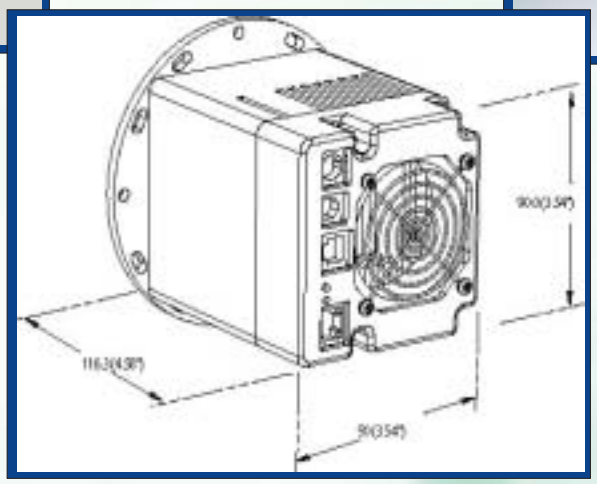
CCDsp™

Scientific Camera *with Dsp*



CCDsp™

BioTools, Inc. is proud to introduce the CCD*sp*™, a high-performance scientific camera with an integrated digital signal processor (DSP). This compact camera is designed for very low-light applications with flexible communication options. The on-board DSP makes stand-alone application practical by eliminating the need for external interface cards.

A sealed chamber also allows for the elimination of fogging, while avoiding problems of vacuum seals. Very flexible binning support is built right in the CCD*sp*™, allowing for improved speed, dynamic range and optimum performance. The CCD*sp*™ is thermo-electrically cooled to -30ºC, reducing the dark current. The temperature performance is guaranteed for 5 years.

In addition, the software accompanying the CCD*sp*™ allows for rapid application development and deployment and includes a sample application. Multiple communication options are available, including high-speed access over intranet/internet through ethernet, high-speed interface to PCs and laptops and high-speed serial connections to legacy PCs.

BioTools offers customization to accommodate customer's specifications and needs.

BioTools

'Tools for Discoveries of Life'

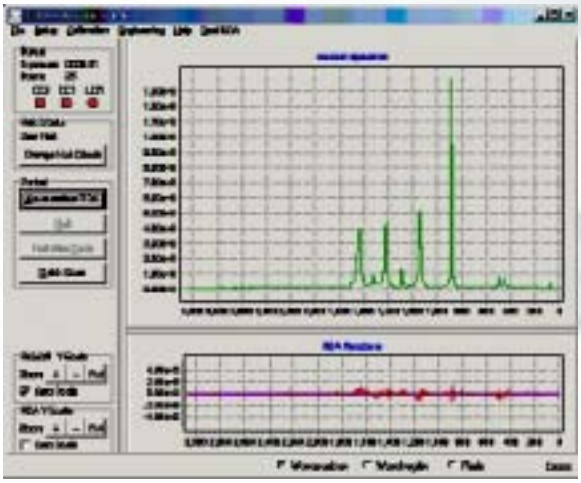
CRITICAL LINK

Custom Product Development

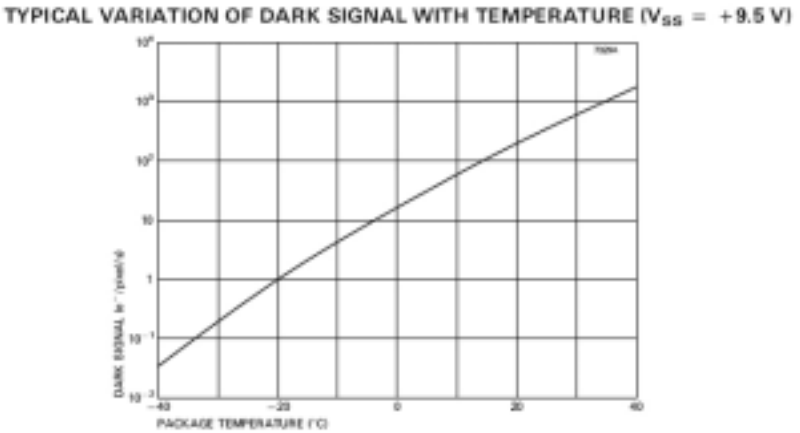
CCDsp™

High performance CCD

- Based on the e2v CCD30-11 sensor.
  - Back illuminated or front illuminated versions available.
  - 1024 x 255 pixels, 26µm square. Standard version uses Grade 1 CCD. Grade 0 CCD available as an option.
  - Other CCD's can be adapted upon request.



Spectrum obtained from sample application



Specifications

CCD:
Pixel Size: 26 µm square
Image Area: 26.6 x 6.7 mm
Full Well Capacity: ~300,000 e^-
Dark Current: <1 e^- / pixel / sec.

Electrical:
Voltage: 110 V / 220 VAC (50 Hz / 60 Hz)

Cooling:
Type: Thermo-electric ~30ºC (from ambient 20ºC)

Communications:
Ethernet: 10/100BaseT
Serial: 115 kbps, RS-232, USB

Mechanical Dimensions:
4.58" L x 3.54" W x 3.54" H

Binning

- Very flexible binning support built right in
  - DSP performs binning operations on-board, minimizing amount of data that must be transferred from the camera.
  - Any number of lines can be binned in the CCD, and/or in the DSP.
    - Binning in the CCD improves speed, but limits saturation level.
    - Binning in the DSP improves dynamic range at the expense of speed.
    - Combination of CCD and DSP binning can provide optimum performance.
  - Discarded lines can be binned in the CCD for speed or can be cleared individually to minimize residuals.
  - Simple DLL interface allows complete flexibility in binning and reading out camera.

Cooling

- Thermoelectrically cooled to -30ºC (from ambient of 20ºC).
- Sealed camera chamber is filled with inert gas to eliminate fogging, while avoiding the problem of vacuum leaks.
- Single AR coated window between CCD and optical path reduces reflections.

Communications

- Included as standard on the CCDsp™ are Ethernet, USB and serial
  - Ethernet allows the camera to be operated at maximum speed, locally or remotely over standard networking equipment.
  - USB provides high performance with a local PC.
  - Serial port provides a simple interface to legacy PC's.

DSP Processing

- CCDsp™ takes advantage of Critical Link's MityDSP™ engine.
- DSP can be programmed to perform in-camera processing, such as peak finding, signature matching and other functions.
- High performance floating point DSP, paired with a powerful Xilinx field programmable gate array (FPGA).
  - DSP capable of 600 Mflops performance.
  - FPGA provides a sea of logic gates which can be configured to perform any desired function, such as specialized binning or signal processing.
  - 2 MB of flash memory and 8 MB of RAM provide enough resources for almost any application.
- Both the DSP and FPGA firmware in flash can be updated through a serial port connected to a PC.
- Customization can be provided to support any application or to create a completely new application.

BioTools
'Tools for Discoveries of Life'

950 N. Rand Rd. Suite 123, Wauconda, IL 60084; *Tel*: (847) 487-5500; *Toll Free*: (866) BTOOLS1; *Fax*: (847) 487-5544;
Web: www.btools.com; *Email*: info@btools.com