Demo Kit Quick-Start Guide

Instructions for Using ON Semiconductor's CMOS Image Sensor Development Kits

Introduction

Thank you for purchasing an ON Semiconductor CMOS image sensor development kit, which are USB-powered camera boards that enable easy testing and characterization of ON Semiconductor® sensors.

ON Semiconductor's sensor demonstration software, DevSuite enables you to display images from your sensor. This software is downloaded from ON Semiconductor's website.

Follow the instructions below to assemble the kit and to download and install ON Semiconductor's DevSuite software.

Before continuing, please ensure that you meet the Hardware and Software requirements listed in Appendix A.

Also, if you have issues with getting the camera to be detected, review the "Trouble Shooting Guide".
A common problem with first-time users is their PC/laptop not having the latest USB3 Chipset FW.

Do not connect your kit to your USB3 port until instructed to do so.

Demo Kit Contents

Before you begin setting up the camera, please verify the components included in your particular kit. Please note that there are several types of kits.

Full Demo Kit contents

- ON Semiconductor development kit baseboard (Demo3)
- ON Semiconductor sensor headboard with lens
- USB3 cable, camera tripod

Headboard-only Demo Kit contents

- ON Semiconductor sensor headboard with lens

Demo Kit Assembly

1. Connect the headboard and baseboard via the 26-pin female connector located on the back of the baseboard and the 26-pin male header on the back of the sensor headboard.
2. For a full demo kit, screw the mini-tripod into the tripod mounting block.
3. For optional auxiliary boards, refer to their User Guide.

ON Semiconductor reserves the right to change products or specifications without notice.
© 2019 ON Semiconductor All rights reserved.
‡Products and specifications discussed herein are for evaluation and reference purposes only and are subject to change by ON Semiconductor without notice. Products are only warranted by ON Semiconductor to meet ON Semiconductor's production data sheet specifications.

Installing DevSuite – Windows OS

Download the base installer from here;
https://www.onsemi.com/pub/Collateral/DEVSUITE_SW.ZIP

Decompress the .zip file downloaded from the Web site and read the "Read-Me-First.doc" for information on the installation package.

To install the Software, double-click the file *setup.exe* and follow the instructions on your screen. If you have an earlier version of DevSuite on your computer, you will be prompted to uninstall it before proceeding with the new install.

If you experience application crashes or an installation error regarding failing to register "apbaseComPS.dll";

- Stop the DevWare installation (if in process).
- Download this ZIP file to your Desktop and perform "Extract".
- Run each EXE separately, and then rerun the DevWare installer (if it was in process).

Note: due to installation limitations, it is recommended to always install the Software in the same drive and location. If installed in a different drive, manually update your system "PATH" variable to remove the previous location, found by searching for "\aptina imaging". An internal search can be used for detailed instructions.

Additional Product Software Installers

Some products require a separate software installer to be downloaded, and some require an NDA.

In either case, after starting DevWare you will be prompted with instructions if an additional installer is required.

- For products that do not require an NDA, a URL to the additional installer will be displayed.
- For products that do require an NDA, you will be directed to a Web site where you can either login with your assigned credentials or request credentials. Other products require that you contact ON Semiconductor support.

Additional Support Software Installers

DevWareX requires Python to be installed for certain products in which you will be prompted to download the installer. It is recommended that you install Python in any case though – continue reading for instructions.
Using the provided URL link, download the installer and then exit DevWareX. Run the installer and then select "Install All". When the installer completes, rerun DevWareX. Here's the URL that will be displayed:
64-bit; https://www.python.org/ftp/python/3.6.3/python-3.6.3-amd64.exe
Note: if you have other Python versions installed, you may need to modify your PATH variable to ensure 3.6.3 is listed first if DevWareX doesn't work properly or you get Python errors.

Our color tuning application SensorTune requires a Matlab Runtime library to be installed.
In these cases, you will be prompted with a URL to use to download the additional installer.
Here is that URL; download, decompress, and double-click "Install" and follow the instructions.
http://ssd.mathworks.com/supportfiles/downloads/R2016b/deployment_files/R2016b/installers/win64/MCR_R2016b_win64_installer.exe

Other OS Platforms

DevWareX can also be installed and run on MacOS and LinuxUbuntu. Please use the following link for information and instructions;
https://aptina.atlassian.net/wiki/display/DEVS/Software+Downloads?src=contextnavpagetreemode

ON Semiconductor reserves the right to change products or specifications without notice.
© 2019 ON Semiconductor All rights reserved.
‡Products and specifications discussed herein are for evaluation and reference purposes only and are subject to change by ON Semiconductor without notice. Products are only warranted by ON Semiconductor to meet ON Semiconductor's production data sheet specifications.

You can now connect your kit to your USB3 port.

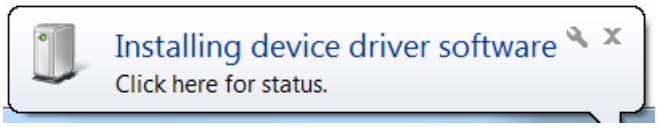
Starting Up the Software – XP Systems

Plug the kit into your computer using the USB cable provided. After a few seconds, your computer should detect new hardware and start the "Found New Hardware Wizard".

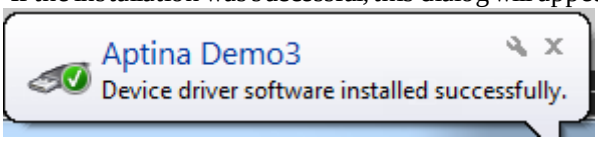
To complete the driver installation, follow the instructions in the document found via the start menu:
"All Programs > Aptina Imaging > Docs > User Guides > USB XP Driver User Guide"

Starting Up the Software – Windows7 and Windows10 Systems

Plug the kit into your computer using the USB cable provided. After a few seconds, your computer should detect new hardware and attempt to download the appropriate USB driver from the Microsoft driver server, during which this dialog should appear:



If the installation was successful, this dialog will appear:



You are now ready to Launch DevSuite – please proceed to "Launching the DevSuite Application".

If the download fails (either due to a failed Internet connection or your system's Firewall settings, or incorrect FW on the ON Semiconductor development kit baseboard), this dialog will appear:



To resolve the issue, follow the instructions in the document found via the start menu:
"All Programs > Aptina Imaging > Docs > User Guides > USB Windows7 Driver User Guide", "USB Windows8 Driver User Guide" and "USB Windows10 Driver User Guide" are found under "User Guides".

Start-up Issues

For any OS, if there is no indication of new HW being present, unplug and plug-in the USB cable.

If there is still no indication of new HW, see section "Trouble Shooting / Camera Not Found" under the 2nd dash "Outdated USB3 FW drivers on the PC".

ON Semiconductor reserves the right to change products or specifications without notice.
© 2019 ON Semiconductor All rights reserved.
‡Products and specifications discussed herein are for evaluation and reference purposes only and are subject to change by ON Semiconductor without notice. Products are only warranted by ON Semiconductor to meet ON Semiconductor's production data sheet specifications.

Launching the DevSuite Application

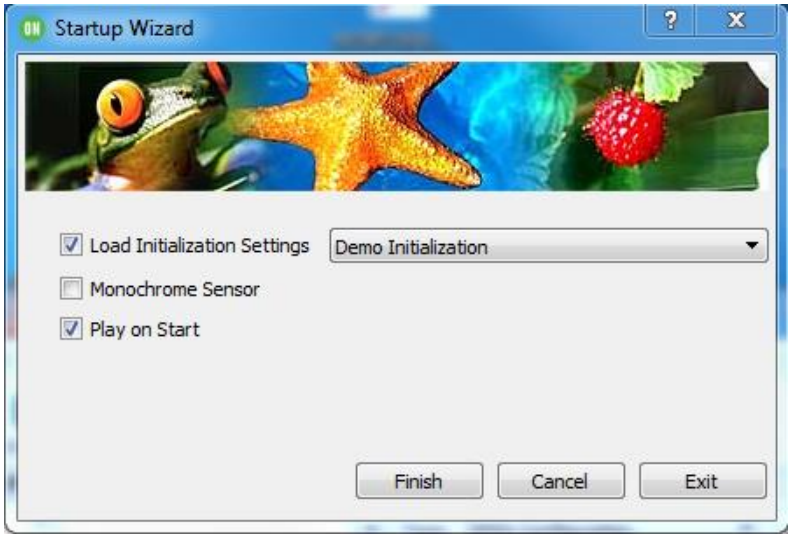
1. Go to the start menu, select "All Programs" then "Aptina Imaging" then "DevWareX." The popup window shown in Figure 1 will display as DevWareX probes for attached devices.
   Note: as described in the "Additional Product Software Installers" section, if the files required for your attached product are not found you will be prompted with a URL to download them.

Figure 1: DevWareX Popup – Searching for Attached Devices



2. After the software has found an attached device, the DevWareX window will appear with the dialog box shown in Figure 2 on page 3; select the settings shown. (Color/monochrome sensors will also need to have the color or monochrome box checked, as appropriate.) Click "Finish."

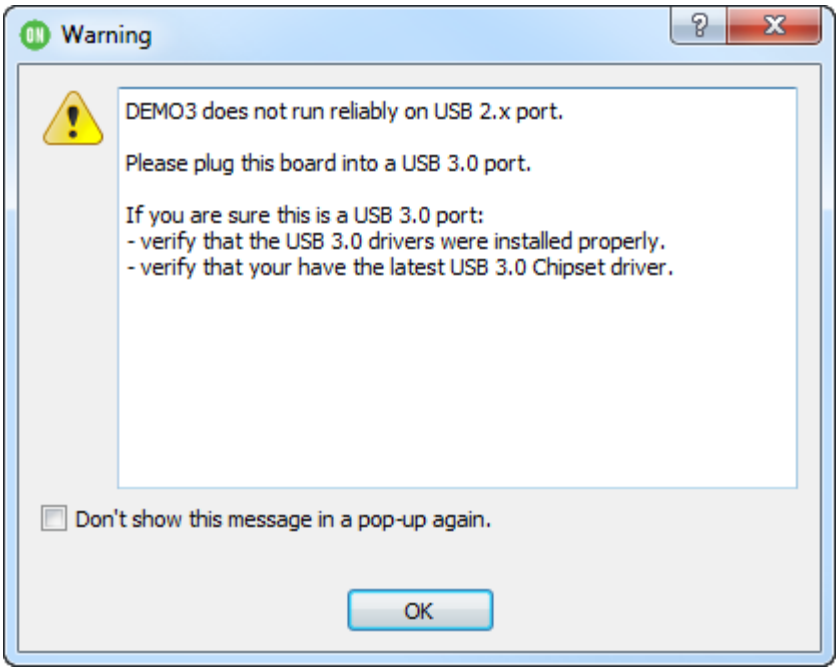
Figure 2: Startup Wizard Dialog



ON Semiconductor reserves the right to change products or specifications without notice.
© 2019 ON Semiconductor All rights reserved.
‡Products and specifications discussed herein are for evaluation and reference purposes only and are subject to change by ON Semiconductor without notice. Products are only warranted by ON Semiconductor to meet ON Semiconductor's production data sheet specifications.

Warning Dialog

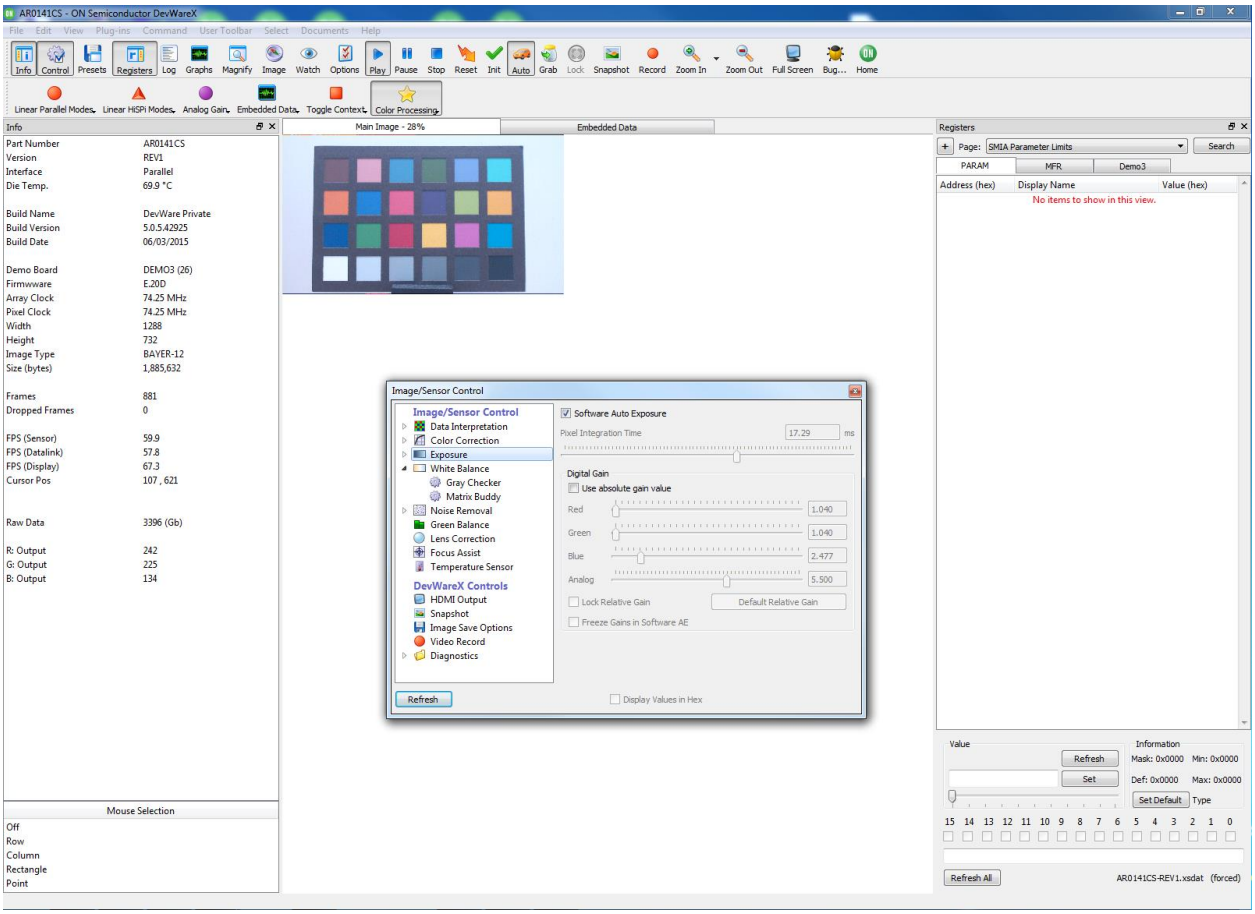
If you see the following dialog before the Startup Dialog in Figure 2;



1. Ensure you are truly connected to a USB3 port.
2. If you are, then update your USB3 Chipset FW as documented in "Trouble Shooting / Camera not found" under the 2nd dash "Outdated USB3 FW drivers on the PC".
3. If you still see the warning, contact your ON Semiconductor representative and request a new Demo3 of Revision 7 or newer.

ON Semiconductor reserves the right to change products or specifications without notice.
© 2019 ON Semiconductor All rights reserved.
‡Products and specifications discussed herein are for evaluation and reference purposes only and are subject to change by ON Semiconductor without notice. Products are only warranted by ON Semiconductor to meet ON Semiconductor's production data sheet specifications.

Figure 3: DevWareX Main Screen



The installation is complete.

For assistance using DevWare, see the help files within the application. Users will also notice that tooltip "pop-ups" are available for many controls; simply pause the cursor over the control to read the tooltip.

ON Semiconductor reserves the right to change products or specifications without notice.
© 2019 ON Semiconductor All rights reserved.
‡Products and specifications discussed herein are for evaluation and reference purposes only and are subject to change by ON Semiconductor without notice. Products are only warranted by ON Semiconductor to meet ON Semiconductor's production data sheet specifications.

Additional Applications and Resources

There are several additional DevSuite applications and resources that are useful for demonstrating and configuring sensors.

Sensor Demo

Sensor Demo is demonstration software that runs DevWareX in an abbreviated mode. The console only shows a basic toolbar and display area allowing for quick demonstration of a sensor. Other dialogs can be selected by using the appropriate dialog name. For example: View -> Info Dialog. Sensor Demo can be launched via the desk-top shortcut.

Side-by-Side Demo

This application allows two ON Semiconductor Imaging Demo cameras to be simultaneously displayed side-by-side. It is useful for comparing differences in equal sized sensors, although dissimilar sensors may also be used. Synchronous control of both images is provided for panning, zooming and play-state. Side-by-Side can be launched via the desk-top shortcut.

Software Development Kit (SDK) - ApBase

ApBase provides an API of the main functions of DevWare and is available for users to write their own applications to interface to ON Semiconductor sensors. Information can be found via the shortcut:
Start->All Programs-> Aptina Imaging->SDK.

ApBase files are included in the General Software installer, but a stand-alone installer is available for only the API files. ApBase stand-alone; download and install the API.

AiViewer

A video viewing application is available for installation via this link.

IQWare

An image quality evaluation tool is available via this link, with documentation found here.

LensTools

A stand-alone installer of the Lens Shading Correction command-line tool, available for installation via this link.

Training Videos

A set of training videos can be found via the shortcut:
Start->All Programs-> Aptina Imaging->Training->DevWare Training.

Documentation

There are various sets of documentation, including User and Development Guides, found via the Windows shortcut:
Start->All Programs->Aptina Imaging->Docs.

The documentation is also available from within DevWareX from the “Documentation” menu item.

Tools Shortcut

There are various other applications that can be found via the shortcut:
Start->All Programs-> Aptina Imaging->Tools.
Each has its own “Help” file

ON Semiconductor reserves the right to change products or specifications without notice.
© 2019 ON Semiconductor All rights reserved.
‡Products and specifications discussed herein are for evaluation and reference purposes only and are subject to change by ON Semiconductor without notice. Products are only warranted by ON Semiconductor to meet ON Semiconductor’s production data sheet specifications.

Trouble Shooting

- DevWareX crashes during start up.
  - Install Python as described in section "Additional Product Software Installers".
  - Found mostly in cases when the Python Anaconda package is installed.
- "Camera not found"
  - If a Demo3 baseboard is attached and this error appears, there are 2 possible causes.
    - USB3 driver start-up; simple disconnect and reconnect the USB3 cable and retry.
    - Outdated USB3 FW drivers on the PC. If this is first time you've installed DevWare and/or the first time you've attached a Demo3, it is possible you need to update the USB3 FW driver on your PC.
      Do a Web search of "<Your PC manufacturer> <Your PC Model> USB3 FW driver update".
      Find a search result that either matches your PC or one for "Intel" (most common USB3 chipset).
    - Windows10; driver certification has not yet been disabled – see Appendix A.
- Demo3 won't stream data or stops streaming data
  - Ensure that you are connected to a USB3 port on your PC. This can be identified as either having a blue connector, or with a label of "SS" (for Super Speed). Some USB2 port implementations are not backward compatible to USB3.
- "Unable to identify attached device".
  - Read the "Read-Me-First.doc" from the installation package to ensure that all required files have been installed.
  - Ensure that the installation package name is matched to the sensor.
  - Another possible cause is non-working Hardware; if you already have the required SDAT file, then do the following;
    - Start DevWare and when the warning dialog appears select "No".
    - When the "Startup Choices" dialog appears, select "Sensor…" and select the SDAT that matches your sensor.
    - When the "Startup Wizard" dialog appears, unselect all check-boxes and select "Finish".
    - In the "Registers" dialog, select any page; if the values are all zero, then you have non-working Hardware.
- Image won't display / DevWare exits before displaying an image.
  - Outdated Graphics display drivers on the PC. If this is first time you've installed DevWare and/or the first time you've attached a Demo3, it is possible you need to update the Graphics driver on your PC.
    Do a Web search of "<Your PC manufacturer> <Your PC Model> Graphics driver update".
    Also, if samples\SimpleQT shows an image, then check for other graphics-based libraries installed on your PC.
- Windows 7: the USB driver can't be found, or device not recognized.
  - On an XP-based OS, run the "Hardware Update Tool" to ensure the correct version of FW is installed; see "USB Driver User Guide" for details. Accessed via:
    Start->All Programs->Aptina Imaging->Docs->User Guides
- The Frame Rate is very low.
  - The amount of data being processed is quite significant for large display sizes, especially on larger sensors. Lower the size of the displayed image.
  - Ensure that the HW and SW requirements as defined in Appendix A are met.
- On XP on DevWare start-up, errors of "The procedure entry point …" are reported.
  - Ensure that Service Pack 3 (SP3) is installed.

ON Semiconductor reserves the right to change products or specifications without notice.
© 2018 ON Semiconductor All rights reserved.
‡Products and specifications discussed herein are for evaluation and reference purposes only and are subject to change by ON Semiconductor without notice. Products are only warranted by ON Semiconductor to meet ON Semiconductor's production data sheet specifications.

Reporting Bugs

If you are having issues with any of the applications, please use the "Bug" icon  on the menu bar to open "Bug Report" dialog. Your system and sensor configuration information will be filled-in automatically.
Please enter information in to "Bug Description" and "How to reproduce the bug" fields, select the "Copy to Clipboard" button, and then paste that information in to an Email using the address provided in the dialog.

If you experience a "Crash", please follow the instruction provided via the link.

ON Semiconductor reserves the right to change products or specifications without notice.
© 2018 ON Semiconductor All rights reserved.
‡Products and specifications discussed herein are for evaluation and reference purposes only and are subject to change by ON Semiconductor without notice. Products are only warranted by ON Semiconductor to meet ON Semiconductor's production data sheet specifications.

Appendix A

Requirements

Hardware and software requirements for ON Semiconductor's development kit are detailed below.

Hardware Requirements

- Pentium III 450 MHz or higher (a faster processor will improve the displayed frame rate on the PC). Advanced noise reduction, sophisticated demosaic, and high dynamic range processing are very CPU-intensive
- Available C: HDD space of at least 600Mb, even when installation will be to another drive.
- Available RAM at least sensor size times 40 bytes. For example 600MB available RAM for a 14MP sensor. Remember to account for RAM needed by the system and by other applications or memory-resident software when calculating total system RAM requirements
- Compatible USB 3.0 host controller.
  Most newer PCs and Laptops have Intel Integrated Chipsets, which will work with the Demo3. Use this link to review known supported systems.
  Note: some USB2 port implementations are not backward compatible to the Demo3, and may cause loss of data streaming and/or poor performance. It is highly recommended that you DO NOT connect the Demo3 to a USB2 port.
- Graphics card and drivers capable of handling the images from the sensor. Some graphics cards or drivers will not display images much larger than about 8MP

Software Requirements

- Windows XP with a minimum of Service Pack 3 or
- Windows 7 with a minimum of Service Pack 1 or
- Windows 8, but USB3 driver certification must be disabled via this process.
- Windows 10 requires no Service Packs.

- The latest FW drivers for the USB 3.0 host controller.
  Do a Web search of "<Your PC manufacturer> <Your PC Model> USB3 FW driver update".
- Python; for products that require it, you will be prompted with the URL for the location of where to download the installer.
- Matlab Runtime Library; DevSuite's SensorTune application requires this.
  You will be prompted with the URL for the location of where to download the installer.

ON Semiconductor reserves the right to change products or specifications without notice.
© 2018 ON Semiconductor All rights reserved.
‡Products and specifications discussed herein are for evaluation and reference purposes only and are subject to change by ON Semiconductor without notice. Products are only warranted by ON Semiconductor to meet ON Semiconductor's production data sheet specifications.