

## OV7640/OV7141 CX Evaluation Module Quick Start Guide

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1.3	12/02/03	Added Assembly Guidelines document to list of documents on page 4 and page 6.
1.4	12/17/03	Added note on page 11 requiring Service Pack 4.

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# 1 Introduction

The primary objective of this document is to provide a description of the contents, setup, and operation of the OV7640/OV7141 CX Evaluation Module.

## 1.1 Intended Audience

This manual is intended for developers who want a convenient way to begin system development. It is assumed that the reader has a basic understanding of digital video and still capturing concepts.

## 1.2 Related Publications

For more information about using OV7640/OV7141, refer to the following documents:

- [OV7640/OV7141 Datasheet](#)
- [OV7640/OV7141 Implementation Guide](#)
- [OmniVision Serial Camera Control Bus \(SCCB\) Functional Specification](#)
- [OmniVision Assembly Guidelines Technical Bulletin](#)

## 1.3 Customer Support

If you have any questions about using any of the OmniVision CAMERACHIP™ family of products, first consult this document and the documents listed in [Section 1.2, Related Publications](#). If you still have questions regarding the setup and operation of this evaluation product, contact OmniVision Technologies using the contact information below:

- **Customer and Technical E-mail Support** — OmniVision Technologies provides an online mailbox at [faqs@ovt.com](mailto:faqs@ovt.com) and [usb@ovt.com](mailto:usb@ovt.com) for USB software support. Your message will automatically be forwarded to the appropriate technical support engineers at OmniVision Technologies.

## 1.4 Sales and Ordering Information

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- **Sales Information** — OmniVision Technologies has mailboxes that will forward your inquiry to the appropriate OmniVision sales representative.
  - [salesAmerica@ovt.com](mailto:salesAmerica@ovt.com)
  - [salesChina@ovt.com](mailto:salesChina@ovt.com)
  - [salesEurope@ovt.com](mailto:salesEurope@ovt.com)
  - [salesKorea@ovt.com](mailto:salesKorea@ovt.com)
  - [salesTaiwan@ovt.com](mailto:salesTaiwan@ovt.com)
- **General Information** — OmniVision Technologies has an online mailbox at [info@ovt.com](mailto:info@ovt.com) that will forward your inquiry to the appropriate OmniVision representative.

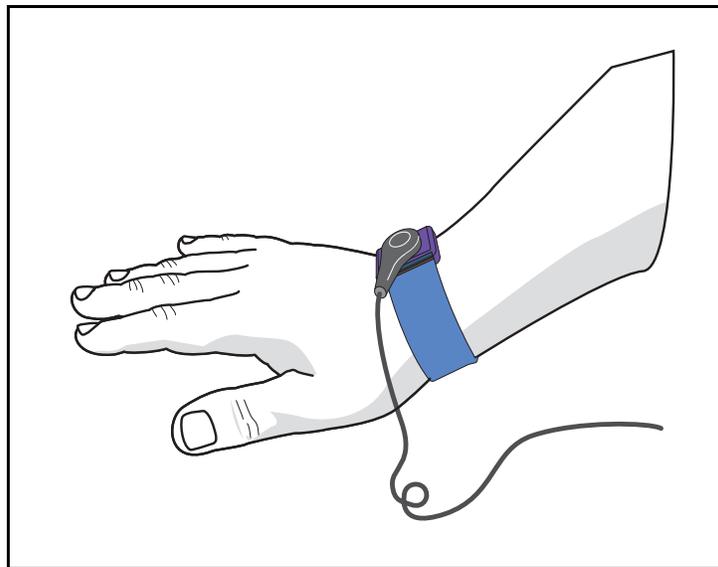
## 1.5 Safety Information

The equipment is designed and manufactured in compliance with several safety standards. However, the following precautions should be observed to ensure personal safety during installation or service, and to prevent damage to the equipment or the equipment to be connected.

Read and follow all warning notices and instructions marked on the product.

### 1.5.1 Electrostatic Discharge Prevention

The OV7640/OV7141 CX Evaluation Module contains components that could be damaged by electrostatic discharge. When handling the boards, wear a properly grounded wrist strap to prevent possible damage, or follow other suitable precautions to prevent equipment damage.



## 2 Getting Started

This section provides information to get the OV7640/OV7141 CX Evaluation Module up and running.

### 2.1 System Requirements

The following items are required in order to use the OV7640/OV7141 CX Evaluation Module:

- PC running Win98/Win2000/Windows XP
- CD-ROM drive
- USB 2.0 port
- Adobe Acrobat Reader

### 2.2 What You Get With Your Evaluation Kit

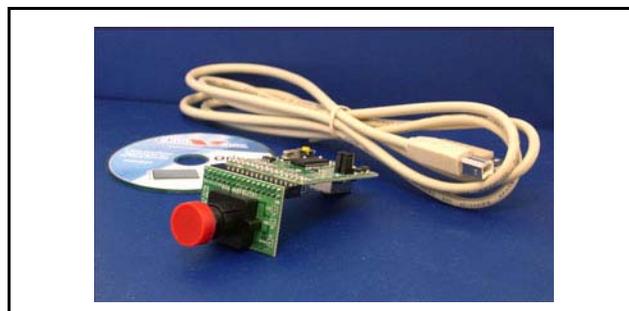
Your OV7640/OV7141 CX Evaluation Module kit should contain the following items (see [Figure 2-1](#)):

- OV7640/OV7141 CX Evaluation Module
- USB Cable
- USB 2.0 Drivers & Documentation CD-ROM

The Drivers and Documentation CD-ROM contains:

- Drivers (USB 2.0 drivers)
- Documentation
  - OV7640\_DS (1.7) - [OV7640/OV7141 Datasheet](#)
  - OV7640\_QSG (1.4)CX - [OV7640/OV7141 CX Evaluation Module Quick Start Guide](#)
  - OV7640\_IG (1.2) - [OV7640/OV7141 Implementation Guide](#)
  - SCCBSpec\_AN (2.1) - [OmniVision Serial Camera Control Bus \(SCCB\) Functional Specification](#)
  - AssyGuidelines\_TB (1.0) - [OmniVision Assembly Guidelines Technical Bulletin](#)
- Utilities
  - OVTDTTool.exe - OmniVision IC debug tool
  - AMCAP.exe - Video capture utility

**Figure 2-1** OV7640/OV7141 CX Evaluation Module



## 2.3 Installing the Evaluation Module

### *For Windows XP*

1. Disconnect the system from the internet.
2. Connect the OV7640/OV7141 CX Evaluation Module to the system's USB 2.0 port.
3. A **Found New Hardware** message will appear in the lower right corner of the screen.



4. When the Found New Hardware Wizard window appears, insert the Drivers and Documentation CD into the CD-ROM drive.
5. In the Found New Hardware Wizard window, select **Install from a list or a specific location (Advanced)** and then, click on **Next**.



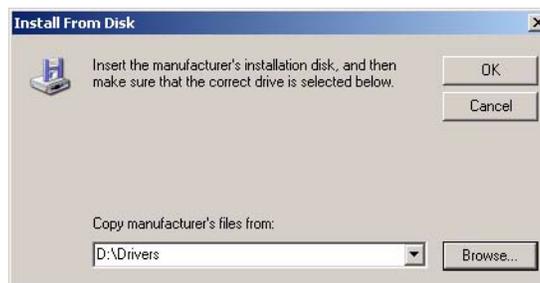
6. When the system asks for search and installation options, select **Don't search. I will choose the driver to install** and then click on **Next**.



7. When the system asks you to select the device driver to install, highlight **OmniVision SuperCam** and click on **Have Disk....**



8. When the Install from Disk window appears, click on **Browse....**



9. A Locate File window will appear. Navigate to the CD-ROM drive that holds the Drivers and Documentation CD and select the **Drivers** folder.

10. Select the **OVUSB2.INF** file and then, click on **Open**.

11. In the Install from Disk window, click on **OK**.
12. In the Found New Hardware Wizard window (see screen under [step 7](#)), click on **Next**.
13. The system will begin copying the drivers to your system. When the following warning message appears, click on **Continue Anyway**.



14. When the system is finished copying the driver files, the following window will appear. Click on **Finish** to complete the installation.



15. When the driver installation is complete, a message indicating the OV7640/OV7141 CX Evaluation Module is ready to use will appear in the bottom right corner of the screen.



## For Windows 2000



**Note:** Service Pack 4 for Windows 2000 is required in order for the drivers and evaluation module to work properly.

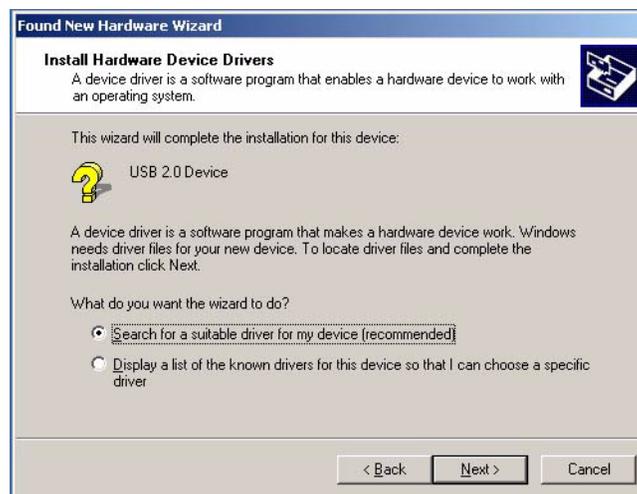
1. Disconnect the system from the internet.
2. Connect the OV7640/OV7141 CX Evaluation Module to the system's USB 2.0 port.
3. A **Found New Hardware** message box will appear.



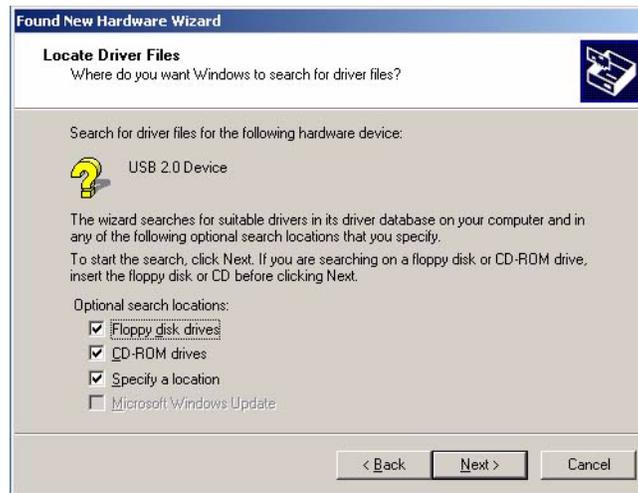
4. When the Found New Hardware Wizard window appears, click on **Next**.



5. When the system asks to locate the driver files, click on **Search for a suitable driver for my device (Recommended)** and then, click on **Next**.



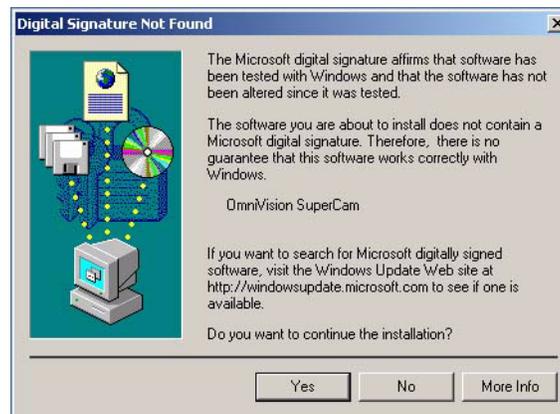
6. When the system will prompts you to select optional search locations, select **CD-ROM drives** and **Specify a location**.



7. The system will then search for an appropriate driver file. If the system cannot find the device driver, it will prompt you to specify a location. When asked, click on **Browse**.



8. Navigate to the CD-ROM drive that holds the OmniVision Drivers and Documentation CD and click on **Next**.
9. When the system has found the correct device driver, the following warning message will appear. Click on **Yes** to proceed with the driver installation.



10. When the system is ready to install the appropriate driver, the Completing the Found New Hardware Wizard message box will appear. Click on **Finish** to complete the driver installation.

### For Windows98

1. Disconnect the system from the internet.
2. Connect the OV7640/OV7141 CX Evaluation Module to the system's USB 2.0 port.
3. A **Windows has found new hardware** message box will appear and then, the Add New Hardware Wizard window will appear. Click on **Next**.



4. At the next window, select **Search for the best driver for your device** and click on **Next**.



5. When the system asks for locations to search, select **Specify a location** and click on **Browse**.



6. Navigate to the Drivers and Documentation CD and select the Drivers folder.
7. When the system finds the appropriate driver, click on **Next**.



8. The system will then prompt you for the Windows 98 CD-ROM. Remove the OmniVision CD and replace it with the Windows 98 CD. Then, click on **OK**.



9. When the system has finished installing the applicable Win98 files, click on **Finish**.



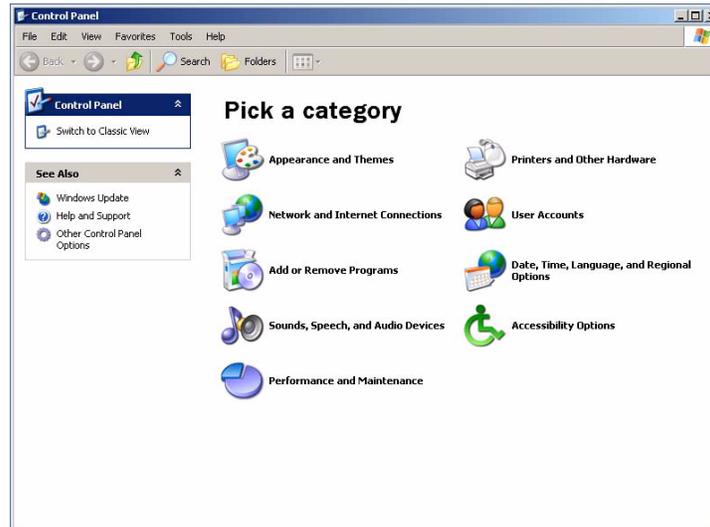
10. To complete the installation, click on **Yes** when prompted to restart the system.



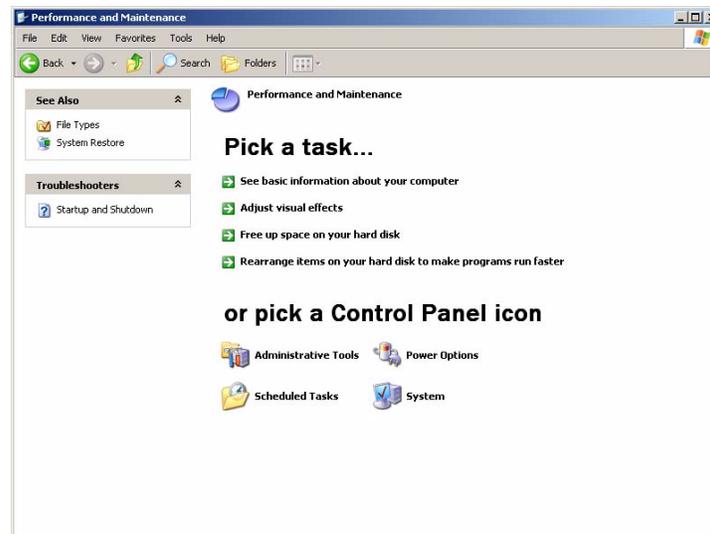
## 2.4 Uninstalling an Existing Driver

### For Windows XP

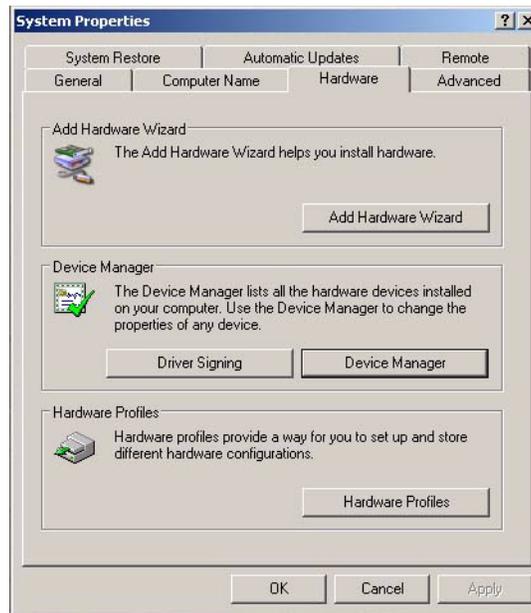
1. Make sure the OV7640/OV7141 CX Evaluation Module is connected to the system.
2. Click on the **Start** button and select **Control Panel**.
3. When the Control Panel window appears, click on the **Performance and Maintenance** icon.



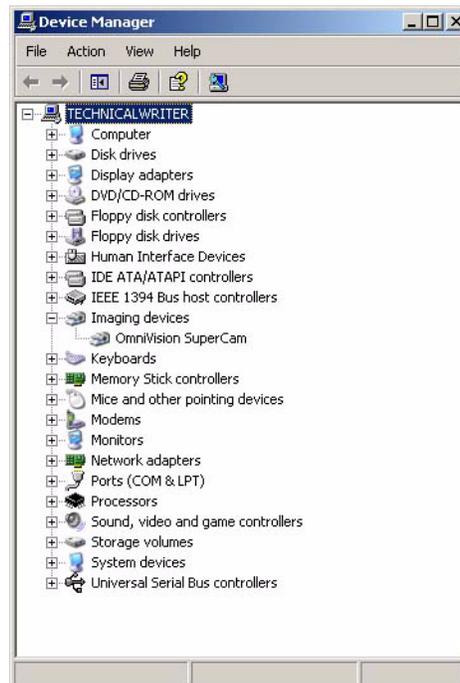
4. When the next screen appears, click on the **System** icon.



- When the System Properties window appears, click on the **Hardware** tab and then, click on **Device Manager**.



- When the Device Manager window appears, double-click on **Imaging devices** if it is not expanded.



- Right-click on **OmniVision SuperCam** and select **Uninstall** from the pop-up menu.
- Unplug the OV7640/OV7141 CX Evaluation Module from the system to complete the uninstallation process.

### For Windows 2000

1. Make sure the OV7640/OV7141 CX Evaluation Module is connected to the system.
2. Click on the **Start** button, select **Settings** and then select **Control Panel**.



3. When the Add/Remove Hardware Wizard appears, click on **Next**.



- When the system asks Which hardware task do you want to perform?, select **Uninstall/Unplug a device** and click on **Next**.



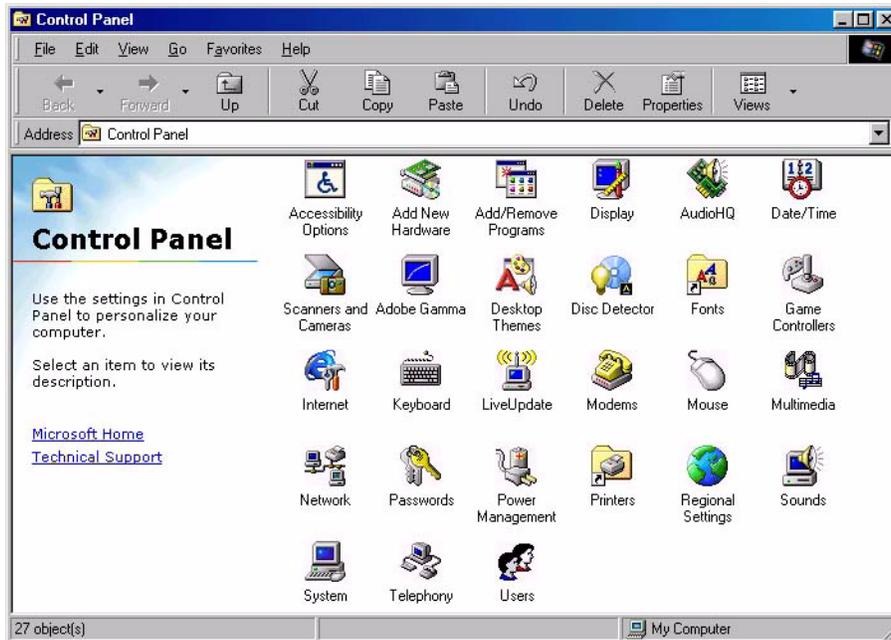
- When asked which removal task to perform, select **Uninstall a device** and click **Next**.
- A list of devices on the system will appear. Scroll down the list and select **OmniVision SuperCam**. Then, click on **Next**.



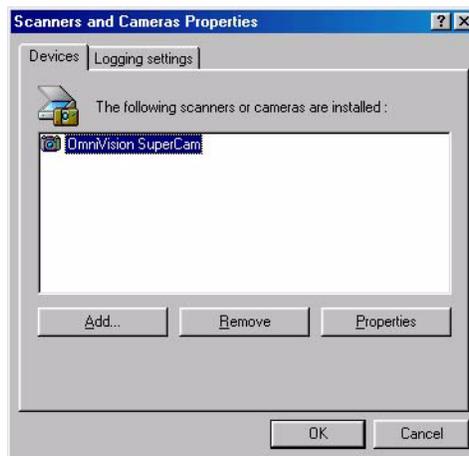
- When the system asks to confirm that you want to uninstall the device, select **Yes, I want to uninstall this device** and click on **Next**.
- After the system has uninstalled the OV7640/OV7141 CX Evaluation Module device driver, the Completing the Add/Remove Hardware Wizard window will appear. Unplug the OV7640/OV7141 CX Evaluation Module from the system's USB 2.0 port and click on **Finish**.

### For Windows98

1. Make sure the OV7640/OV7141 CX Evaluation Module is connected to the system.
2. Click on the **Start** button, select **Settings** and then select **Control Panel**.



3. Click on the **Scanners and Cameras** icon.
4. When the Scanners and Cameras Properties window appears, select **OmniVision SuperCam** and click on **Remove**.



5. When OmniVision SuperCam disappears from the Scanners and Cameras list of devices, click on **OK**.

### 3 Troubleshooting Your Setup

If the camera is already recognized by the system during installation and the Add New Hardware Wizard does not appear (see [step 3 of Section 2.3, Installing the Evaluation Module](#), an older driver may already be installed.

1. Remove the existing driver following the procedure in [Section 2.4, Uninstalling an Existing Driver](#).
2. Follow the installation procedure to install the driver again.

If the system is running Win98, you may be required to insert the Win98 CD-ROM to continue installation.

If installation is completed but the light on the USB board does not turn on and the system prompts you to restart, this is an indication that something went wrong during installation.

1. Unplug the camera and restart the system.
2. Re-install the camera and ensure that the light is ON.
3. If the light remains off, uninstall the driver and then, follow the installation process again.

If, during the installation process, the system asks for files that it cannot find on the OmniVision CD and the Win98 CD, then there is something wrong with the system.

1. Unplug the camera and cancel the current installation sequence.
2. Uninstall the old driver and restart the system.
3. Follow the installation procedure to install the driver again.

## 4 Using AMCAP and OVRTDTool

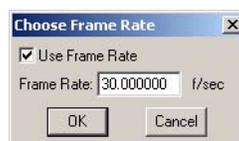
### 4.1 Using AMCAP

AMCAP is a utility that enables the user to capture video using the OV7640/OV7141 CX Evaluation Module. It also allows the user to adjust image quality controls, such as brightness, contrast, exposure, hue, saturation, sharpness, blacklighting, etc., as well as change image size, adjust frame rate and select format. AMCAP can be accessed by pressing the button on the OV7640/OV7141 CX Evaluation Module or by double-clicking on AMCAP.exe in the Utilities folder in the Drivers and Documentation CD.

#### 4.1.1 Capturing Video

To capture video to an AVI file:

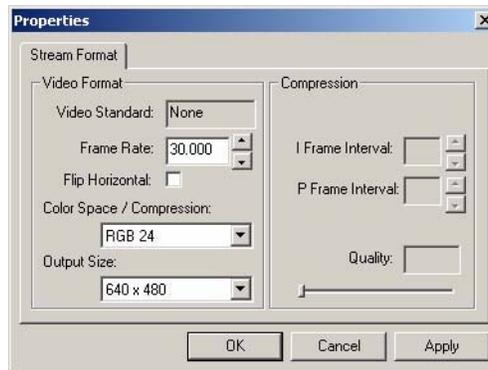
1. Set the capture by clicking **File** and then selecting **Set Capture File** from the pull-down menu.
2. When the Set Capture File window opens, type in a file name for the capture file in the File Name field box.
3. Navigate to find an appropriate location on your system to save the capture file and then, click on **Open**.
4. When the Set File Size dialog box appears, type in the size you want to limit the capture file size to be in Mbytes and then, click on **OK**.
5. Set the frame rate by clicking on **Capture** and then selecting **Set Frame Rate ...** from the pull-down menu.
6. When the Choose Frame Rate dialog box appears, type in the frame rate you want in the Frame Rate field box (make sure the Use Frame Rate box is checked off) and then, click on **OK**.



7. A time limit can be set for the captured video by clicking on **Capture** and then selecting **Set Time Limit ...** from the pull-down menu.
8. When the Choose Time Limit dialog box appears, type in the time period you want to limit the capture to in seconds (make sure the Use Time Limit box is checked off) and then, click on **OK**.



9. Other parameters, such as output size, frame rate, color space/compression, etc., can be set by clicking on **Options** and then selecting **Video Capture Pin ...** from the pull-down menu. Note that frame rate can be set from this window as long as the Use Frame Rate box is not checked off in the Choose Frame Rate dialog box (see [step 6](#)).



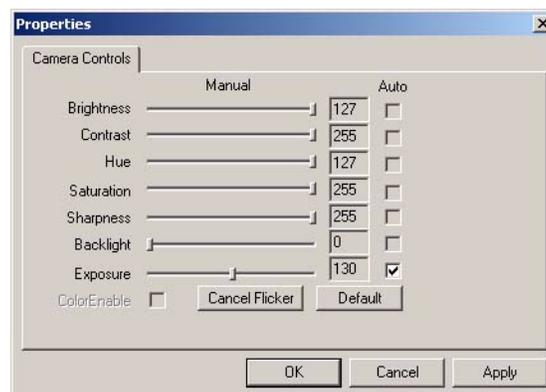
10. To start the capture, click on **Capture** and then select **Start Capture** from the pull-down menu.
11. When the Ready to Capture dialog box appears, click on **OK** to begin capturing video using the OV7640/OV7141 CX Evaluation Module.

#### 4.1.2 Adjusting Image Quality

AMCAP enables the user to adjust the following image qualities:

- Brightness
- Contrast
- Hue
- Saturation
- Sharpness
- Backlighting
- Exposure

To adjust the image quality produced by the OV7640/OV7141 CX Evaluation Module, click on **Options** and then select **Video Capture Filter ...** from the pull-down menu.



## 4.2 Using OVTDTTool

OVTDTTool is an IC debugging tool used to read and write to specific registers in the OV7640/OV7141 CAMERACHIP.

1. Ensure that the OV7640/OV7141 CX Evaluation Module is connected and running properly.
2. Verify that the Driver Selection field displays **ovtcam2**.



### 4.2.1 Reading a Specific Chip Register

To read the value of a specific register:

1. Click in the Sub Address field and enter the sub-address you want to view.
2. Hit the **<Tab>** key and the Write Data field will display the current value of the register.



### 4.2.2 Writing to a Specific Chip Register

To write a value to a specific register:

1. Click in the Sub Address field and enter the sub-address you want to write to.
2. Hit the **<Tab>** key and the current value of the register will be displayed and highlighted.
3. Enter the desired value and then, hit the **<Enter>** key.

### 4.2.3 Writing Chip Register Values to a Data File

To dump the register values to a file:

1. Click on **File** and select **New IC File** from the pull-down menu.
2. In the Notepad window, click on **File** and select **Save As...** from the pull-down menu.
3. Type in the name, **dump.ovt**, in the File name field, navigate to where you wish to keep the dump.ovt file and click on **Save**.
4. Close or minimize the Notepad window.
5. Click on **Dump to File** and the register values of the OV7640/OV7141 will be written and saved to the dump.ovt file.
6. To view the dump.ovt file, click on **View Dump File**.

### 4.2.4 Writing Data File Values to Chip Registers

To read data from a file and write the values to the OV7640/OV7141 registers:

1. Click on **File** and select **Open** from the pull-down menu.
2. Navigate to the location of the data file you wish to use. Highlight the file and click on **Open**.
3. Click on **Send File** and the data from the data file will be written to the OV7640/OV7141 registers.
4. Click on **View Data File** to just view the data file.

## 5 Product Description

### 5.1 Overview

OmniVision Technologies Inc. supplies prototyping and evaluation modules to demonstrate operation of the associated CAMERACHIP products, as well as to demonstrate associated companion back-end system ASICs, where required.

The OV7640/OV7141 CX Evaluation Module is intended for evaluation purposes. The module provides a USB 2.0 interface to easily demonstrate the CameraChip's features.

### 5.2 System Design Considerations

There are several implementation tips to consider for achieving the best results with the CameraChip:

- Be certain to provide a clean power source to the CAMERACHIP, especially the AVDD and SVDD power pins.
- The CAMERACHIP may be adversely affected by transient heat produced by associated components on the PCB. Avoid placement of heat-producing components on the PCB directly adjacent to or on the back-side of the CAMERACHIP. This will limit heat transfer to the CAMERACHIP and reduce the possibility of a poor image and failed components.
- To minimize the resistance and inductance of the PCB traces, be certain to design the PCB with the coupling bypass capacitors as close as possible to the CAMERACHIP power pin(s).
- To avoid ground-plane noise issues, use a separate PCB trace for the AGND and the DGND pins. Connect the two ground traces at a single point to the system ground.
- Orient the CAMERACHIP on the PCB with pin 1 down when facing the chip. This application will result in normal image attributes (i.e., right-side up images).

### 5.3 Module Schematic

Refer to [Figure 5-1](#) for the PCB schematic for the OV7640/OV7141 AA Prototyping Module. This schematic is provided to assist the development engineer with incorporating the OV7640/OV7141 CAMERACHIP into product designs. The schematic also includes the header-connector pin interface information of the OV7640/OV7141 AA Prototyping Module for easy system integration and CAMERACHIP evaluation.



**Note:**

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