

1040 Series Pockels cell light modulators are designed for high speed laser shutter and pulse chopper applications external or internal to the laser cavity. They are also utilized as Q-Switches, cavity dumpers and polarization rotators. The basic mechanical design is configured to accept a variety of connection devices to meet most system requirements.

Basically capacitive in impedance, they utilize low inductance, wide copper tab leads to minimize device RC and L/R time constants thereby allowing switching times as fast as 300 picoseconds in 10 millimeter aperture models. Miniature banana pins, useful for direct connection to printed circuit board drivers, as well as N, BNC, HN, MHV and SHV type connectors for cable impedance matching are available. For capacitive or source terminated use, tab leads are located on one side while the "straight through" configuration, with matching input and output copper tab leads, is used for load terminated applications.

The 1040 Series mechanical configuration yields the lowest capacitance devices for a given aperture size. It facilitates experimentation and impedance matching with transmission lines, Blumlein structures, spark gaps, and solid state FET or avalanche transistor type drivers.

Low capacitance of both single and dual crystal types simplifies their use with resonated electrical drives in UHF applications. Dual crystal types operate at one half the voltage of single crystal types.

Crystals used in the 1040 Series are KD\*P ( $98 \pm D_2\%$ ,  $KD_2PO_4$ ) grown and fabricated at Lasermetrics. They are selected to be free from strain, stria, inclusions, lowest residual birefringence and wavefront distortion. The standard optical finish on crystals is: flatness  $1/8$  wave; parallelism 10 arcseconds. Windows are bubble and strain-free fused quartz with a 10-5 optical finish. Wedged crystals and windows as well as integrally mounted polarizers, antireflection coatings and index matching fluids are available options.

Sol Gel antireflection coatings can be applied to crystals for highest peak and average power applications. Sol Gel coatings are extremely efficient, having reflection losses of 0.05% per surface. Damage threshold for Sol Gel coatings is at least as high as that of the KD\*P crystal material. They are available for the wavelength range of 532 to 1100 nanometers.

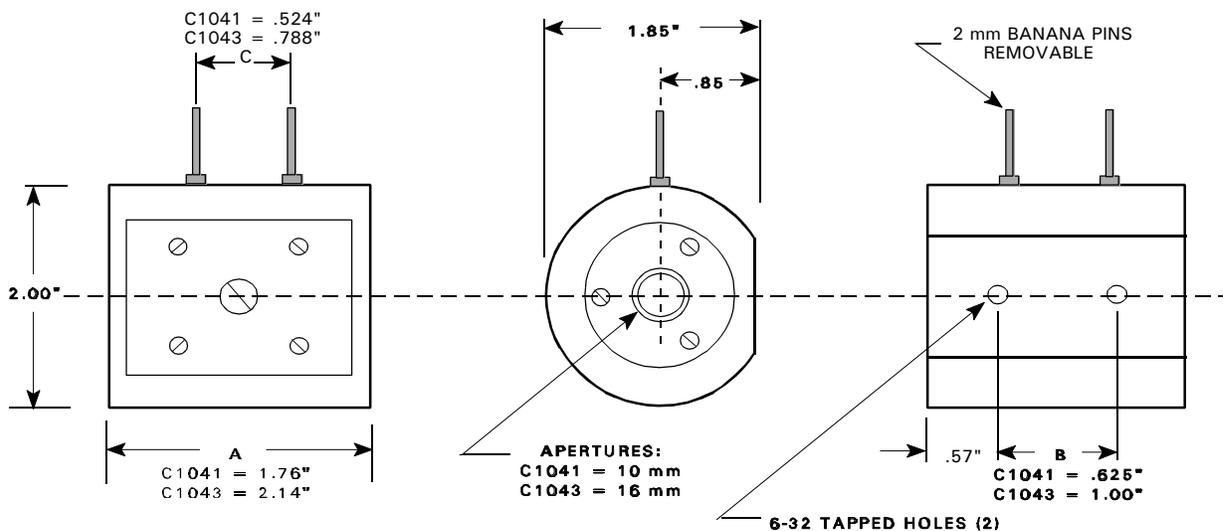
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### 1040 SERIES - NOMINAL SPECIFICATIONS

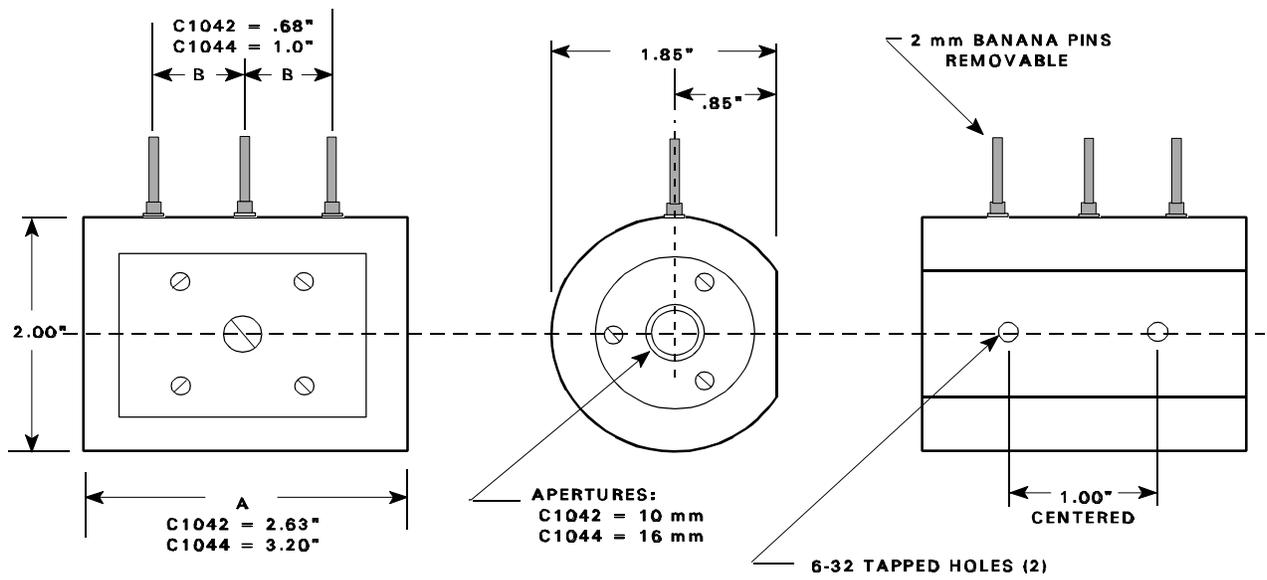
MODEL	1041	1043	1042	1044
Aperture Diameter, mm	10	16	10	16
Number of Crystals	1	1	2	2
Crystal Material	98.5% + % Deuterated D-KDP KD*P)			
Peak Optical Power Density Capability, Uniform Beam, No Hot Spots, sol gel coatings	750 Megawatts/cm <sup>2</sup> for pulses < 20 nsec wide 10 Gigawatts/cm <sup>2</sup> for pulses < 500 psec wide 20 Gigawatts/cm <sup>2</sup> for pulses < 100 psec wide			
λ Range for Peak Power Density	400 to 1100 nanometers			
Transmission, 400 to 1064 nm	98%	98%	95%	95%
Quarter Wave Retardation Voltage kV @694 nm kV @1064 nm	2.1 3.2	2.2 3.3	1.1 1.7	1.2 1.7
Extinction Ratio (Contrast Ratio), Full Aperture Beam, @633 nm	1000:1	800:1	800:1	700:1
Rise Time, 10% to 90%, picoseconds	300	350	450	500
Capacitance, picofarads	5	11	8	17
Weight, kilograms	0.18	0 18.	0.22	0.22

### CONFIGURATIONS AND DIMENSIONS

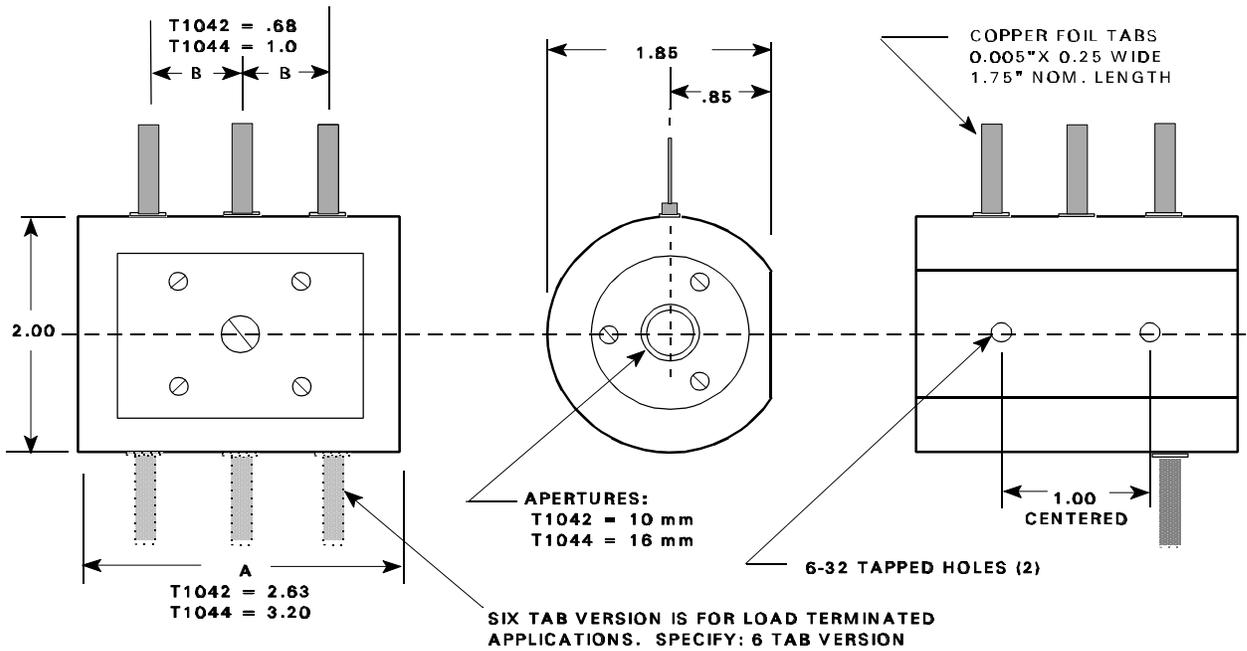
Contact Engineering Sales for details on available connectors and configurations



### MODELS 1041 & 1043 SINGLE CRYSTAL MODULATORS

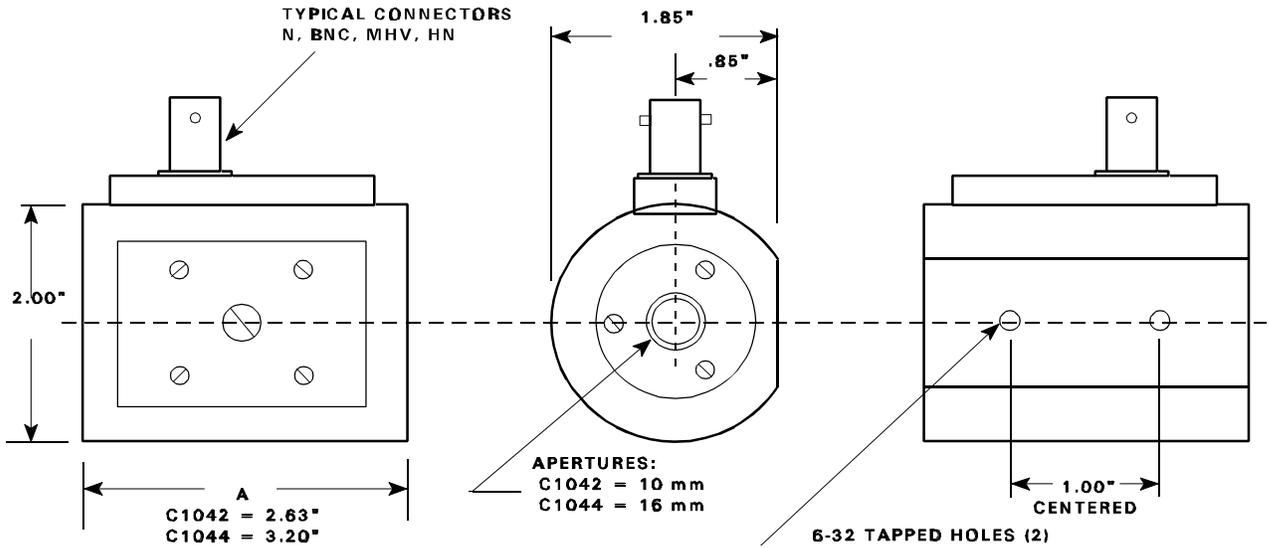


**MODELS C1042 & C1044 DUAL CRYSTAL MODULATORS**



**MODELS T1042 & T1044 DUAL CRYSTAL MODULATORS  
WITH COPPER TAB LEADS**

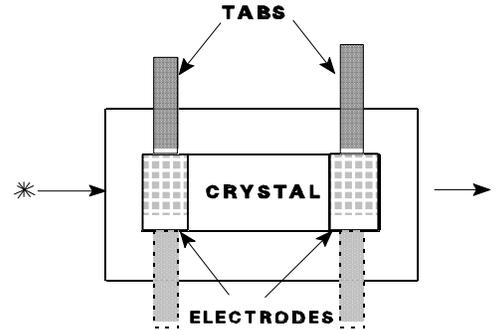
**SHOWN: MODELS MHV1042 & MHV1044 DUAL CRYSTAL MODULATORS WITH MHV CONNECTORS. ALL MODELS IN THE 1040 SERIES ARE AVAILABLE WITH A VARIETY OF CONNECTORS AND CONFIGURATIONS.**



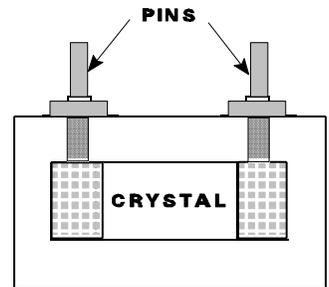
### Terminal & Electrode Configurations

(Note: coaxial connectors are available on all models)

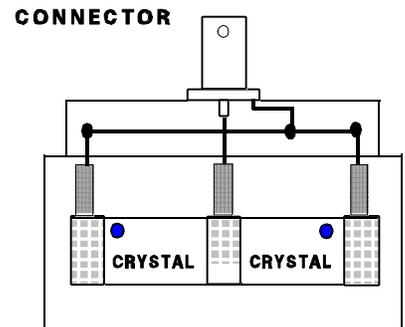
Copper tab leads minimize lead inductance and rise time. For transmission line connection, tabs can be integrated on both sides of the crystal housing for soldering directly to the input driving and output load cables. The output cable is usually terminated with a resistor which matches the cable characteristic impedance, thus preventing electrical reflections.



Miniature Pin Connectors provide the same electrical configurations as tabs. Pin connectors are preferred for ease and reliability of connection. Mating connectors are supplied with the Pockels cell and are also available from electronic supply stores. Standard housing connectors are female. Male connectors (As indicated) are also available standards items.



**Dual Crystal Configurations:** Copper tab leads, miniature pin connectors, coaxial connectors or cables. Crystals are optically in series and electrically in parallel. The dual crystal configuration reduces the required drive voltage by a factor of two compared to a single crystal device since each crystal contributes  $\frac{1}{2}$  of the polarization rotation necessary for rotating the input plane of polarization. Note that for a given aperture size, housing & crystal dimensions are identical for all configurations. Dots on the crystals indicate positive direction of the Z crystallographic axis.



Three Electrode, Double Length, Single Crystal units with three independent electrodes are available for specialized switching applications. The configuration is similar to a dual crystal device (shown to the right) but utilizes a double length crystal and each electrode is attached to separate tab leads or pin connectors.