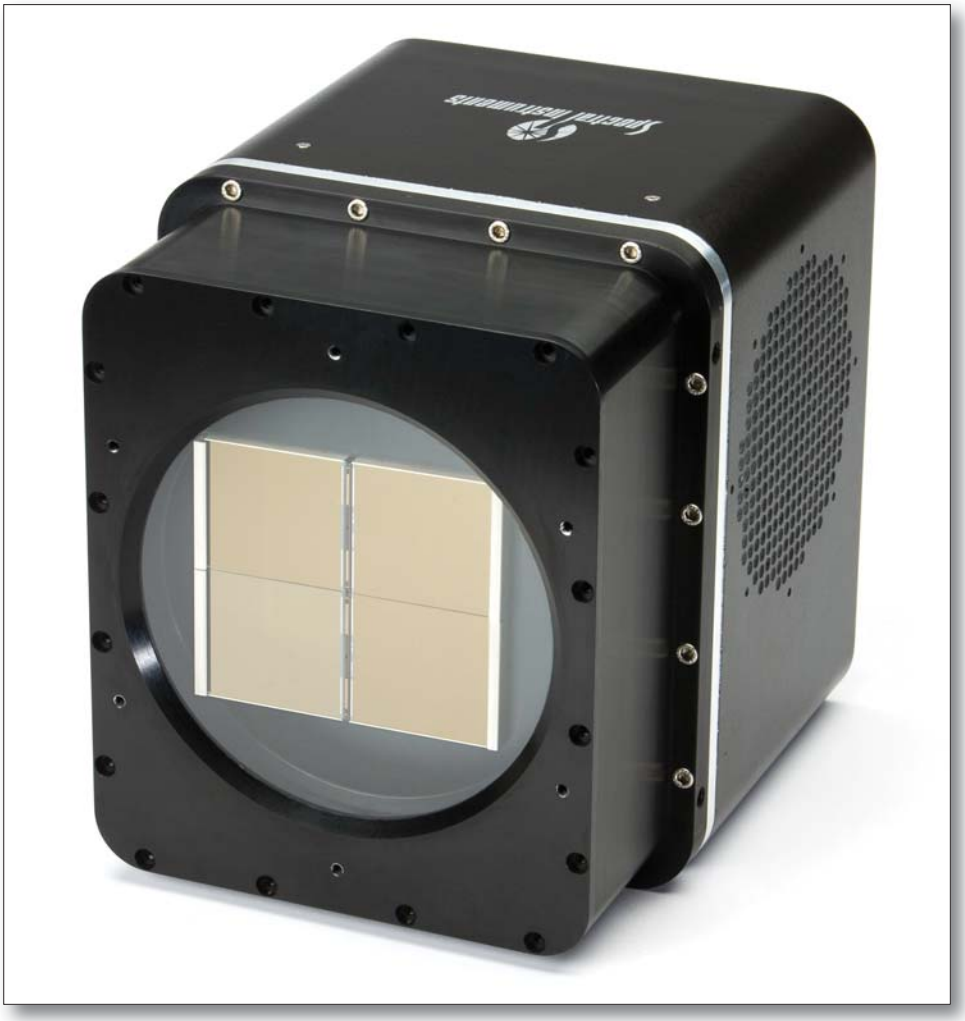
900 Series Camera



Overview

The 900 Series camera is a low temperature multi-CCD camera designed for applications requiring very large imaging areas. The 900 Series is capable of accepting up to 16 scientific CCDs in a single camera head. Pictured here, it is configured with a 2X2 array of backthinned 4kX4k 15µm pixel CCDs. This camera system can read up to four ports simultaneously from each CCD. Dark current is practically eliminated by using a mechanical cryocooler capable of cooling the CCDs to below -100°C, making the 900 Series cameras capable of very low light level imaging and long exposures.

Key Features

- Simultaneous read-out from 1, 2 or 4 ports per CCD
- Precision 16-bit digitization at up to 800kHz read rates
- Very low readout noise (3 e^- RMS) over a range of pixel readout rates achieved by correlated double sampling using dual-slope integration
- Low dark current through cooling to -100°C
- Accommodates a wide variety of multi-port scientific CCDs
- Fiber optics bonded directly to each CCD are available as well

Applications

- Wide-Field Optical Astronomy
- Medical Imaging

Continued other side.

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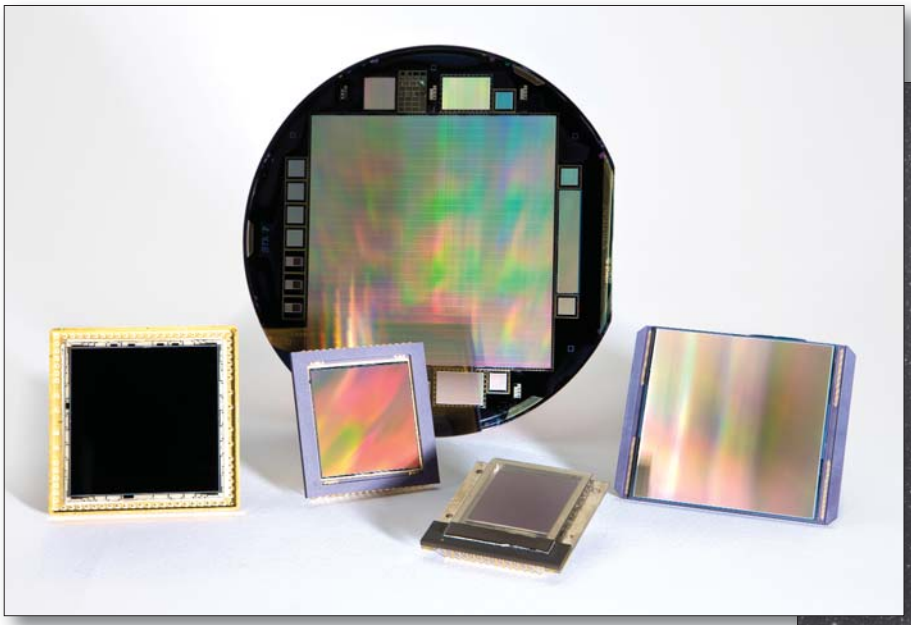
900 Series

CCDs Supported

The 900S is designed to be capable of supporting a large variety of different CCD types and configurations.Virtually any CCD with suitable package characteristics for the application can be utilized in the 900S cameras. The example on the front illustrates the ability of the 900S to accommodate four 4kX4k 15µm pixel CCDs for a 64 Megapixel camera with over 150cm^2 of active pixel area. The 4k chips featured here have a separation of 7mm in one direction, and only 1mm in the other. All four of the CCDs are physically mounted in a manner to be flat to tight optical tolerances. The circular window opening allows field flatteners or other optic components to be mounted as close as 10mm from the CCD surfaces. Each CCD has its own analog and clocking electronic boards to ensure a clean data path to allow as low noise as possible.



Camera Size

The 900S camera shown on the front was redesigned from our larger x-ray models with fiber optics to have as low a cross section as possible for placement at prime focus for a telescope. It is roughly 10"w X 11"h X 12"d. The cryo-tigers and power supply are stored in a stand-alone rack mount.

CCD Cooling

The entire camera head has enough cooling from a closed-loop cryo-tiger system to cool the CCDs below -100°C. The cooling allows near zero background imaging to take place on all four CCDs.

Software Interface

Spectral Instruments provides our own SI Image SGL camera control software that uses an intuitive graphical user interface for camera control, image acquisition, viewing, processing and archiving. In addition, a TCP/IP server is built into the software allowing another program on the same computer or from another computer to initiate image acquisition and transfer. SI Image SGL is written in LabVIEW and is provided as a Windows application. LabVIEW and C++ SDKs are available as an option for users who need to extend its functionality or incorporate controlling other instruments into a single program.

Computer Interface

A fiber optic data connection is used to connect to the camera. The fiber connects the camera head to Spectral Instruments proprietary PCI card in a PC. The fiber optic data link can be used at distances of over 30 meters.

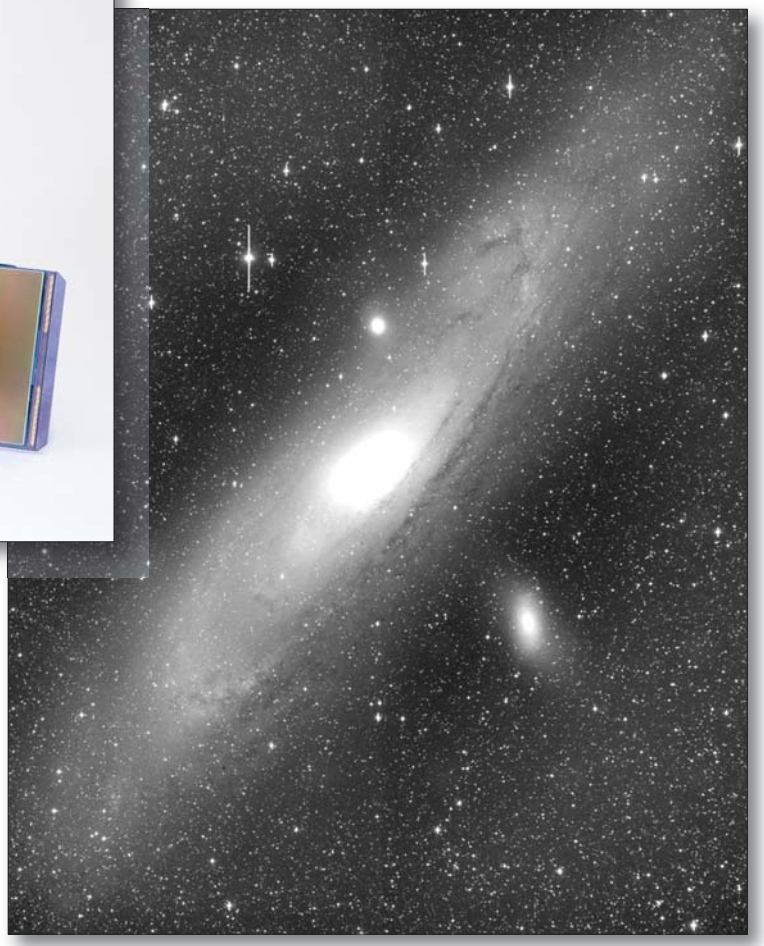


Image courtesy of Dr. Steve Larson of the University of Arizona

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