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## PCI DV Release Notes

The PCI DV supports a wide variety of camera models. However, each model is different; they do not all operate in exactly the same manner. These notes provides installation, protocol, and operating instructions for specific camera models when they differ from instructions provided in the *PCI DV User's Guide*, EDT part number 008-00966.

### Cables

A ten-foot cable to connect the PCI DV to the camera is included with the PCI DV (although not the PCI DVK option). These cables are camera model-specific; specify the camera manufacturer and model when you order the PCI DV. The connector pinout can be found in the *PCI DV User's Guide*.

If you've ordered the PCI DVK option, see the section below entitled "Kodak MEGAPLUS Serial AIA cameras" on page 4.

### Cincinnati Electronics

You can control the Cincinnati Electronics Iris-256 with the PCI DV by means of the RS-422 serial port on the camera. Use the *serial\_cmd* program to test whether the connection is working, and also as an example for adding serial communications functionality to your own application.

Numeric arguments to *serial\_cmd* are treated as hexadecimal.

To test the serial communications, make sure that the RJ-12 breakout connector on the cable is plugged into the port on the back of the camera. Then enter:

1. `serial_cmd -x 2`

Toggles remote. If the "remote" light on the camera doesn't light up, try again until it does.

2. `serial_cmd -x 1b`

Turns on GO\_TO\_LOCAL.

3. `serial_cmd -x 23`

Sends lens ADC. The camera responds with a value representing the temperature of the lens.

### Dalsa

The PCI DV supports most variations of the Dalsa CA-D1, D4, and D7 are-scan, and CL-C3, C4 and E2 line-scan cameras. However, the Dalsa product line is so large, and the variations so numerous, that it is not possible for us to test or provide configuration files for all of them. If you get a Dalsa camera for which no configuration file exists, contact EDT and we'll make one for you.

Some models of Dalsa cameras can be ordered with or without internal oscillators. EDT supports only Dalsa cameras with an internal oscillator.

The DV 3.0 and PdvDisplay programs were designed primarily for area-scan cameras. Using them with a line-scan camera may not produce useful results. We recommend you use the *take* program instead, or a custom application.

## Hitachi KP-F100

Set the **Mode** switch on the KP-F100 to 1 (Electronic Shutter OFF) or 2 (Electronic Shutter ON). Set the **Frame On Demand** switch to OFF. If Electronic Shutter is ON, set the shutter speed with the **Shutter Data** switches.

## Kodak MEGAPLUS 1.4, 1.6, 4.2

Some Kodak MEGAPLUS cameras with a separate Camera Control Unit (CCU) have an RS-232/RS-422 switch on the back of the CCU. This switch must be set to RS-422 in order to enable the PCI DV to control the camera. Also, the front panel **Mode** switch must be set to **Computer** and the **Shutter** switch must be **On**.

## Kodak MEGAPLUS Serial AIA cameras

Kodak serial AIA cameras include all Kodak *i* and ES models.

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*NOTE ES models require the LVDS option to the PCI DV, EDT part number 019-01127.*

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### Installation

The camera must be on when installing the PCI DV software and when rebooting the system. If the camera was off when the software was installed or the machine was rebooted (or if you're not sure):

1. Turn the camera on.
2. Run *pdvload* (UNIX-based systems).  
or:  
Select a camera configuration as described in the section entitled "Setting the Camera Model on Windows NT Systems" (Windows NT).
3. Launch Pdv Utilities, if you have not already done so (Windows NT).
4. Run the required applications.

Once you've established that the installation was successful and you can capture images with the provided applications, send a "SAV" serial command to the camera, to save the values set in the camera's EEPROM. This obviates the need to repeat the above procedure. See **Sending Commands to the Camera** below for instructions on sending serial commands to the Serial AIA cameras.

## Cable

If you have a PCI DVK with Kodak MEGAPLUS models, make sure you're using the correct Kodak cable, which is not provided by EDT, but by Kodak: specify the RS-422 cable, Kodak part number 03000172-001. It has male 68-pin connectors on both ends and no RS-232 breakout connector.

## Interface Protocol

The Kodak ES and i model cameras are configured at the factory for either RS-232 or RS-422 control. Because the PCI DV board controls the camera through the RS-422 lines, you must specify RS-422 control when ordering your camera from Kodak. If your camera does not operate correctly with the PCI DV card (for example, the camera does not click when an acquire is requested, or it clicks continuously), the camera is probably configured for RS-232 control.

To verify this, use the *serial\_cmd* program included with the PCI DV software: this program tests whether the board is able to talk to the camera over RS-422 lines, and can also configure specific camera parameters. To run the test:

1. Install the PCI DV software.
2. Set the camera model, as described in the *PCI DV User's Guide*.
3. Enter:

```
serial_cmd "STS?"
```

Example 1 shows a sample response, although some parameter values can differ.

```
Read 78 bytes:
```

```
DEF OF
GAE 6
BKE 0
MDE TR
SHE ON
EXE 20
TRM P
TRE 1
STP P
```

### Example 1. serial\_cmd Output

Example 1 shows a clean status: the board is able to communicate with the camera. If the camera is connected properly and the hardware and software was installed according to instructions, but the test instead results in garbage characters output to the screen, then your camera is probably configured for RS-232 control. If so, contact your Kodak representative and arrange to reconfigure it for RS-422 mode.

## Sending Commands to the Camera

You can also use the *serial\_cmd* program to send to the camera any of the function and query commands described in the *Kodak MEGAPLUS Camera User's Manual*. For example, to turn on Defect Conceal, enter:

```
serial_cmd "DEF ON"
```

See the description of the Digital Video Library routine `pdv_serial_command` for instructions on sending commands to the camera from a C program.

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*NOTE* Application programs such as *initcam*, *DV 3.0*, and *take* modify some camera parameters.

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## Kodak ES 1.0/SC Operating Mode

Single-channel mode is not available on the ES 1.0 /SC, so be sure to choose "*Kodak MEGAPLUS ES 1.0/SC*" for this camera.

## Kodak ES 1.0 and ES 1.0/SC Extended Functions

The ES 1.0 and ES 1.0/SC cameras have some functionality that is not available on other Kodak cameras, such as black level balance and gain balance (**BKB** and **GAB**). EDT provides no corresponding options or buttons in the applications provided to set these parameters. If you want to change these settings, use the *serial\_cmd* program, or, in a C program, the `serial_command()` function.

For example, to set the black level balance to 100, enter:

```
serial_cmd "BKB 100"
```

Or in a C program:

```
pdv_serial_command(pdv_p, "BKB 100");
```

## PULNiX TM-9701

This camera is supported in Shutter Speed modes 1-8 (camera-controlled shutter) and mode 9 (computer-controlled shutter). Choose the appropriate mode when setting the camera model, and make sure that it matches the position of the switch on the back of the camera.

These cameras also have two other mode switches, NRM/ASY and INT/NON. These should be set to NRM ("normal," that is, not asynchronous) and NON (noninterlaced), respectively.

You will need the PULNiX 37-pin adapter cable (part # 30DG-02) to operate with the PCI DV.

## Silicon Mountain Design

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*NOTE* SMD cameras require the LVDS option to the PCI DV, EDT part number 019-01127.

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With the PCI DV for SMD cameras, EDT ships a parallel data cable with a breakout box on one end. The breakout box has both a DB-9 serial connector and a BNC connector. Use the SMD-supplied serial cable to connect the DB-9 connector on the breakout box to the RJ-11 serial port on the camera.

The SMD has three triggering modes: computer-controlled, triggered, and continuous. Computer-controlled and triggered modes also require that you connect the BNC connector on the breakout box with the SMA port on the camera, using a coaxial cable you must supply yourself.

The configuration files `smd*.cfg` are shipped set up for computer-controlled mode. Comments in the configuration files show how to modify them for other modes. Before doing so, read the section entitled “Customizing the Camera Configuration” in the *PCI DV User’s Guide*.

The differences between modes consist of:

- several different flags for the driver, and
- different bytes in the `serial_init` string.

The `serial_init` string defines a series of bytes (binary in this case) that *initcam* sends to the camera over the serial lines, to set up the camera for the proper operating mode.

`serial_cmd.c` is a utility that you can use to send serial commands to the camera. To send binary data, send commands in the form:

```
serial_cmd -x N
```

where *N* is the hexadecimal byte to send to the camera. (You need not append 0x or h.)

Also look at the `pdv_set_gain()` and `pdv_set_exposure()` routines in `libpdv.c` for an SMD-specific example. Search for the `SMD_SERIAL` flag.

## Xillix MicroImager 1400

The minimum exposure time for the MicroImager 1400 is 30 ms. It is possible to specify lower exposure times using the PCI DV; however, these lower shutter speeds (especially below 10 ms) are likely to be unreliable and cause data errors.

The Xillix MicroImager can run at various clock speeds. The default setting in the configuration file `xm1400*.cfg` is not the fastest. If you’d like to run at a faster speed, and you believe the host can support it:

1. Edit the configuration file to comment out the line in effect, and uncomment a line specifying a faster speed. The comment character is #.
2. Rerun the camera setup and reselect the camera model (or rerun `pdvload` (UNIX-based systems) or `cam-setup.bat` (Windows NT) to reinitialize the system).
3. Try the system at the new clock speed. If it misses partial or full frames, or if you get error messages, then edit the configuration file again to reinstate a slower clock speed.