C. The unit is not sealed against moisture or condensing humidity.

OEM Packaging is also available.

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

For questions, please contact Brimrose at office@brimrose.com.