TECHNICAL SUPPORT

Computer Configuration

Andor CB2 Cameras

Table

Glossary

- **HDR**: High Dynamic Range
- **ADU**: Analog Digital Unit
- **HG**: High Gain
- **LG**: Low Gain
- **ADC**: Analog to Digital Converter
- **NUC**: Non Uniformity Correction
- **IWR**: Integrate While Read
- **ITR**: Integrate Then Read
- **FPS**: Frames Per Second
- **CDS**: Correlated Double sample

1. Introduction

The goal of this technical note is to describe how to configure your computer to be able to operate your Andor CB2 camera. It includes the recommended computer specifications, how to configure it (on Windows), and specific instructions to use the GigE Vision protocol.

2. Minimum computer specifications

The minimum computer requirements are heavily dependent on the specific model of Andor CB2 camera you have. Specifically, requirements will get harsher for cameras with more pixels. In this document, we will refer to recommended computer specifications, which will correspond to configurations we have tested and know work.

There are currently 5 models of Andor CB2 cameras:

- Andor CB2 0.5 camera, equipped with an IMX426LLJ-C 816 x 624 pixels sensor.
- Andor CB2 1.7 camera, equipped with an IMX425LLJ-C 1608 x 1104 pixels sensor.
- Andor CB2 7.1 camera, equipped with an IMX420LLJ-C 3216 x 2208 pixels sensor.
- Andor CB2 UV camera, equipped with an IMX486-AAMJ-C 2848 x 2848 pixels sensor.
- Andor CB2 24B camera, equipped with an IMX530-AAMJ-C 5328 x 4608 pixels sensor.

Each of these cameras support several pixel formats, from 8-bits to 16-bits. In this document, we will assume the worst-case scenario and estimate requirements for 16-bits pixel format.

Functionalities that can be constrained due to insufficient computer performance include:

- Small buffer size for playback of acquisition, due to insufficient RAM space available.
- Slow playback speed of acquisition, due to insufficient RAM, CPU speed. Using a dedicated GPU can help.
- Failing to live record to disk, due to insufficient SSD and / or CPU performance.

Thus, the critical parts of your computer are the CPU, RAM, and SSD. In all cases, a dedicated GPU will help.

2.1. Andor CB2 0.5 and Andor CB2 1.7

These two cameras are in the same class and have the lowest requirements. We recommend using:

- Intel 10th Gen 4 cores CPU or above (meaning latter Generations (11th, 12th, 13th…) and / or higher core counts will work as well).
- At least 32 GB of DDR4 RAM (for the Andor CB2 0.5, 16 GB is enough). Any speed should work.
- SSD capable of more than 1.5 GB/s sustained writes. For example, the 'Samsung MZVLB1T0HBLR' drive is sufficient.
- A motherboard with a separate 2.1 / 3.1 PCIe (x4 lanes) port or better.
- A dedicated GPU is not strictly necessary but will help with live playback and statistics computation.

2.2. Andor CB2 7.1 and Andor CB2 UV

These two cameras have harsher requirements, having significantly higher pixel counts. We recommend using:

- Intel 11th Gen 4 cores CPU or above (meaning latter Generations (12th, 13th…) and / or higher core counts will work as well).
- At least 64 GB of DDR4 RAM. Any speed should work.
- SSD capable of more than 2.2 GB/s sustained writes. For example, the 'Samsung MZVLB1T0HBLR' drive is barely sufficient.
- A motherboard with a separate 2.1 / 3.1 PCIe (x4 lanes) port or better.
- A dedicated GPU will significantly improve the user experience, particularly for live playback.

2.3. Andor CB2 24B

This camera has the largest sensor we integrate. It requires a very performant computer to properly drive it. We recommend using:

- Intel 13th Gen Core i9-13900K 3.00 GHz (with 24 cores) or better (meaning latter Generations, higher speeds and / or higher core counts will work as well).
- At least 128 GB of DDR4 RAM. DDR5 is better. At least 3000 MHz.
- SSD capable of more than 4.00 GB/s sustained writes. For example, the 'Samsung 990 PRO 2TB SSD' drive is sufficient.
- A motherboard with a separate 3.0 PCIe (x8 lanes) port or better.
- A dedicated GPU is required for live playback and displaying live statistics about your images.

3. Software configuration

3.1. Software

To operate your Andor CB2 camera, we recommend the use of our proprietary GUI First Light Vision or our Software Development Kit FliSDK. These two software packages are available on Windows® 10, Windows® 11, Ubuntu® 18.04 and 20.04 LTS.

All software is available on Andor's website: https://andor.oxinst.com/downloads/?categories=28. You can select 'CB Series' in the 'Product family' sorting box to find First Light Vision, FliSDK (listed as First Light Imaging SDK) and the redistributables (for Zebra (formerly Matrox) 'Matrox Redistributable').

Please note, however, that using First Light Vision or FliSDK is not an obligation. You can operate your camera using your frame grabber's software as well.

3.2. Specific configuration for Windows and GigE Vision: Jumbo frames

Jumbo frames refer to Ethernet frames with packet sizes larger than 1500 bytes. Thus, the 'Jumbo frames' functionality refers to whether the system can use such frames. This is disabled by default on Windows and is a requirement for the proper operation of the camera through GigE Vision.

To enable Jumbo frames:

- Open the Control panel (to do so, you can search for 'Control panel' in the task bar).
- Click on 'Network and Internet'.
- Click on 'Network and Sharing Center'.
- On the left, click on 'Change adapter settings'.
- Right-click on the device for which you want to enable Jumbo frames (in this case, every 10Gb port from your Ethernet card) and click on 'Properties'.
- In the 'Networking' tab, click on 'Configure…'.
- In the 'Advanced' tab, select 'Jumbo frames' and change it to 9014 Bytes.
- Still in the 'Advanced' tab, select Receive-Buffer-Size and change it to a value between 2000 and 4000 (corresponding to between 2GB and 4GB). Do the same for the Send-Buffer-Size.
- Reboot your computer.

4. Using GigE Vision

CB2 supports the GigE Vision protocol; we support Zebra's (formerly Matrox) implementation to transfer its frames, and this document will focus on this. However, please note that other stacks may be used for GigE Vision, for which we will not provide specific support.

To use GigE Vision, you will need two things: a 10Gb or 2x10 Gb network card and a license from Zebra.

Zebra uses special dongles to handle their licenses. These dongles come in the form of very small USB devices, like what is used by some wireless peripherals (mouses, keyboards…) to connect to your computer. You can purchase the dongles either from your local Zebra distributor or directly through us.

Fig. 1 : *Photo of a plugged Zebra license dongle*

Once you have received them, the dongles may need to be activated before you can use them. To do so, you will need to have MIL X Lite installed on your computer. You can find a MIL X Lite package compatible with your distribution in your account's library, under 'Redistributables'.

After downloading the Redistributable for Zebra, unzip the folder, open it and run the 'MIL64Setup' executable. Follow the installation procedure. At some point during installation, you will have the option to change the 'Non-paged memory size'. Set it to 256 and continue.

Once MIL is installed, you will need to install a patch. This patch is in the Matrox/MatroxValid folder. This folder contains a readme.txt file, follow its instructions to install the patches corresponding to your configuration.

Note: If you purchased your dongle through us (either as a standalone item or a product included with your Acquisition pack or your camera), it is already activated. You do not need to follow the following instructions: you only need to plug the dongle in your computer.

Plug the unactivated dongle then open MILConfig, a program that was installed during this process. In MILConfig, go to 'Licensing', then 'Generate'. Select the dongle in the device list (it should appear as 'CmStick dongle'), then select the 'Interface' package. Click 'Generate' to generate a Lock Code.

You will need to send this Lock Code to your local Zebra supplier, along with the serial number of the dongle and your MIL X license number. If you are using MIL X Lite (which is what you have installed if you used the package available in your First Light account's library), specify that you have installed MIL X Lite instead.

They will send you a License number, which you can enter in the 'License Key' field in 'Licensing -> Activate'. Click 'Activate', and the dongle should now be activated. You will be able to use GigE Vision if the dongle is plugged into the computer you are using. Furthermore, the dongle can be moved from computer to computer: it is not tied to a single machine.

For any further information, please contact Oxford Instruments First Light Imaging's support team at fli-support@oxinst.com.

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