



420 N Bonita Ave.  
Tucson, AZ USA 85745  
phone: +01 (520) 884-8821  
e-mail: sales@specinst.com

Quotation # 007452-00

07/10/2021

Quoted To:

Instituto de Astronomia, UNAM  
Km 103 Carretera Tijuana-Ensenada  
Col. Pedregal Playitas  
Ensenada B.C. 22860  
Mexico

Quotation Valid Thru : 12/28/2021

Terms : See Below

FOB: Ex Works (EXW) Tucson, AZ USA

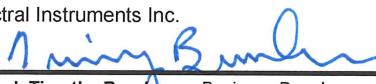
Attention: Alan Watson

Phone: + 20-222-333-14

Item	Part / Rev / Description / Details	Quantity	Unit Price	Extended Price
001	<p>0000</p> <p><b>Spectral Instruments 1110S Cryo-Cooled CCD Camera System</b></p> <p>1110S cryo-cooled CCD camera system with a backside-illuminated Teledyne e2v 231-84-1-F21 (4k x 4k, 15µm pixel) Grade 1 CCD sensor, with deep depletion silicon, an Astro Multilayer-2 coating with Anti-Etalon process fringe suppression and comes in a standard ceramic-PGA package. The CCD is tested for cosmetic quality to the Teledyne e2v published specifications for a Grade 1 CCD231-84-1-F21 CCD sensor. The camera head window is fused silica and is Red ML BBAR coated, &lt;1% from 480nm-1000nm and &lt;0.5% from 600nm-900nm, and will have 9.06 mm from inside of the window to the CCD sensor. The camera digitizes the CCD from four, two or one port(s) with 16-bit digitization.</p> <p>The camera cools the CCD to an operating temperature of -100°C to -110°C with a cryo cooler. The compressor and camera power supply are both included in a supplied service cabinet of approximate dimensions 70cm high x 60cm deep x 70cm wide. Two 125' PT-30 cryo hoses run from this cabinet to the camera head and will be charged with PT-30 refrigerant. <b>NOTE:</b> The 125' cryo hoses are being sold at a 25% discount (ordered previously for a canceled order, never used). Also supplied are one 25' "thin" power cable and one 75' "thick" power cable.</p> <p>Drawings of the camera head will be supplied within six weeks of the receipt of order. The camera head will be less than 210mm in diameter and will be about 310mm in length (including connected power and cryo lines), similar to previous camera ordered</p>	1.00	279,880.00000	<b>US\$ 279,880.00</b>

Technical specifications are complete, adequately defined, and can be met by Spectral Instruments Inc.

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Approval, Timothy Bruchman, Business Development Manager



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	<p>serial number 1110-167. At the CCD chamber the front plate acts as a window retainer.</p> <p>The camera will come with an 8-pin LEMO connector which can be wired for the customer's I/O use. Typical applications of these I/O's are: shutter trigger (O), integration begin (I), timing sync for GPS (O).</p> <p>A Vincent Associates CS-90H uncased shutter is mounted onto the front of the camera and controlled through camera control imaging commands.</p> <p>For data transmission and camera control the camera head is connected to a customer supplied computer (Windows® 10, 64-bit) through a PCIe interface module with a 50m fiber optic MT-RJ to MT-RJ cable. The camera electronics are all located at the camera head. The camera is 16-bit, correlated double sample analog signal processor and is read from four, two or one port(s). Three read speeds available, approximately 333kHz, 500kHz, and 1 MHz.</p> <p><b>Performance Specifications of camera:</b></p> <ul style="list-style-type: none"><li>- Readout performance of the camera is optimized to provide the lowest noise possible at a 1 MHz per channel read rate. The design and performance goal is a read noise of 5.5 e- at 1 MHZ, with a maximum read noise of 6.5 e- at 1 MHZ high gain. The camera's performance at lower speeds will be tested and noted in the test report.</li><li>- Dark Current: Maximum 0.001 e-/pixel/s at 110°C, goal 0.0005 e-.</li><li>- Single pixel full well: 140,000 e- in NIMO operation at low gain goal (minimum allowed 125Ke-).</li></ul>			

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	<p>- Linearity: 1% nonlinearity +50e-, 5Ke- to 140Ke-.</p> <p>A SI Image SGL II software installation CD-ROM is supplied with the camera system and includes the SI Image SGL II Software and Manual. SI Image SGL II software is provided for image acquisition, basic data processing and data archiving, i.e. save/recover images in TIFF or FITS formats (functions only on Windows® 7 or 10, 64-bit). C++ or LabView SDKs will be provided upon request. A Linux driver is provided.</p> <p>Final test report of the 1110S cryo-cooled CCD camera system is provided.</p>			
002	7567-1 Rev C <b>Cable Assy, 1110S Ext DC Power 25'</b>	2.00	836.00000	<b>US\$ 1,672.00</b>
003	7941-6 Rev D <b>Cable Assy, 1110S Ext DC Power 75'</b>	1.00	2,702.00000	<b>US\$ 2,702.00</b>

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004	<p>8828-1 Rev B</p> <p><b>Assy, Cooling Line Ext 125 ft PT-30</b></p> <p>Female straight to female straight connectors</p> <p><b>NOTE:</b> Price includes 25% discount for pre-ordered (but not used) cryo cooling hoses. Cooling hoses will not be pre-charged with PT-30 refrigerant.</p>	2.00	2,400.00000	<b>US\$ 4,800.00</b>
	<p><b>TERMS</b></p> <p><b>Payment Terms:</b> 100% pre-payment for item 001 via bank wire transfer. All other items are NET 30 (bank wire transfer preferred).</p> <p><b>Delivery:</b> 20 weeks after receipt of order (ARO) or 6 weeks after receipt of CCD, whichever is later for item 001. All other items 2 weeks ARO.</p> <p><b>Warranty:</b> 12 months after shipment of items</p> <p><b>Miscellaneous Fees:</b> Any and all other fees related to taxes, shipping and customs fees including but not limited to customs, tariffs, duties, taxes, delivery fees , etc. are the responsibility of UNAM.</p> <p><b>NOTE:</b> Extended warranty can be purchased if desired. Extending the warranty for one camera costs 4% of that camera's purchase price per year of extended warranty. Extended warranties must be purchased at time of camera purchase.</p>			

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