



Version 6.0

Camera Guide: DVC-1310 Digital Camera

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DVC-1310 Digital Camera

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Introduction

The DVC-1310 from the DVC Company Inc., is a high-resolution digital monochrome integrating camera. The camera employs an interline CCD (no need for a mechanical shutter). The full resolution 10 bit monochrome image (1300 x 1028) that is produced can be read out at 12 frames per second and the camera is capable of exposing for up to 10 seconds.

The installation, use and adjustment of the DVC-1310 camera is described below. Most of the functions and features described here are exclusive to this camera. **MCID™ Elite**, however, provides many other features related to camera-based image acquisition in general (e.g., frame averaging for noise reduction, real-time image alignment). These are described in the online *MCID Elite Reference Manual (Chapter 2: Acquiring Camera Images)*.

Connecting the DVC-1310

The DVC-1310 camera hardware consists of three components, a camera head, a digital interface cable with a serial pigtail, and an AC power supply.

Figure 1: The DVC-1310 camera hardware components.



The digital interface cable has a 44-pin male connector at one end and a 100-pin digital connector on the other end, together with a 9-pin serial, pigtail connector. Connect the 44-pin end to the rear of the camera head, to the connector labeled **Digital Video**. Connect the 100-pin digital end to the RS-422 digital input board (see the *MCID Elite Start-Up Guide* for information regarding the RS-422 digital input board). Take the 9-pin serial pigtail and connect it to one of your free **COM** ports on the back of your computer. Take the 9-pin cable from the AC power supply and connect it to the 9-pin connector on the rear of the camera body, labeled **Power**.

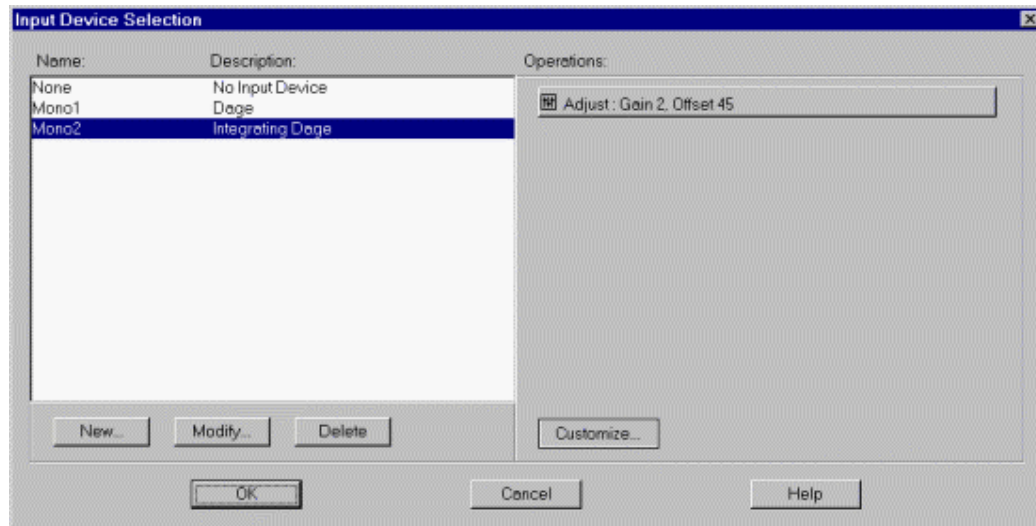
Figure 2: Rear view of the DVC-1310 camera body.



Installing in MCID Elite

The **MCID Elite** imaging system's interface to cameras is controlled through the *Settings > Input select* menu command. The *Input Device Selection* dialog box (Figure 3) contains a list of every camera that you have already installed. You can select, add, or delete any camera input from the list. You can also edit the definition of a specific input, and assign specific operations and settings to it. See the online *MCID Elite Reference Manual* for details (*Chapter 2: Acquiring Camera Images*).

Figure 3: The Input Device Selection dialog box lists all cameras installed in MCID Elite. It is also used to add new cameras to the list.



TO DEFINE THE DVC 1310 CAMERA:

1. Open the *Settings* menu and select *Display format*. Set the *Image Type* to *10 bits*.

2. Open the *Settings* menu again and select *Input select*. The *Input Device Selection* dialog box appears, which lists every camera that is currently installed in **MCID Elite**.
3. Click the **[New]** button.
4. If another camera has been installed already, a *Create Input Device* dialog box will appear (Figure 4). Select the *New device* radio button and click **[OK]**. If no other cameras have been installed, the *Input Device Definition* dialog box appears (Figure 5).

Figure 4: The *Create Input Device* dialog allows you to install a new camera from scratch, or to copy all of the settings associated with an existing device.

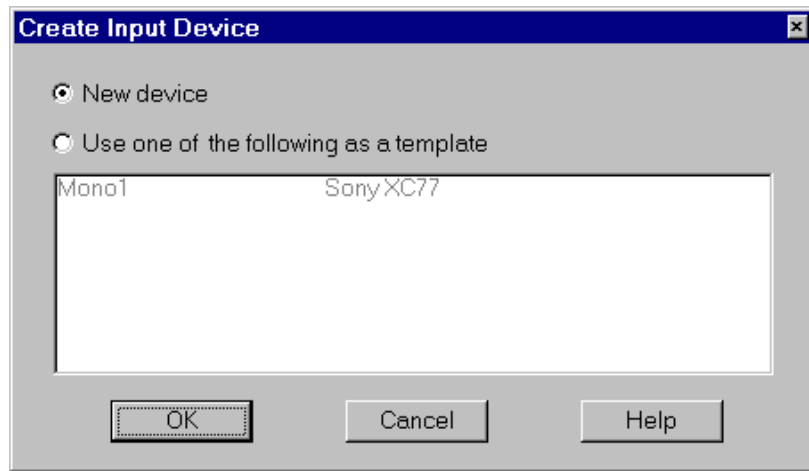
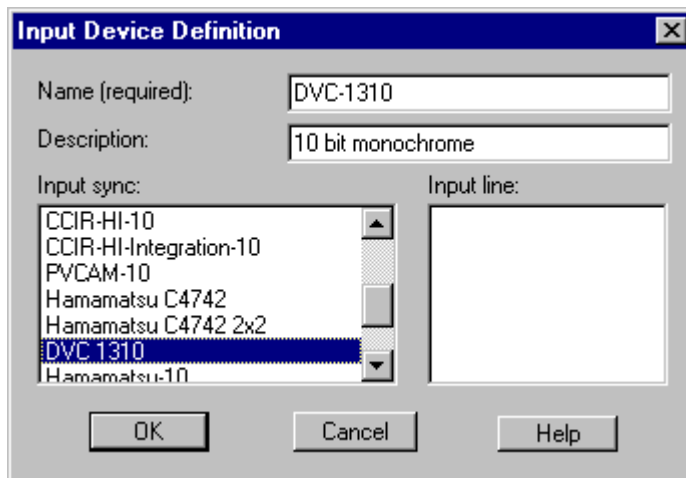


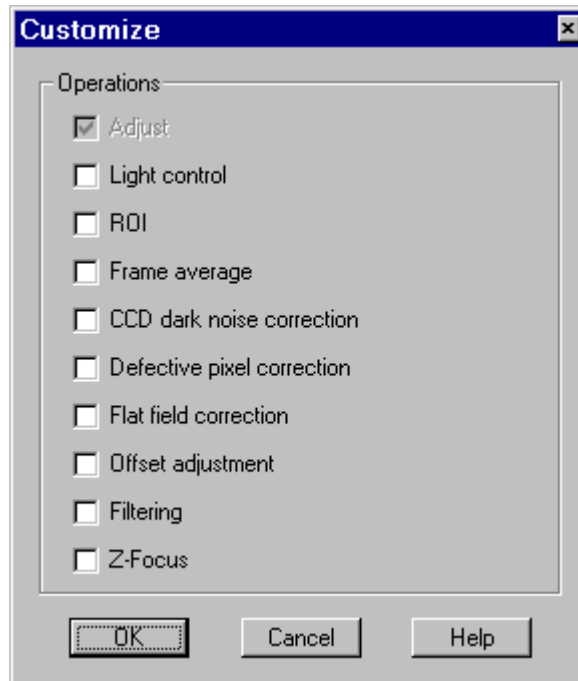
Figure 5: The *Input Device Definition* dialog box is used to describe a camera and its *Input sync*.



5. Select the *DVC 1310* as the input sync.

6. Enter a unique *Name* and *Description* in the appropriate entry fields (e.g., “DVC-1310” and “10 bit monochrome”).
7. Press [OK] to exit the dialog box.

Figure 6: The *Customize* dialog box is used to link controls for various camera operations to the camera.



8. A *Customize* dialog box appears next (Figure 6), which allows you to assign various input device operations to this camera (e.g., frame averaging controls). You can select them now or assign them later (see *Chapter 2: Acquiring Camera Images* in the online *Reference Manual* for details).
9. Click [OK] to exit the dialog.

The camera is now installed in the list of input devices. When you exit the *Input Device Selection* dialog box, the camera (and all of the settings and operations associated with it) becomes the default, input device.

Acquiring Images

The basic procedure for acquiring images with the DVC-1310 camera is as follows:

TO DIGITIZE AN IMAGE:

1. Select the desired Display format, (*10 bits*).
2. Select the camera from the list of input devices, if necessary.
3. Press the **Digitize** icon to display a “live” image on the video monitor.

4. Make any necessary adjustments to the live image (e.g., focus or exposure time).
5. Press the <Return> key to complete digitization.

The frozen image is now transferred to the image monitor and any of **MCID Elite's** functions can be applied to it (e.g., the image can be processed, calibrated, sampled, or saved to disk as an image file).

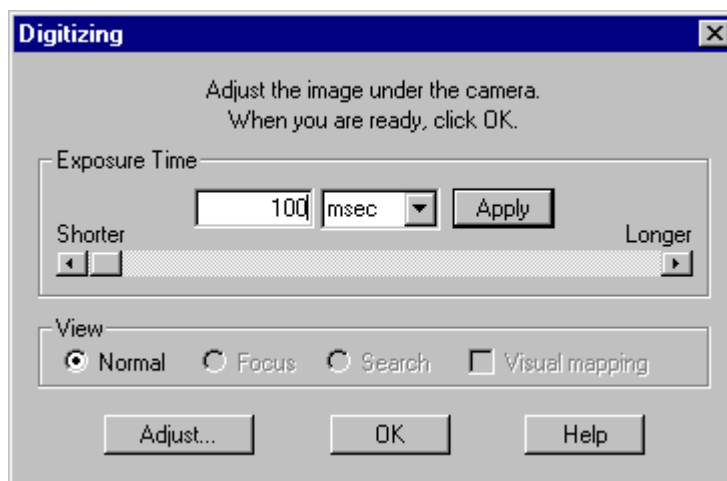
Digitizing



Click the **Digitize** icon to initiate digitization or press <Ctrl - D>. A dialog box appears to indicate that **MCID Elite** is digitizing continuously and a live image appears on the image monitor.

Light is accumulated as long as the electronic shutter is open. Longer exposure yields higher sensitivity. Exposure time is controlled by moving the *Exposure Time* slider (Figure 7). For most purposes, an exposure of about 83 to 167msec is fine. Adjust lighting to give proper illumination. In low light situations, the exposure time can be increased to periods of up to about 5 sec with a gradual increase in background. Exposures longer than this result in sufficient background noise to impair image quality. We have used the DVC-1310 to acquire moderately bright fluorescence images with low backgrounds. Very dim fluorescence starts to become submerged within background noise.

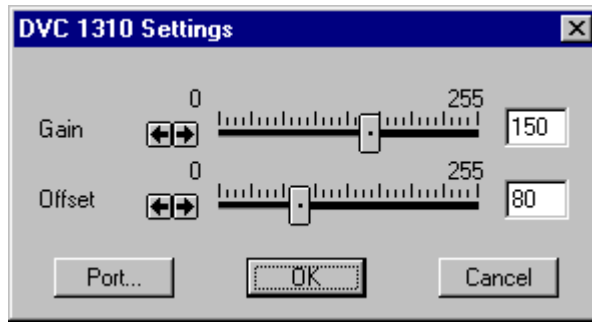
*Figure 7: Clicking the **Digitize** icon initiates the digitization procedure and displays a dialog box. Move the slider along the *Exposure Time* bar to control the length of time the shutter remains open.*



Adjusting the Camera Response

MCID Elite allows digital control over camera gain (the amount of light amplification) and offset (the size of the no-light signal). To access these controls, press the [**Adjust**] button while digitization is occurring. **MCID Elite** will display a dialog box for camera adjustment (Figure 8).

Figure 8: Various options for the DVC-1310 camera.



The *Gain* and *Offset* should be adjusted to yield optimal camera response with your specimens (i.e., the best image contrast) which, is typically arrived at by experimentation. By default, **MCID Elite** sets the gain for the DVC-1310 to 150 and the offset to 80.

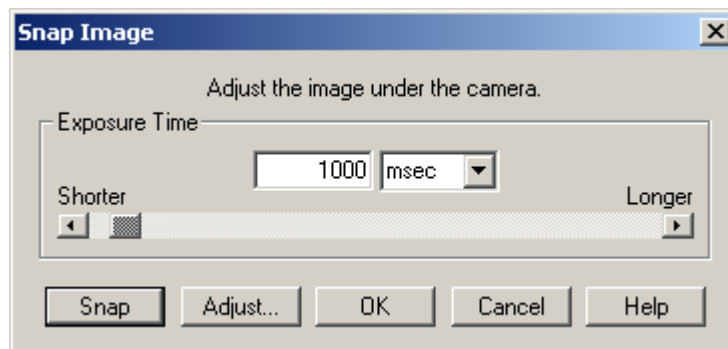
Snap Shots



Press the **Snap Shot** button to capture an image using a single exposure (i.e., without displaying a continuously ‘live’ image). The **Snap Shot** skips the display of the *Digitizing* dialog box (Figure 7) and simply snaps and captures a new image to the display monitor. This function can be very useful if you are working with dim specimens and you have already chosen the correct exposure time. Clicking the **Snap Shot** icon will automatically snap a fresh image.

To adjust the exposure time, Ctrl-click on the **Snap Shot** icon to display the *Snap Image* dialog box. Move the slider control to increase or decrease the exposure time. Press the **[Snap]** button to test the exposure.

Figure 9: The Snap Image dialog box.



Maintenance and Troubleshooting

Cleaning the Camera

The DVC-1310 camera contains a solid state sensing element (a chip) covered by a thin glass window. The glass window attracts dirt like a magnet. Dirt will appear as dark blots on the image. To determine if dirt is on the chip window, move the camera a bit, while looking at an actively digitizing image. Dirt that does not move is on the chip. To avoid gathering dirt, we recommend that you remove the lens or microscope video adapter as little as possible.

The first step in cleaning is to try blowing off dust with clean compressed air, of the type sold for cleaning camera lenses. Use canned air, not air from a lab tap, which often contains oil. Reassemble the camera and digitize an image to see if the dust is gone. If it is not, moisten a cotton swab or piece of lens paper with a glass or lens cleaner. Do not use alcohol or other solvents on optical surfaces (the optical coating and cements can be damaged by such solvents). Remove the lens and gently wipe the glass with the swab or paper. Make sure that the swab or paper has not become dry. Then blow the chip dry with compressed air. Replace the lens and digitize an image to inspect for dust. You may have to repeat the cleaning process a few times to remove all dust.

You may also clean the chip window with “Prophot” cleaners, available from many camera stores. Do not use tissue paper, which often contains impurities. Do not use dry lens paper or swabs to clean the glass over the chip, either. Dry rubbing may produce static charges.

Cleaning the camera is one of those unpleasant and thankless tasks that everyone detests. The best way to avoid cleaning is to keep the camera sealed, so that dust does not enter.

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