



420 N Bonita Ave.
Tucson, AZ 85745
phone: (520) 884-8821
fax: (520) 884-8803
e-mail: info@specinst.com

Our Quotation # 006779-01

09/28/2016

Quoted To:

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

Quotation Valid Thru : 12/28/2016

Terms : See Below

FOB: Ship Point, DDU

Attention : Alan Watson

Phone 20-222-333-14

Fax - - -

| Item | Part / Rev / Description / Details | Quantity | Unit Price | Extended Price |
|------|--|----------|---------------|-----------------|
| 001 | <p>0000 Rev -</p> <p>1110S cryo cooled CCD camera with a backside e2v 231-84-1-E90 (4k x 4k 15µm pixel) CCD, with deep depletion silicon, an astro multi-2 AR coating and a Ceramic PGA package installed and tested. 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 -100C to -110C with a cryo cooler. The compressor and camera power supply are both included in a supplied cabinet of approximate dimensions 70cm high x 60cm deep x 70cm wide. The supplied power and cryo cables are 100' long which run from this cabinet to the camera head (2 cryo cables, one 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 200mm in diameter and will be about 275mm in length (including connected power and cryo lines). At the CCD chamber the front plate acts as a window retainer.</p> <p>The window is fused silica with an extended IR coating on both sides..</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>The camera is connected to a PCIe data interface module by a 50-meter fiber optic data cable. The PCIe data card included with the camera utilizes a fiber optic data cable with a gigabit data</p> | 1.00 | 174,775.00000 | US\$ 174,775.00 |

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



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| | <p>connection to the camera head. SI Image software is included which can run on a customer supplied PC running Windows 7, 8 or 10. C++ or LabView SDKs will be provided upon request.</p> <p>A Linux driver is provided.</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>Performance of camera: Three read speeds available, approximately 333kHz, 500kHz, and 1 MHz Dark Current: Maximum 0.001 e-/pixel/s, goal 0.0005 e-. Linearity, less than 1% nonlinearity. Minimum single pixel full well of 125,000 e- in NIMO operation at low gain. The 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.</p> | | | |
| 002 | 0000 Rev - | 1.00 | 5,875.00000 | US\$ 5,875.00 |

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| | Additional Vincent Associates CS 90 shutter | | | |
| | Terms: 100% pre-payment. Delivery: 20 weeks ARO or 6 weeks after receipt of CCD whichever is later. Warranty: 12 months Price does not include sales or use tax. Camera products are custom materials, orders are not cancelable 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. | | | |

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