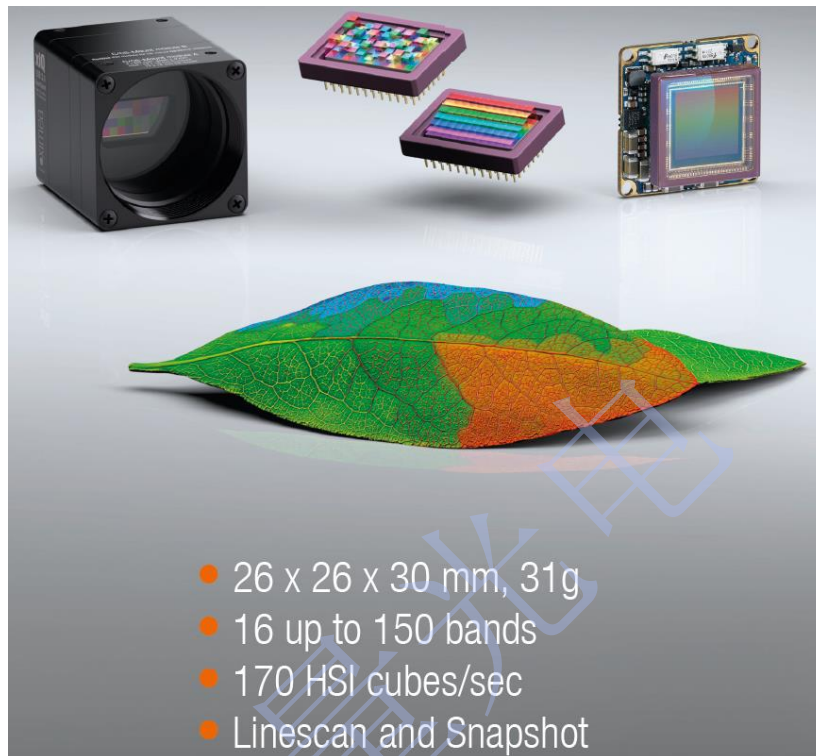


# xiSpec

## USB-stick – content



### Technical manual

The technical manual of our xiQ series which is the platform for the xiSpec cameras is stored in the folder xiQ-Manual. This document is also available at: [http://www.ximea.com/downloads/usb3/manuals/xiq\\_technical\\_manual.pdf](http://www.ximea.com/downloads/usb3/manuals/xiq_technical_manual.pdf)

The camera model MQ022MG-CM fits best.

The installation of our API / SDK is described in chapter 5.3ff.

### General info about xiSpec

Files available on the USB-Stick:

xiSpec Whitepaper: xiSpec-whitepaper\_V05.pdf in the main folder  
general info from IMEC: folder IMEC-Public

## API / SDK / drivers:

Our API / drivers etc. are available for download for free:

Most recent beta version: <http://www.ximea.com/support/documents/14>

Stable version (and LINUX / MacOS files): <http://www.ximea.com/support/documents/4>

Part of the driver/API are two standard viewers: xiViewer and xiCamTool (recommended)

One version of the API package for Windows is stored in the subfolder XIMEA-API.

## Sensor calibration data

The sensor specific calibration data (measured and calculated by IMEC) are stored in the folder xiSpec-calibration-data.

Some documentation is available in three different files (imec changes the file format several times) in the main folder:

TR\_sensor\_calibration\_files-V01.pdf

TR\_sensor\_calibration\_files-V02.pdf

TR\_sensor\_calibration\_files-V03.pdf

Part of this calibration file is an info about the active sensor area, e.g.

```
<filter_area version="0">  
  <offset_x>0</offset_x>  
  <offset_y>3</offset_y>  
  <width>2045</width>  
  <height>1080</height>  
</filter_area>
```

The offset data is the info where the upper left corner of the first (upper left) hyperpixel is located (chapter 3.3.1 in the file TR\_sensor\_calibration\_files.pfd).

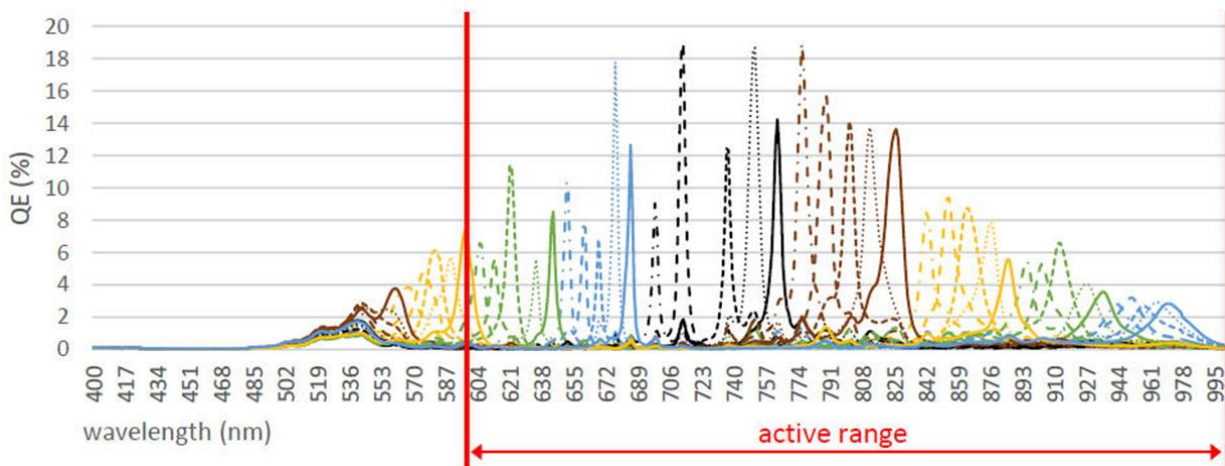
The info about all bands is documented in chapter 3.5

1. pattern\_position\_index: The 0-based index for the position of the band in the pattern, numbered from left to right, top to bottom.

### 3.5.2 Tag response\_composition

Contains the spectral composition of a band's response as measured during the calibration. This information depicts the contribution of each wavelength in the illumination to the band's signal.

To understand the values of the RAW image it may help to visualize the sensor response values:



### Development:

A software solution must be used / developed that is able to acquire the RAW-data from the camera and read and interpret these calibration data. An API/SDK is available for free. Please note that additional software components or own image processing is required to generate the so called hyperspectral cubes.

Link to our API: <http://www.ximea.com/support/wiki/apis/APIs>

C/C++ manual: [http://www.ximea.com/support/wiki/apis/XiAPI\\_Manual](http://www.ximea.com/support/wiki/apis/XiAPI_Manual)

C# manual: [http://www.ximea.com/support/wiki/apis/XiAPINET\\_Manual](http://www.ximea.com/support/wiki/apis/XiAPINET_Manual)

After installation of the API you'll find some samples (with complete source code) at:

C:\XIMEA\Examples (Windows):

xiSample	C: how to start
xiAPI.NET	C#: how to start
xiViewer	sourcecode of our standard viewer

Please do not use MONO modes. Only RAW8 or RAW16 will deliver the original sensor data. MONO8 / MONO16 is a post-processed format. Please note

[http://www.ximea.com/support/projects/apis/wiki/XiApi\\_Manual#XI\\_PRM\\_IMAGE\\_DATA\\_FORMAT-or-%E2%80%9Cimgdataformat%E2%80%9D](http://www.ximea.com/support/projects/apis/wiki/XiApi_Manual#XI_PRM_IMAGE_DATA_FORMAT-or-%E2%80%9Cimgdataformat%E2%80%9D)

[http://www.ximea.com/support/projects/apis/wiki/XiApi\\_Manual#Data-Format-Dependency-Table](http://www.ximea.com/support/projects/apis/wiki/XiApi_Manual#Data-Format-Dependency-Table)

You can set the output bit depth using:

[http://www.ximea.com/support/projects/apis/wiki/XiApi\\_Manual#XI\\_PRM\\_SENSOR\\_DATA\\_BIT\\_DEPTH-sensor\\_bit\\_depth](http://www.ximea.com/support/projects/apis/wiki/XiApi_Manual#XI_PRM_SENSOR_DATA_BIT_DEPTH-sensor_bit_depth)

[http://www.ximea.com/support/projects/apis/wiki/XiApi\\_Manual#XI\\_PRM\\_OUTPUT\\_DATA\\_BIT\\_DEPTH-output\\_bit\\_depth](http://www.ximea.com/support/projects/apis/wiki/XiApi_Manual#XI_PRM_OUTPUT_DATA_BIT_DEPTH-output_bit_depth)

[http://www.ximea.com/support/projects/apis/wiki/XiApi\\_Manual#XI\\_PRM\\_IMAGE\\_DATA\\_BIT\\_DEPTH-image\\_data\\_bit\\_depth](http://www.ximea.com/support/projects/apis/wiki/XiApi_Manual#XI_PRM_IMAGE_DATA_BIT_DEPTH-image_data_bit_depth)

It is recommended to use the data packing to increase the transfer speed in case of a bit depth of 10 or 12 bits.

If you need to change the exposure time during your operation please use the parameter

[http://www.ximea.com/support/projects/apis/wiki/XiApi\\_Manual#XI\\_PRMM\\_DIRECT\\_UPDATE](http://www.ximea.com/support/projects/apis/wiki/XiApi_Manual#XI_PRMM_DIRECT_UPDATE)

## **Analysis software**

We have stored a tool scyven from NICTA, Australia on the USB-stick (subfolder NICTA-Scyven). This software can be used to analyze data stored in standard ENVI file formats (e.g. HDR/BSQ).

## **XIMEA demo tool (Windows only)**

A first simple demo tool to grab and store hyperspectral data from our snapshot mosaic xiSpec cameras is stored as a ready to use application in the subfolder xiSpec01-Beta.

Please type in the wavelength of an additional filter (if used) in the appropriate input fields, then simply start the data acquisition.

A spectral response curve (w/o spectral correction) is visible for all pixels of the image (current mouse position) in the lower left window.

It is recommended to calibrate the sensor data using a white calibration target at first (use an exposure time to get a 80-90% saturation level in the middle of the sensor).

You will find a Button "W" in the lower right corner. Please press this button to grab the white calibration image to initiate the "vignetting" correction.

This tool can be used to store ENVI-files in the subfolder images.