LabView Tutorial

Image Acquisition Using IMAQdx
(examples using a webcam)

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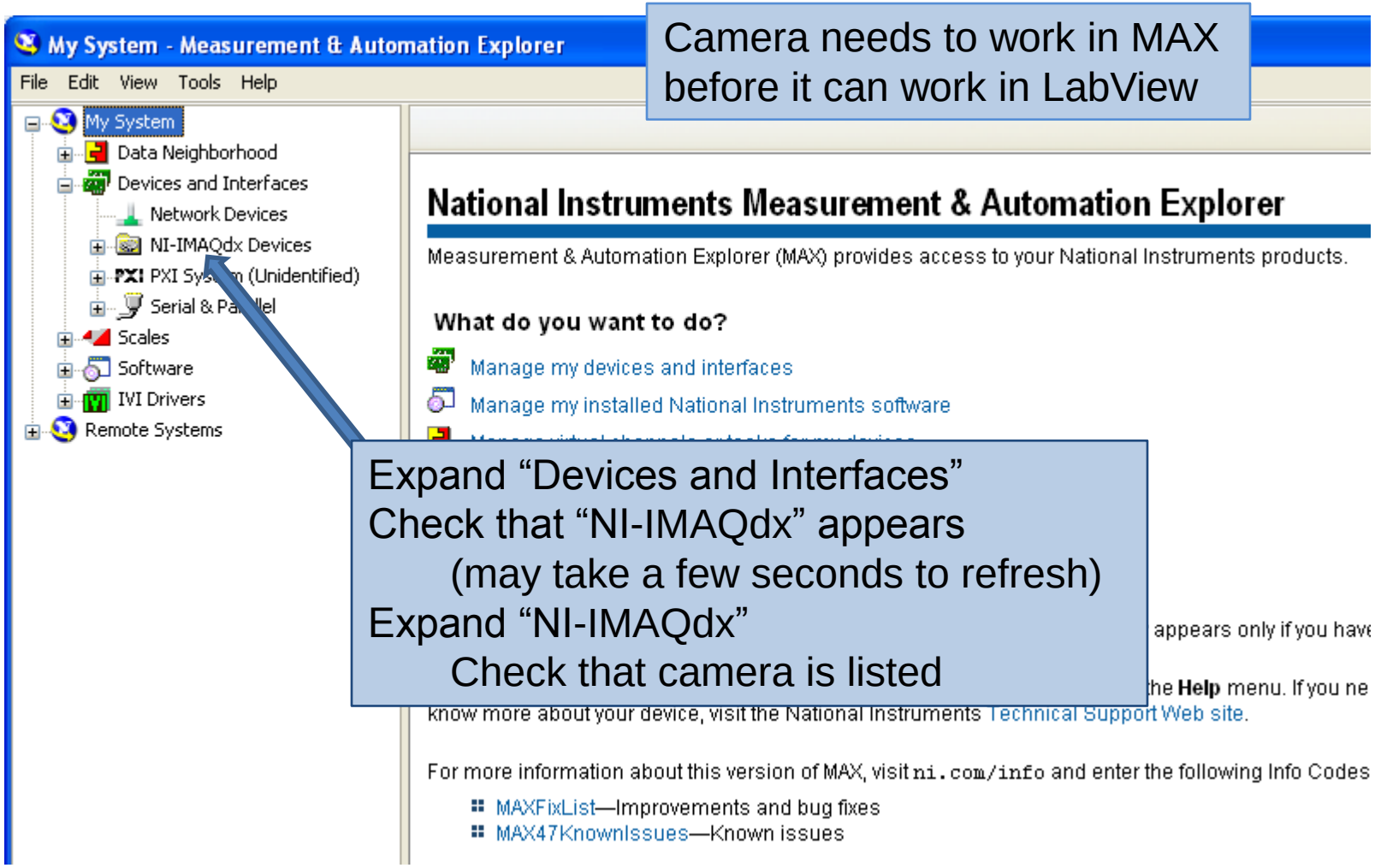
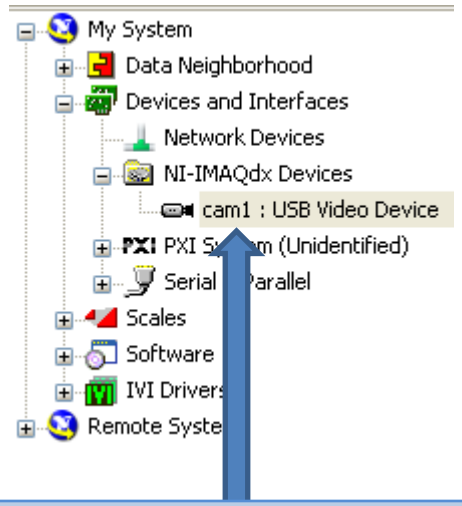
Measurement & Automation Explorer (MAX)



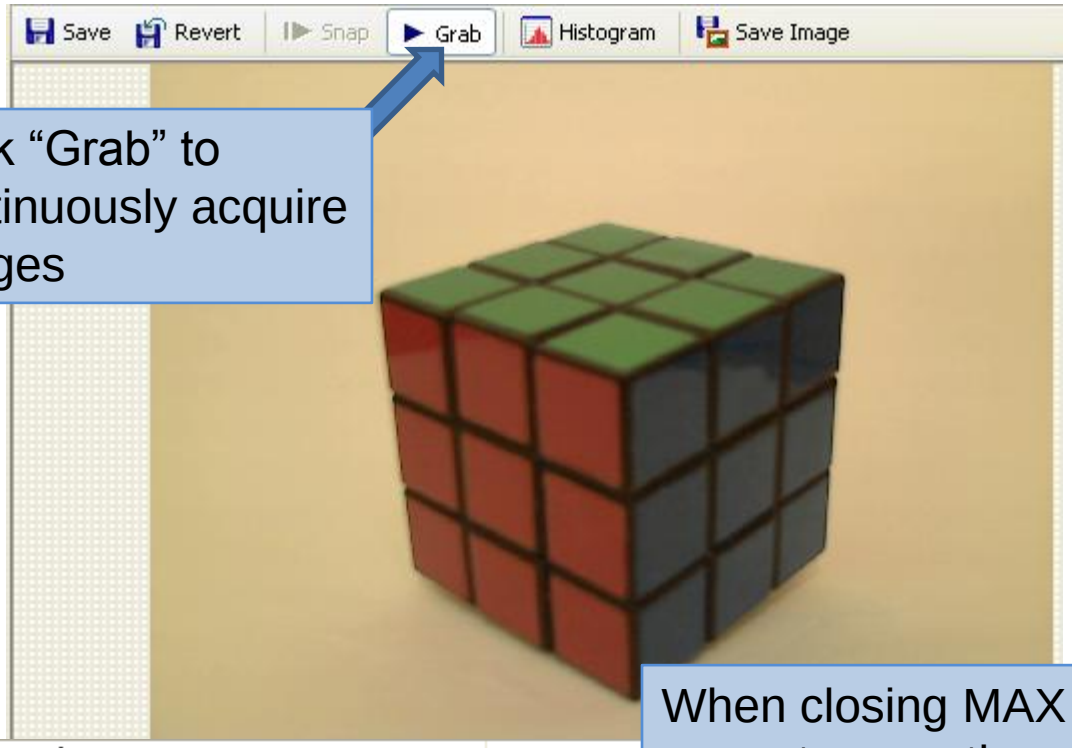
Camera needs to work in MAX before it can work in LabView

Expand “Devices and Interfaces”
Check that “NI-IMAQdx” appears
(may take a few seconds to refresh)
Expand “NI-IMAQdx”
Check that camera is listed

Setting the camera exposure

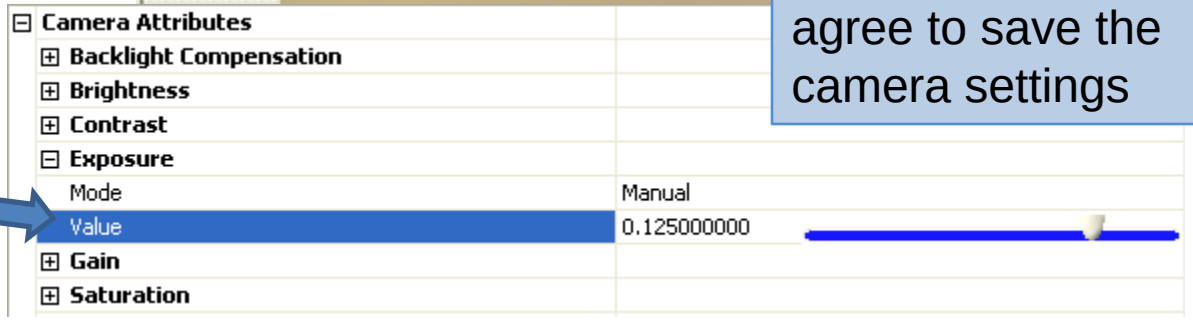


This is the name “cam1” that LabView uses to identify the camera



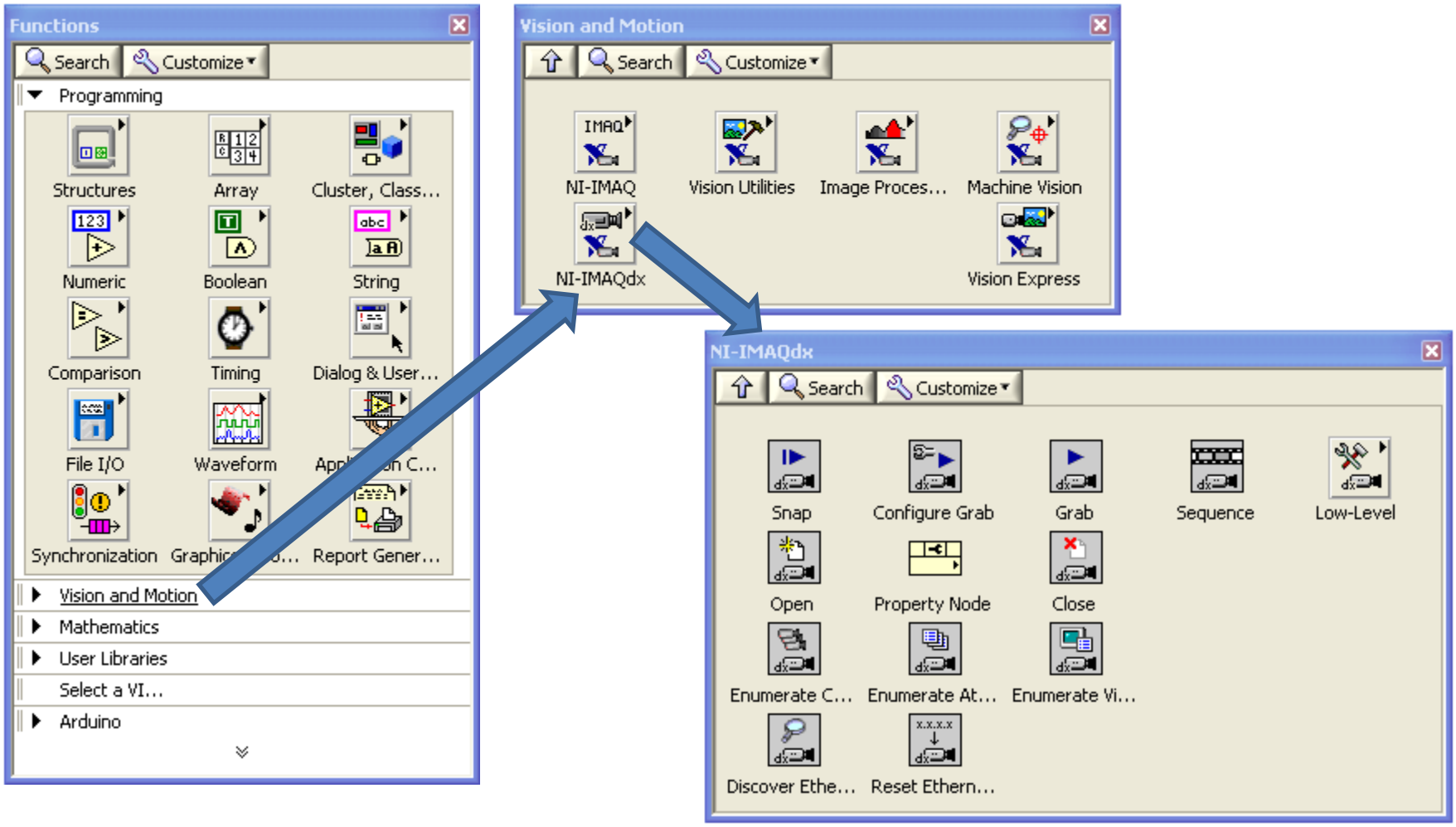
Click “Grab” to continuously acquire images

When closing MAX agree to save the camera settings

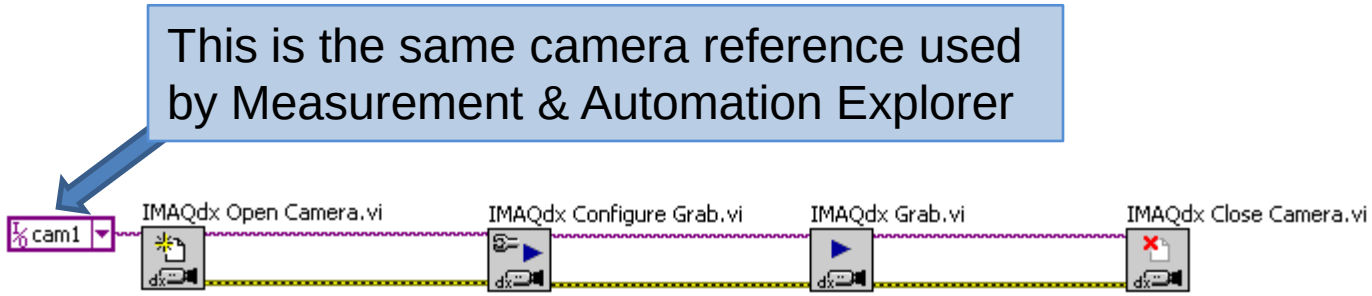


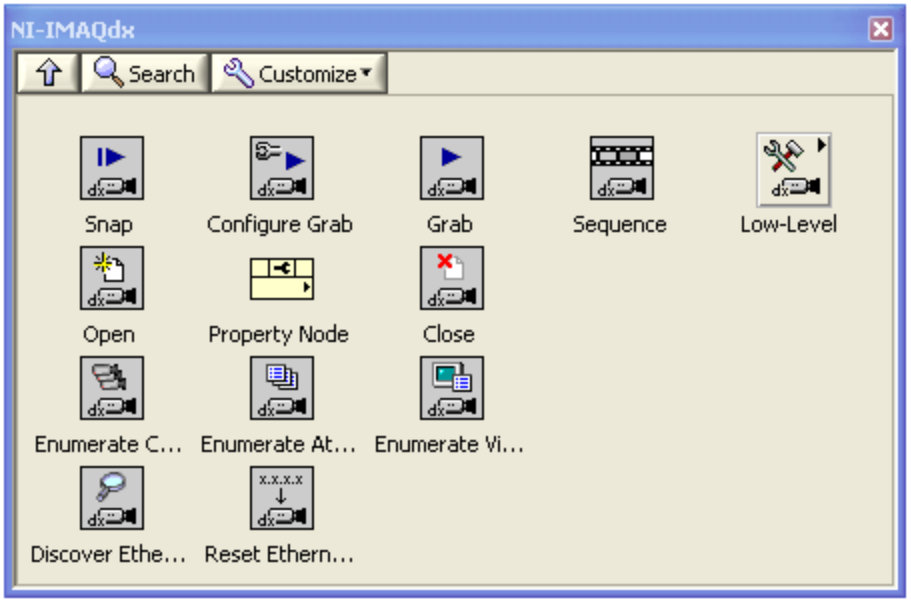
Adjust the exposure & gain

Using NI-IMAQdx in LabView



Setting up an image acquisition

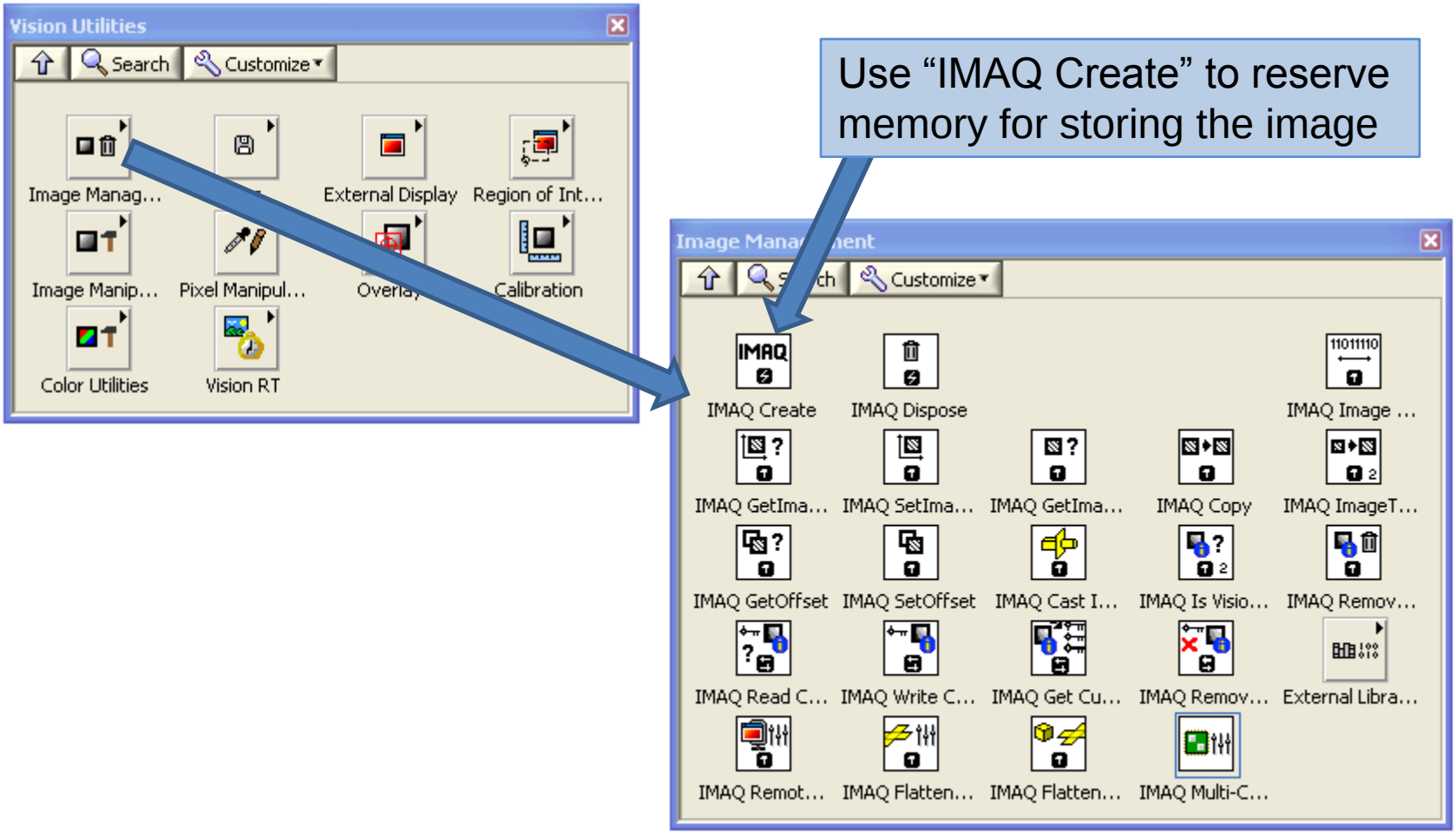




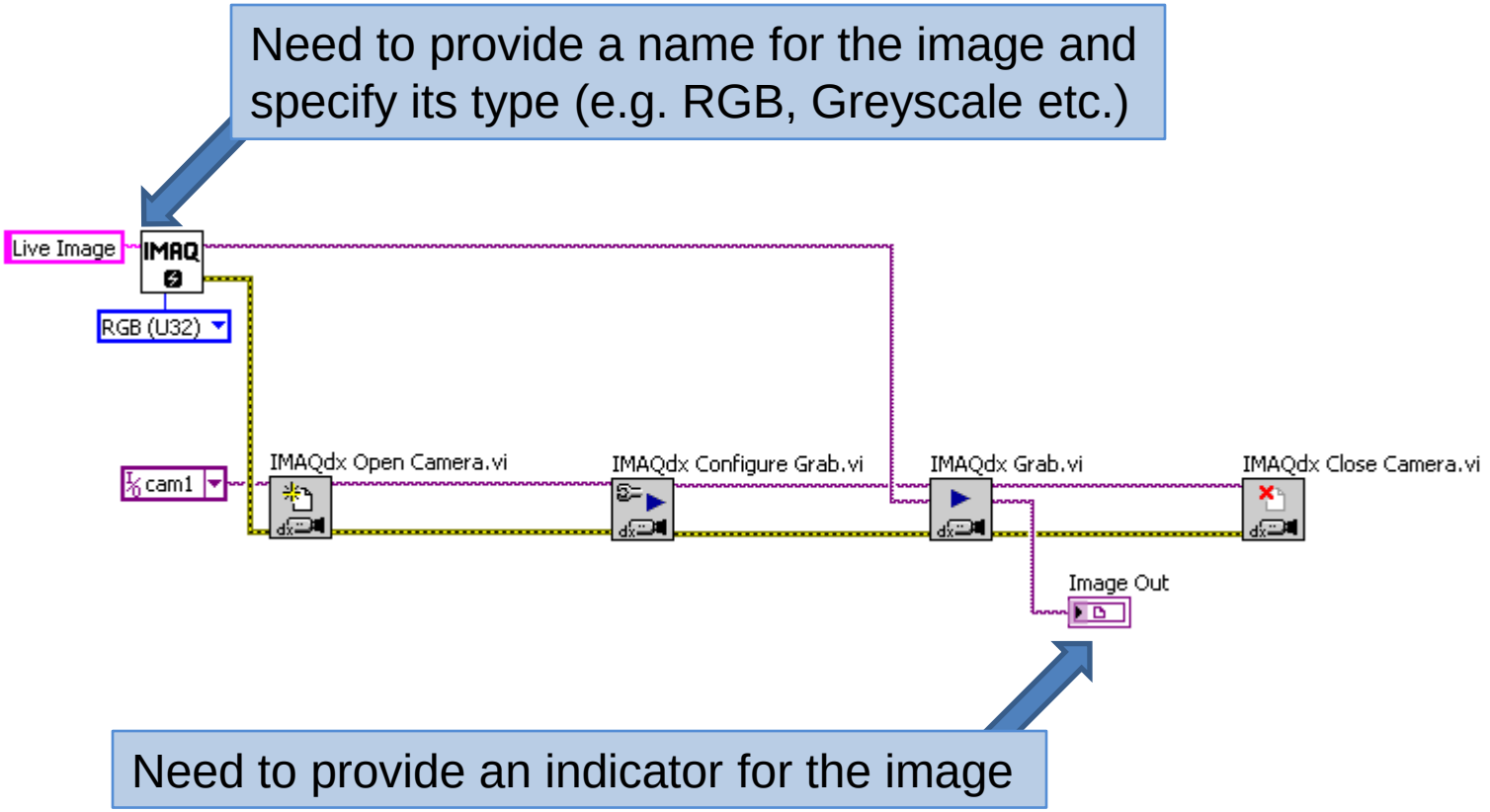
Require the following sequence:

1. Open camera
2. Configure the acquisition
3. Grab image
4. Close camera

Image management in LabView

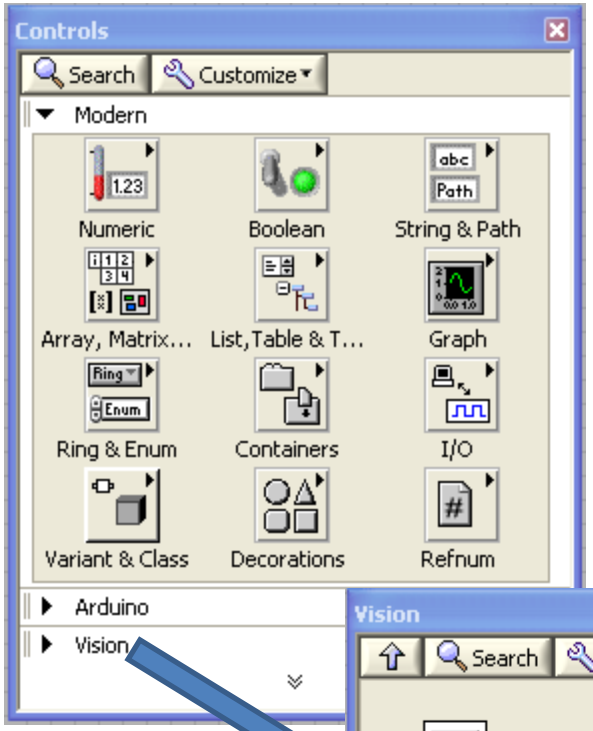


Basic camera software

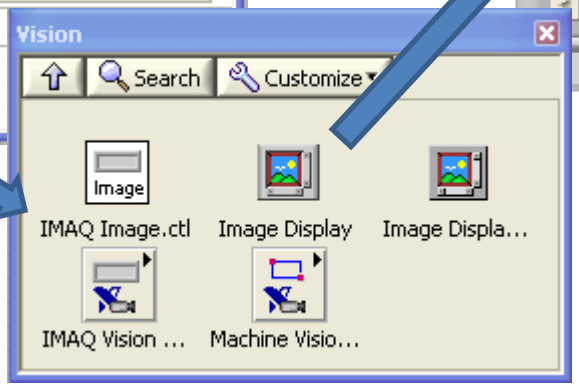


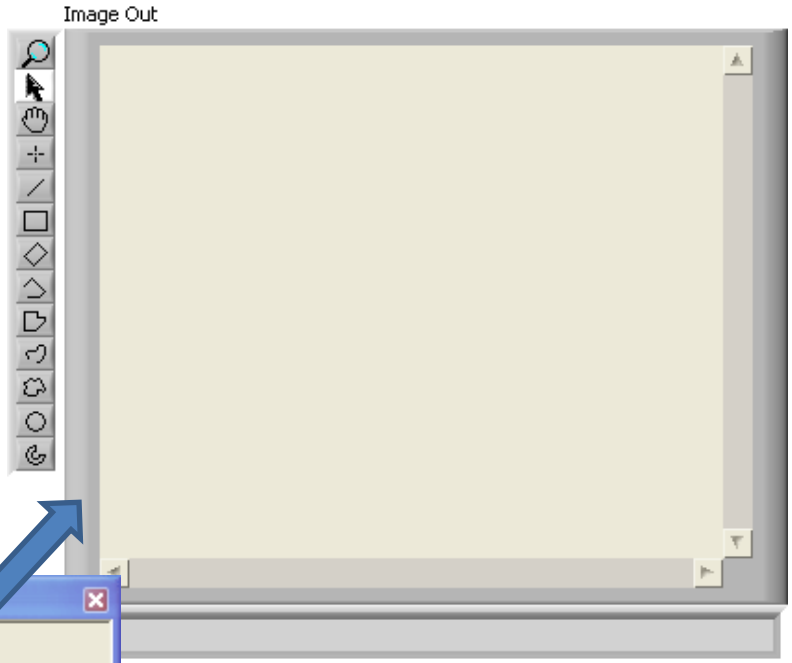
Providing an image indicator

1. On front panel right click indicator and select “replace”



2. Select “Vision”



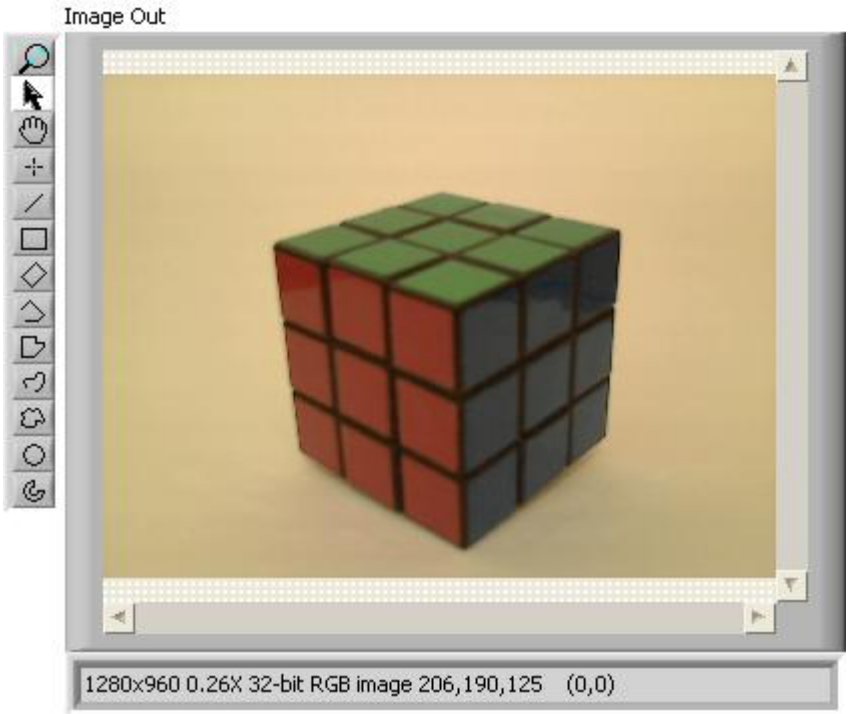


3. Select “Image Display”

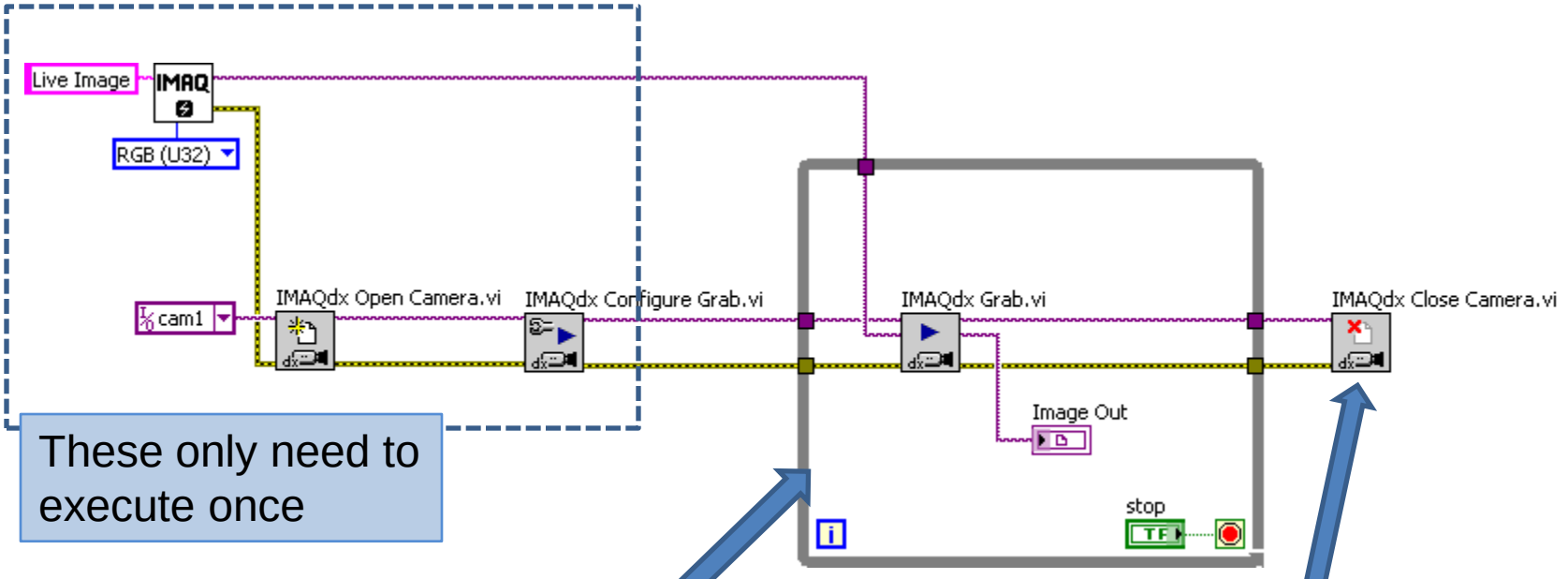
Run program – snapshot image

Run program once.

Program initialises the camera, grabs a single image then closes the camera.



Continuous image acquisition

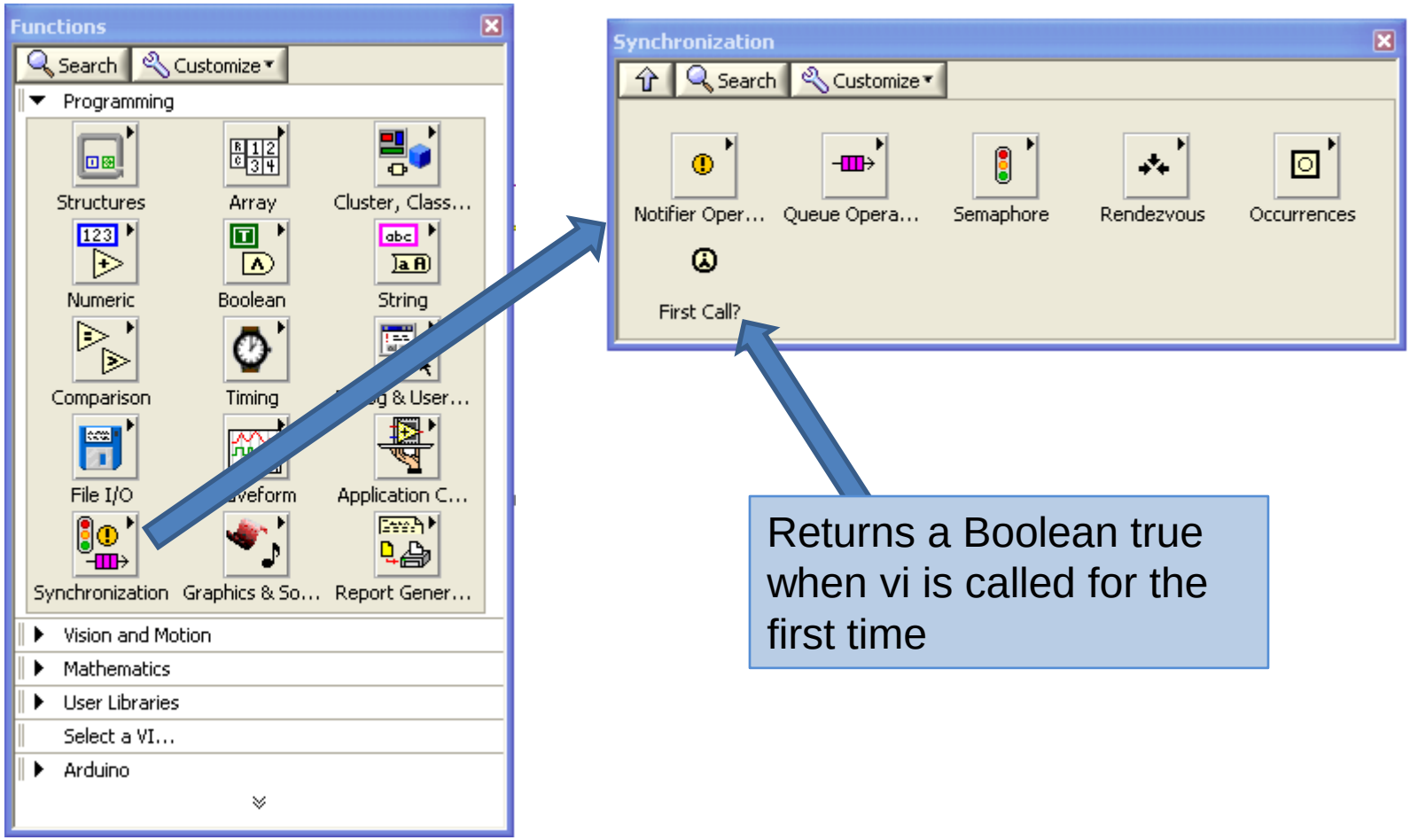


These only need to execute once

Grab images until program is stopped by pressing the “Stop” button

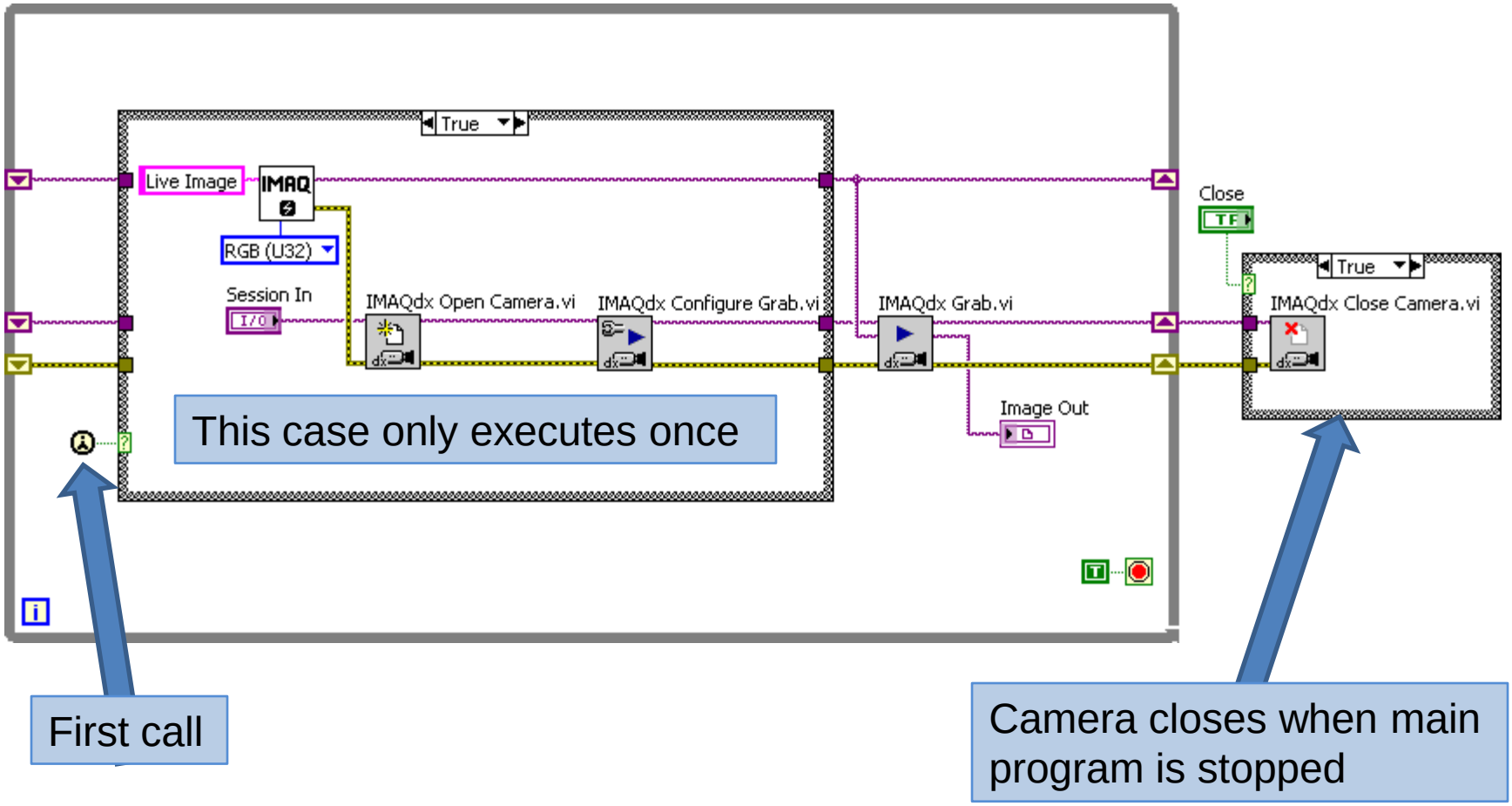
Close camera only when program is stopped

Creating a sub.vi – first call



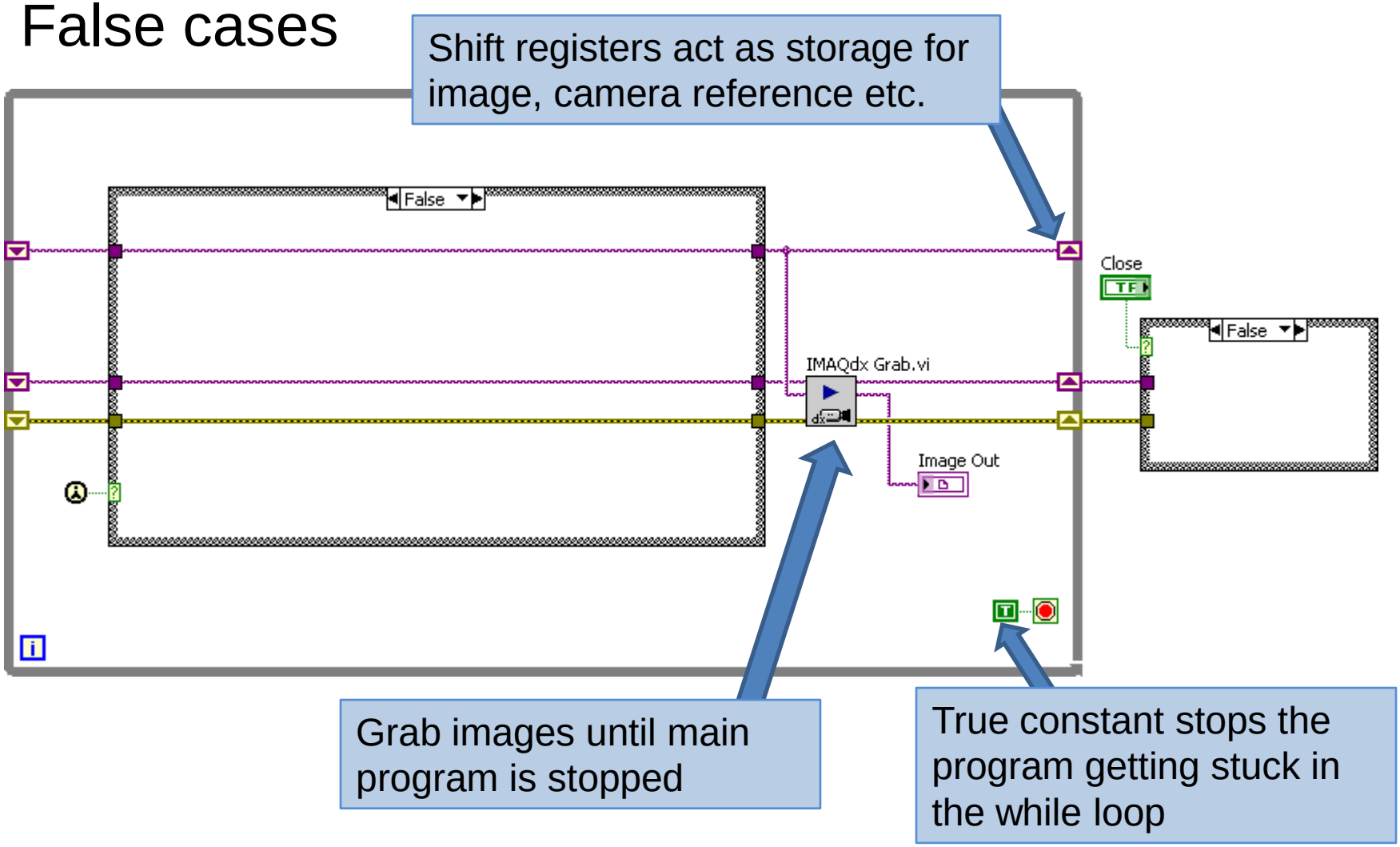
Creating a camera sub.vi

True cases



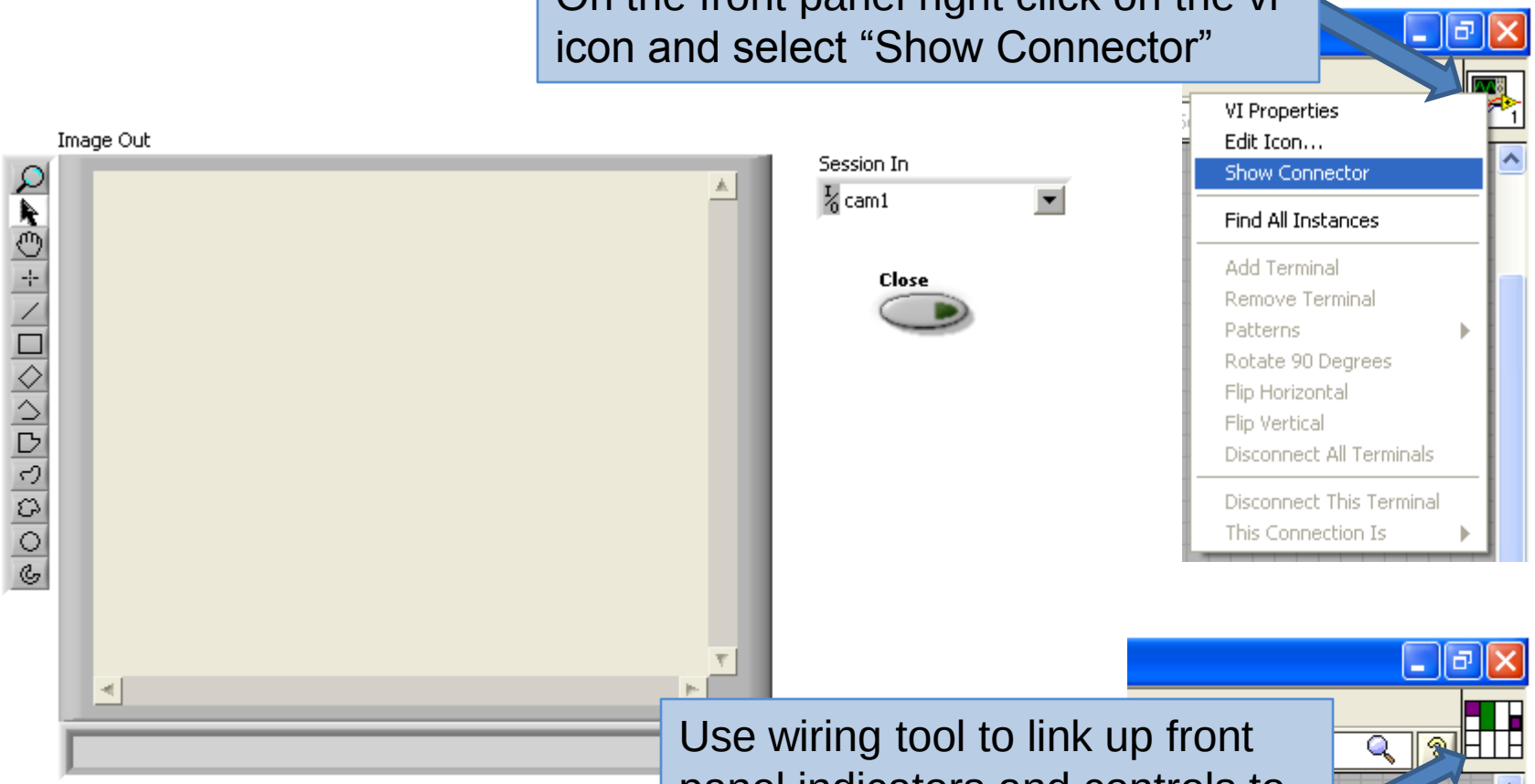
Creating a camera sub.vi

False cases



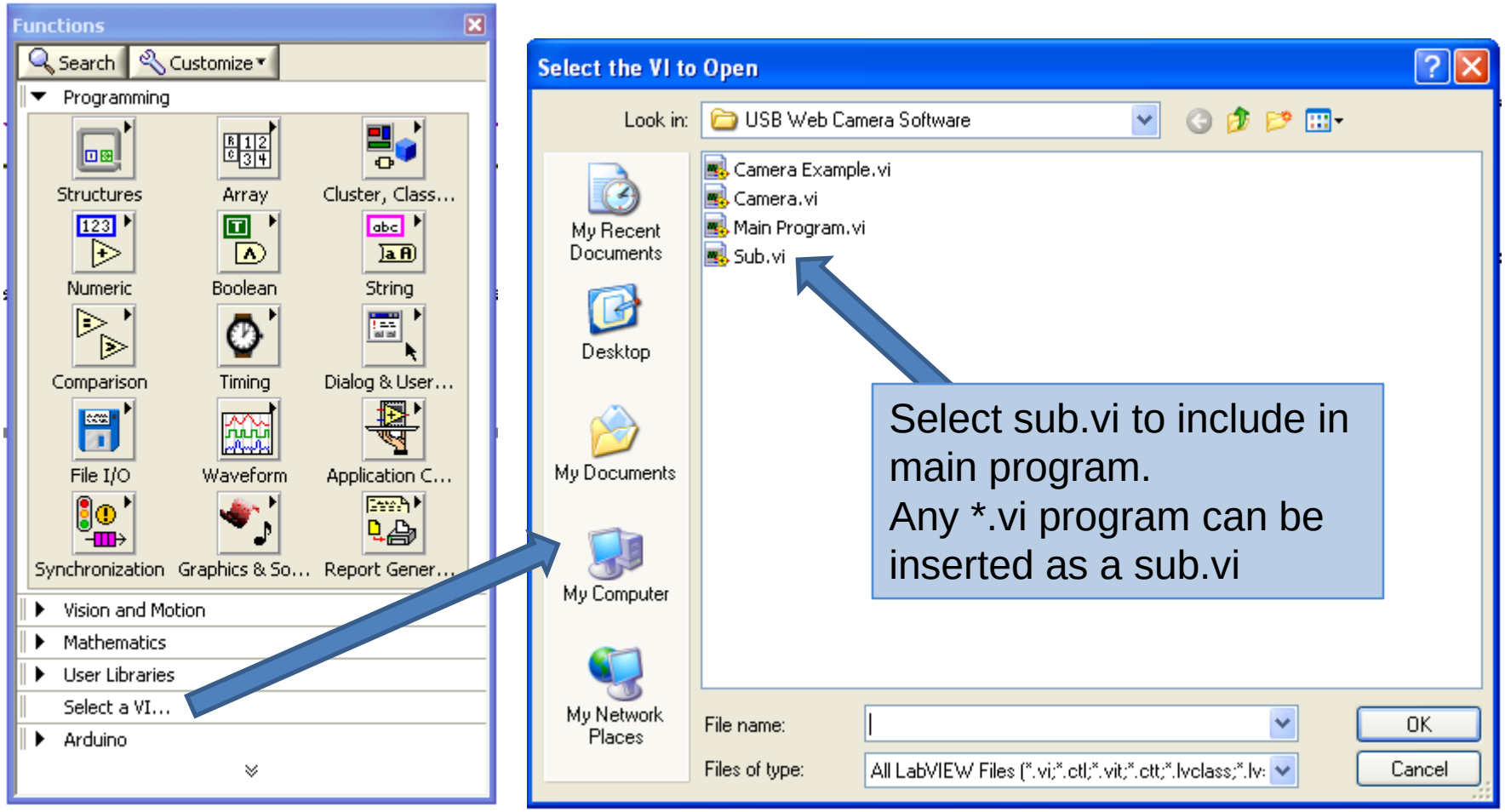
Setting up the connections

On the front panel right click on the vi icon and select “Show Connector”

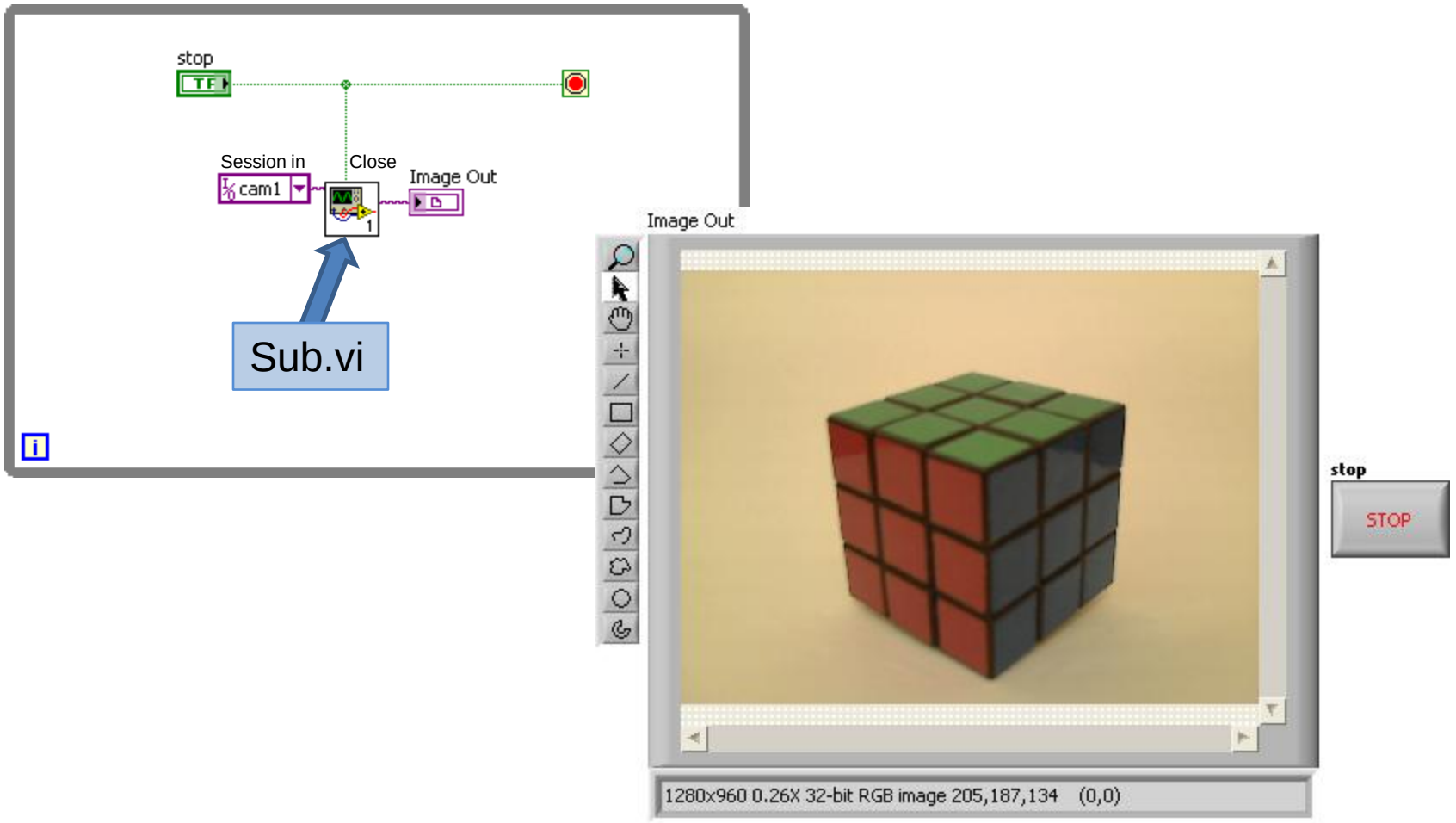


Use wiring tool to link up front panel indicators and controls to the connector

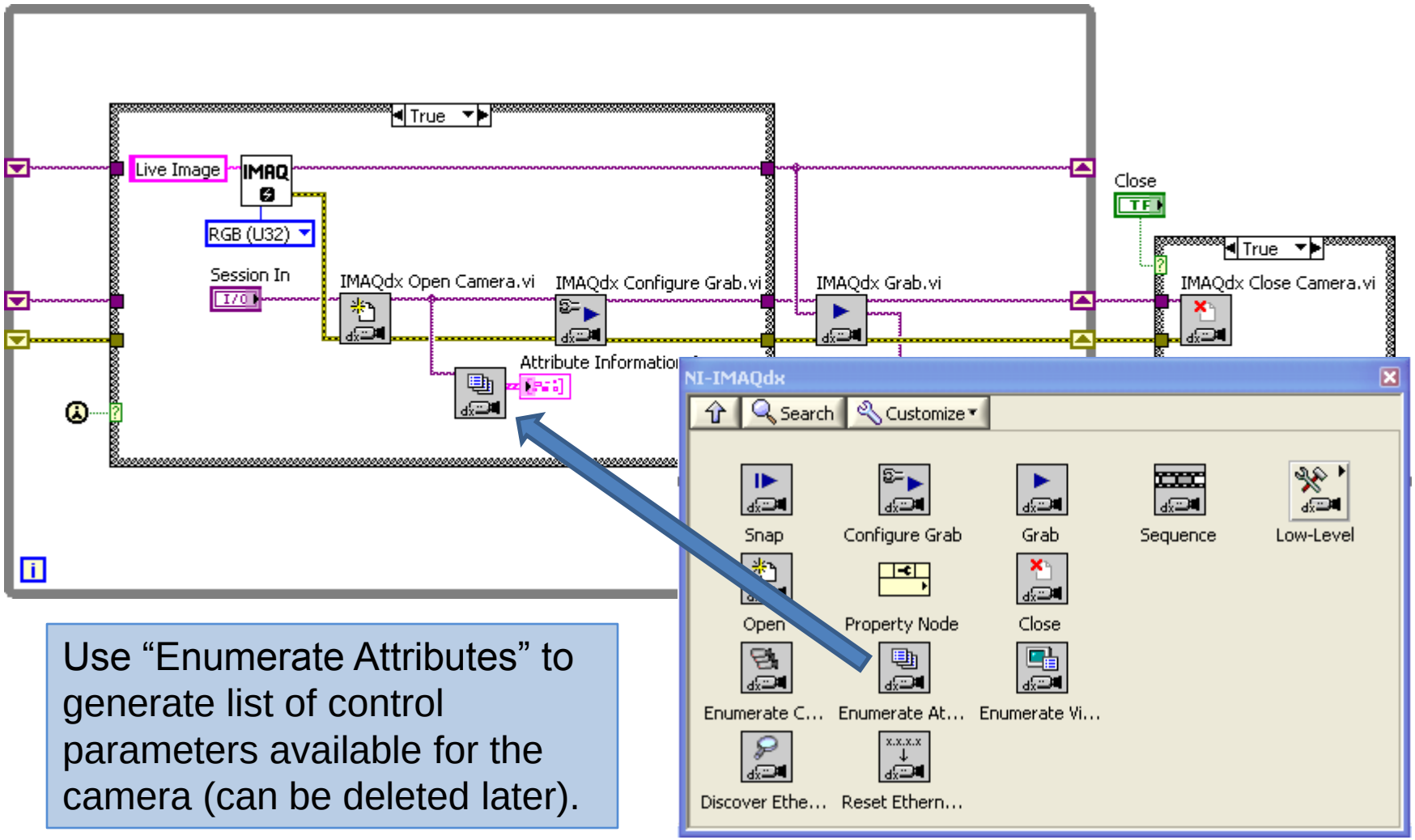
Adding a sub.vi to main program



Running sub.vi from main program

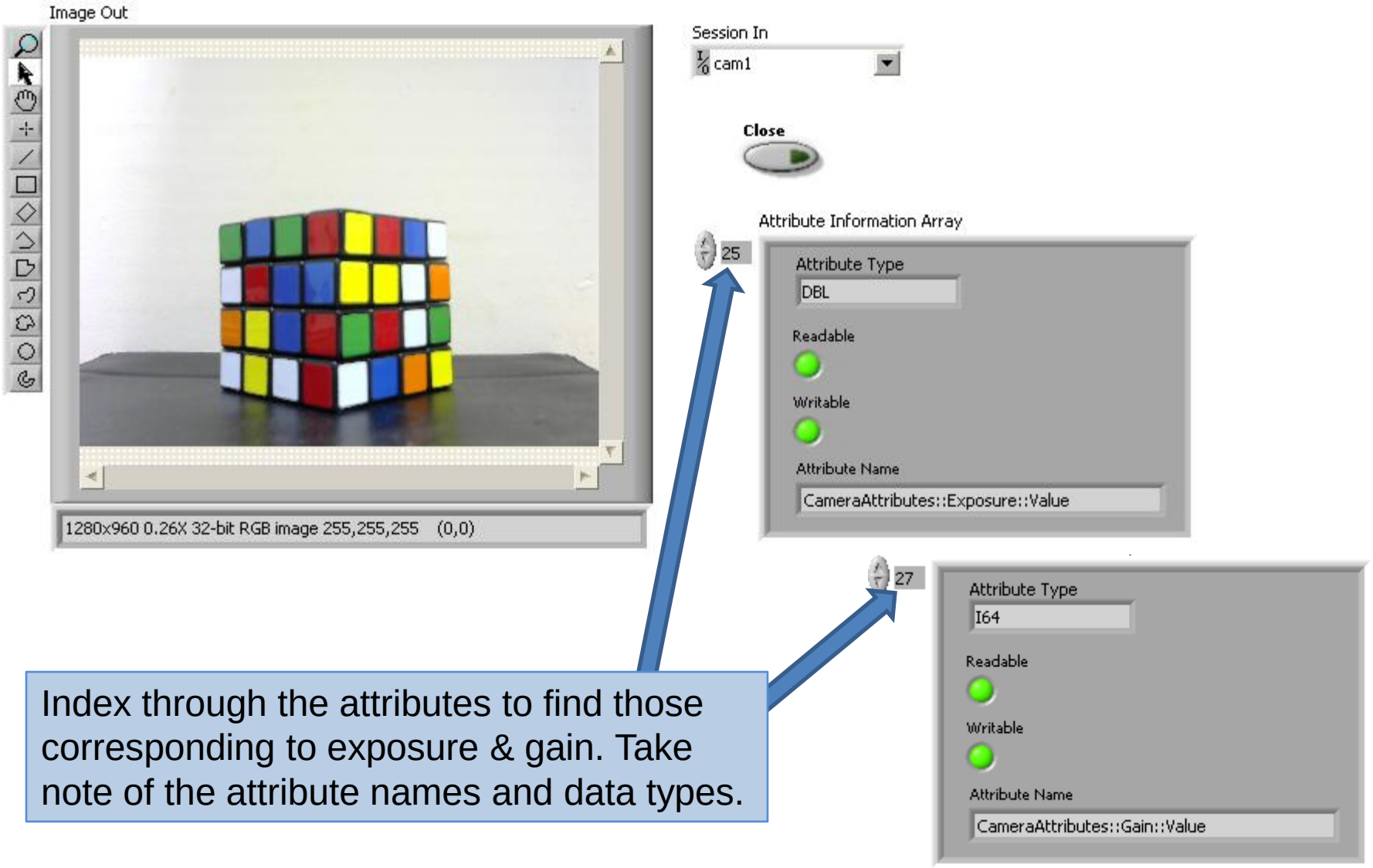


Adding exposure & gain controls



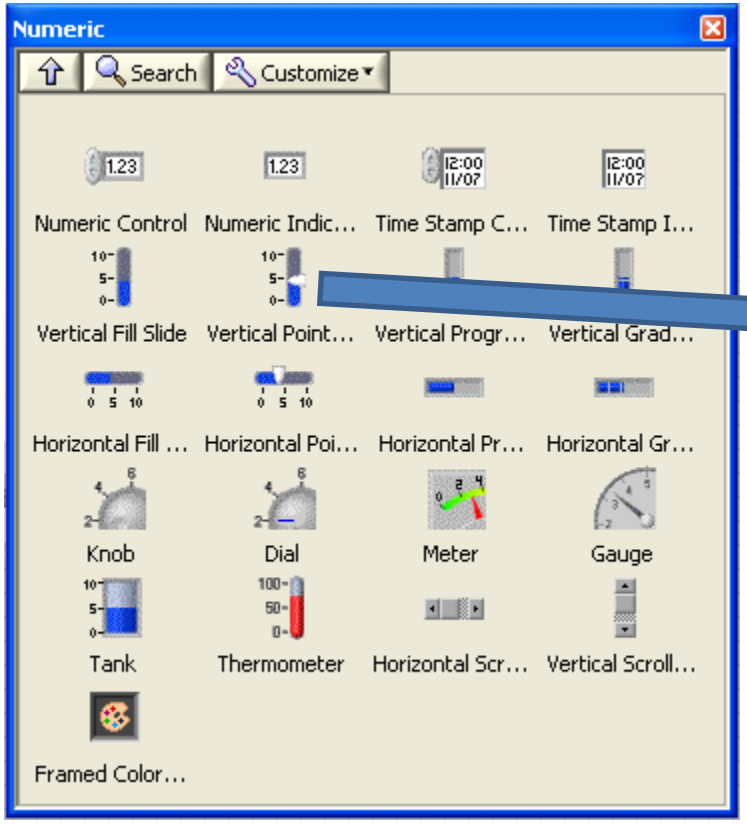
Use “Enumerate Attributes” to generate list of control parameters available for the camera (can be deleted later).

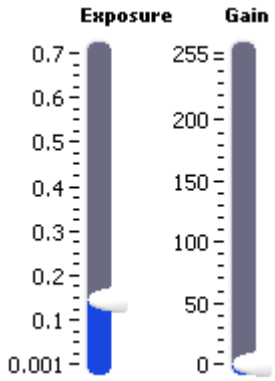
Adding exposure & gain controls



Index through the attributes to find those corresponding to exposure & gain. Take note of the attribute names and data types.

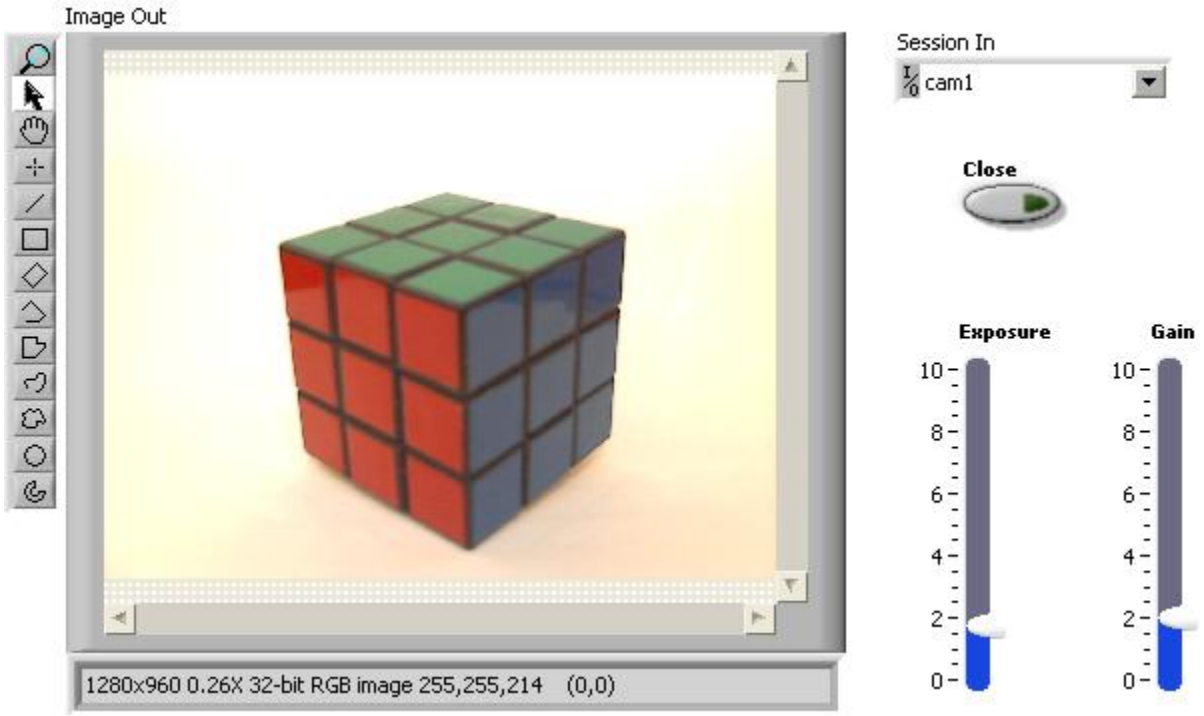
Adding exposure & gain controls





Place 2 numerical sliders on the front panel. Label them “Exposure” & “Gain”.

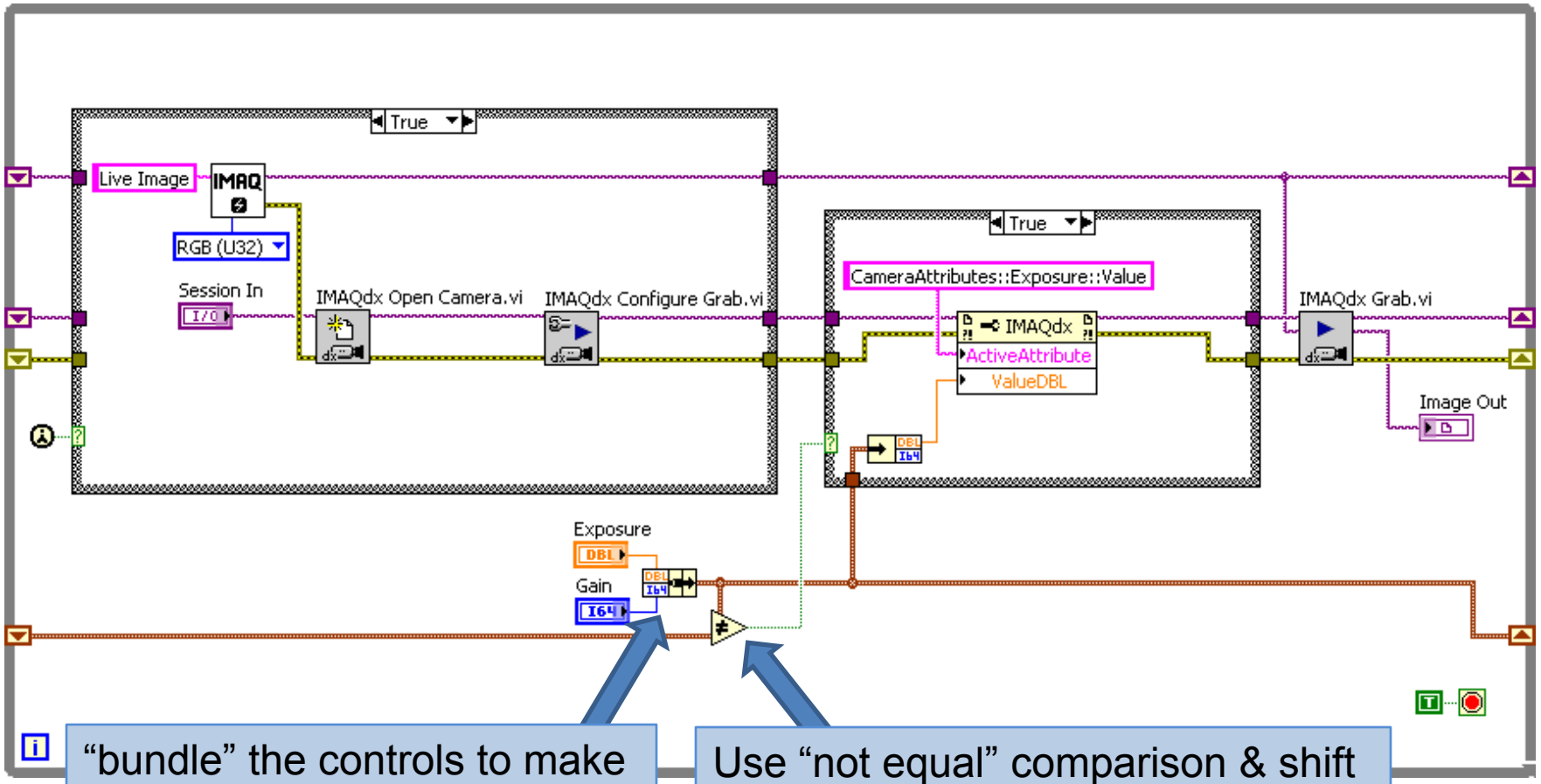
Connecting up the controls



Enumerate Attributes can now be deleted once the names and data types are known

Now need to link the controls to the LabView program and set the max & min values.

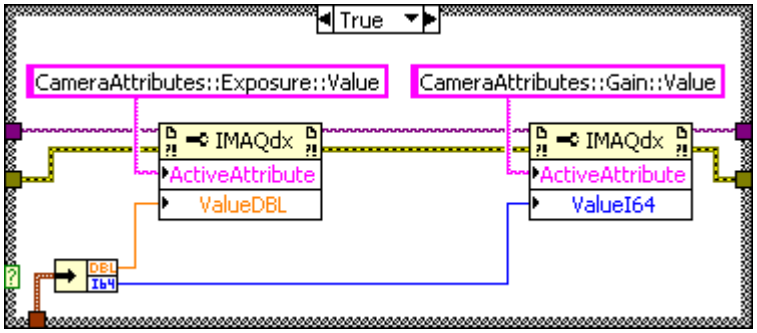
Using IMAQdx property nodes



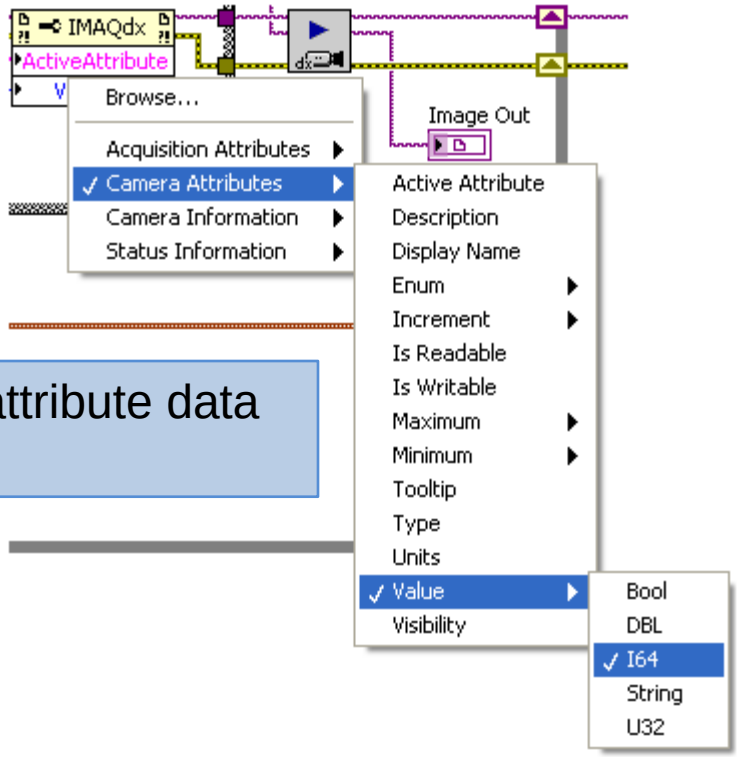
"bundle" the controls to make code more manageable

Use "not equal" comparison & shift register to test for changes to the controls (only updates properties when values are changed).

Defining attribute names & types

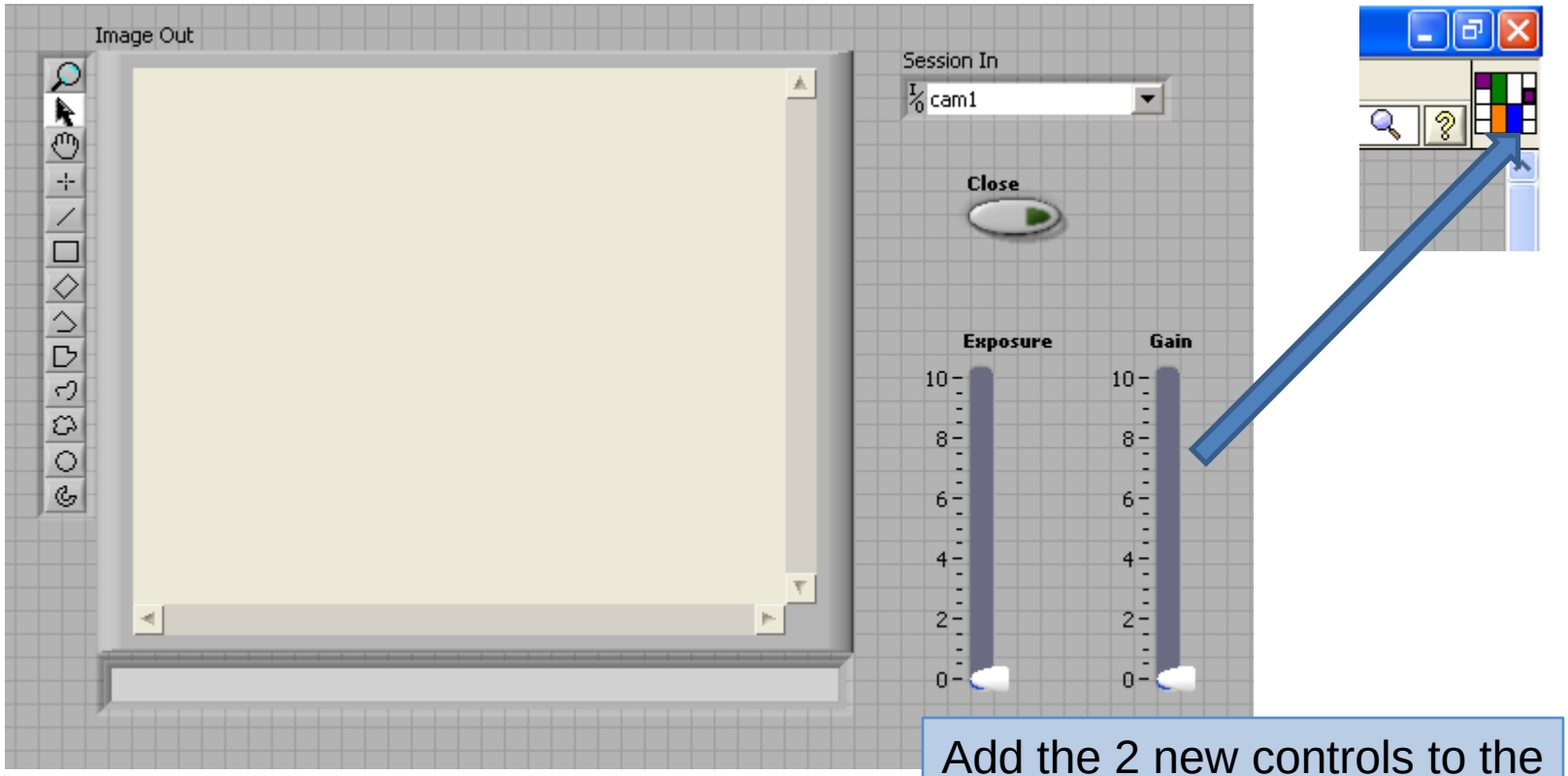


Setting the attribute names

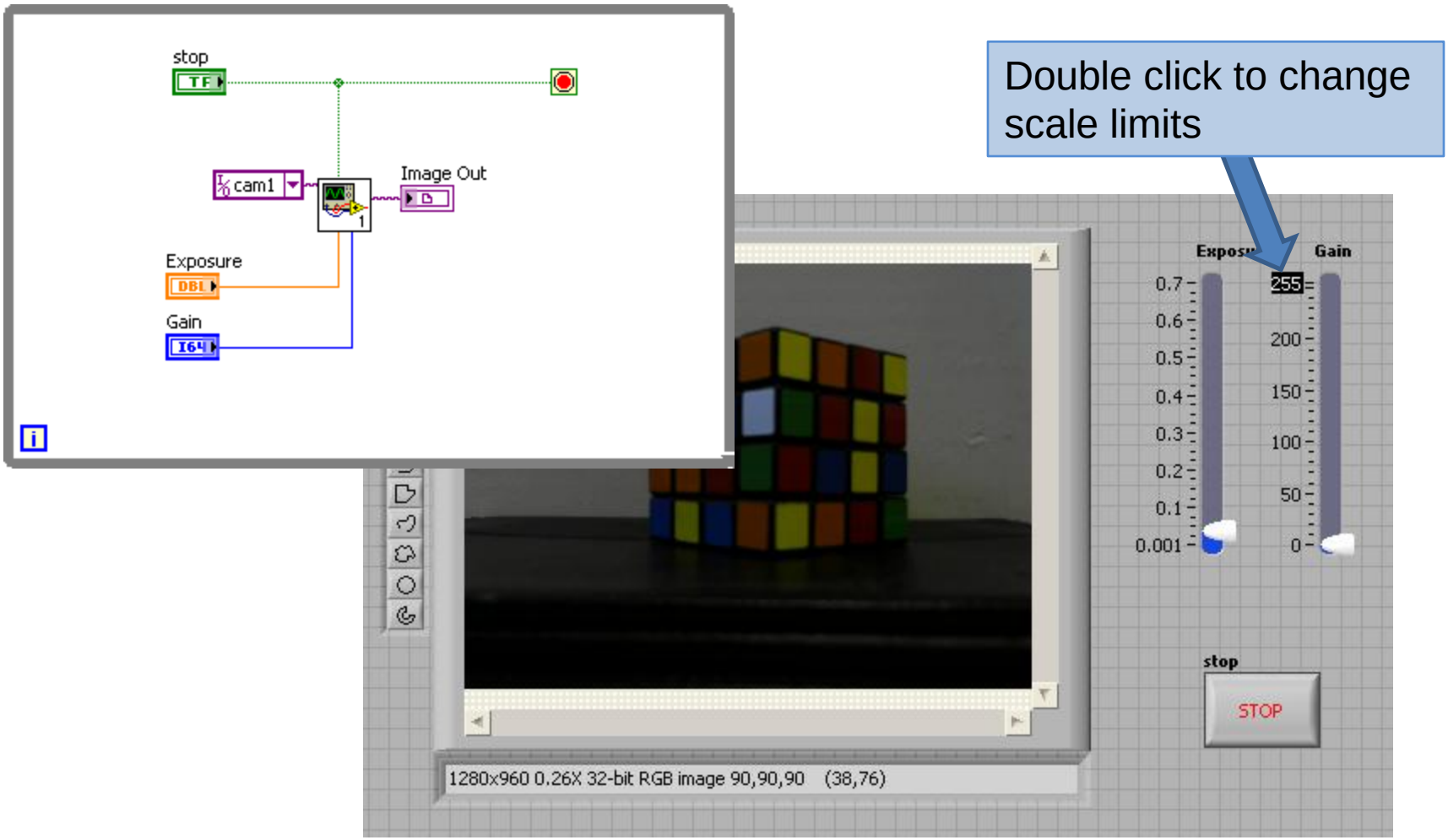


Setting the attribute data types

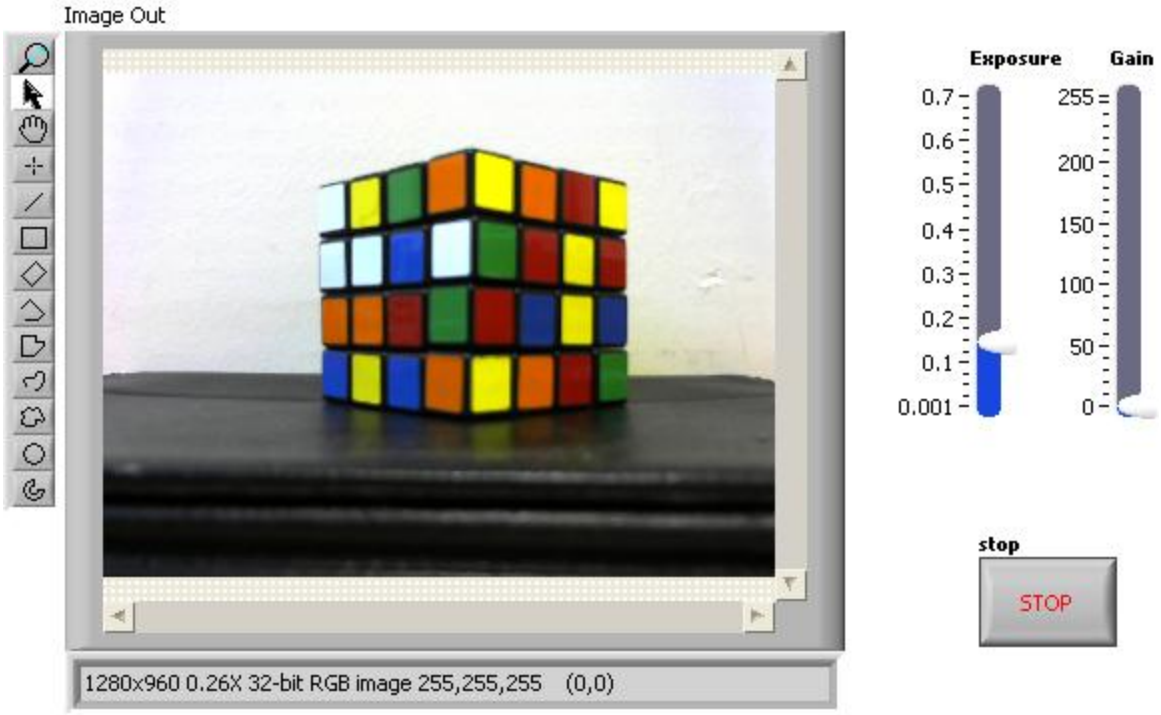
Updating the terminal connections



Updating the main.vi front panel



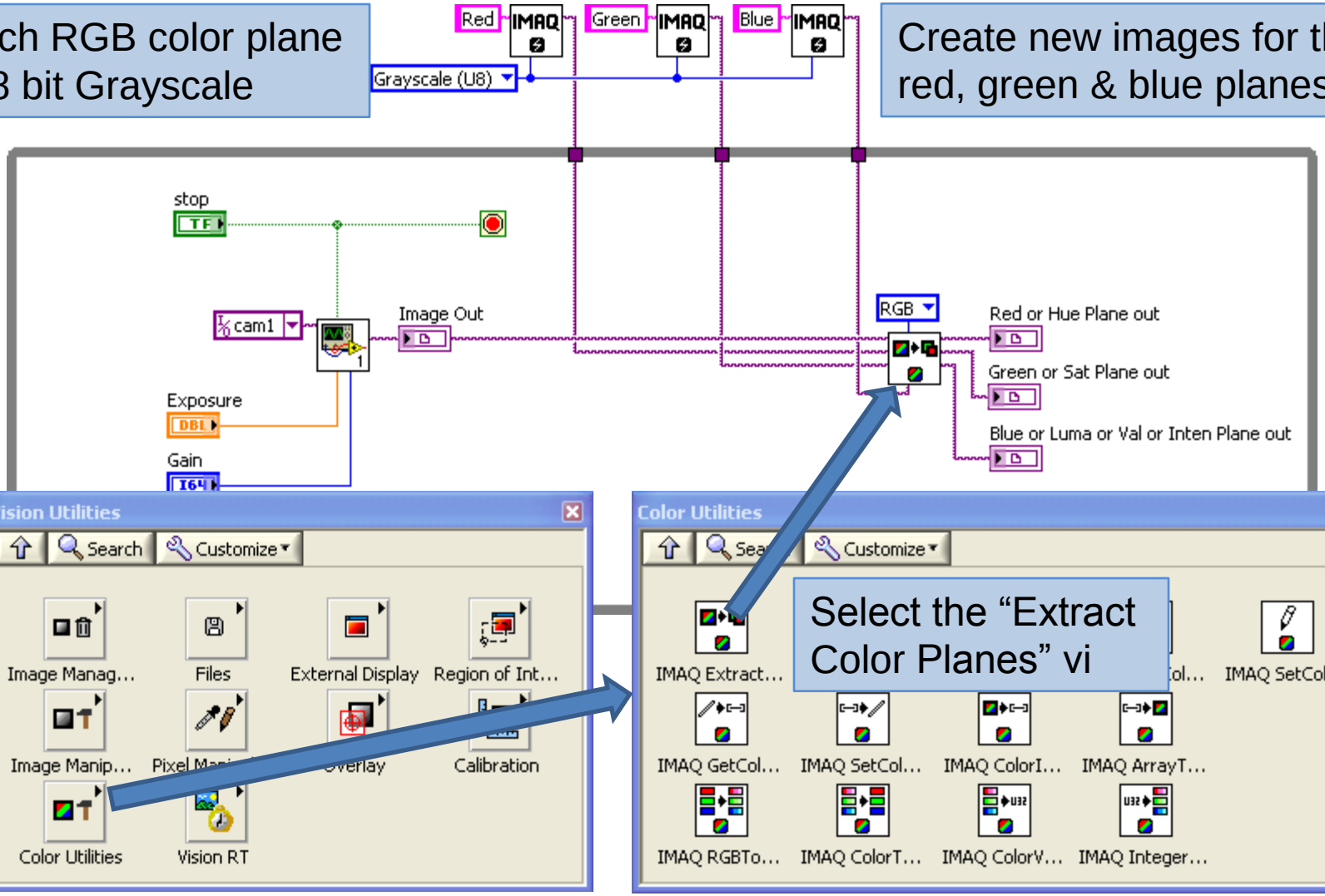
Testing the main.vi



Exposure & gain can now be controlled while vi is running

Working with color

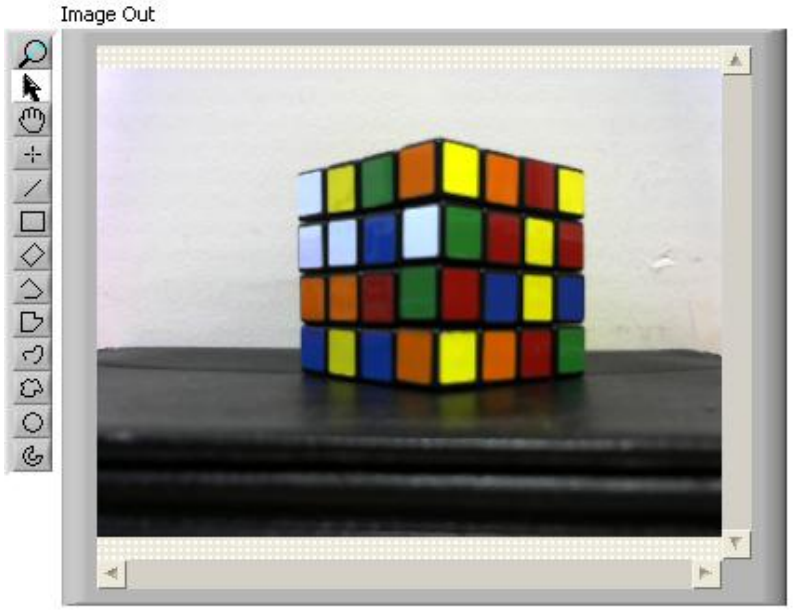
Each RGB color plane is 8 bit Grayscale

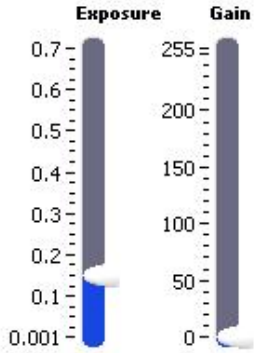


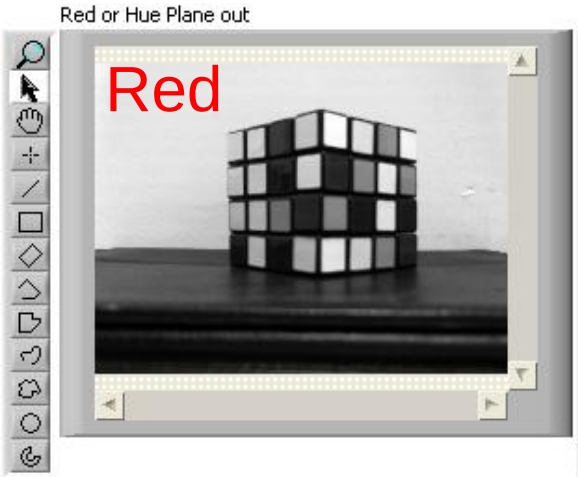
Create new images for the red, green & blue planes

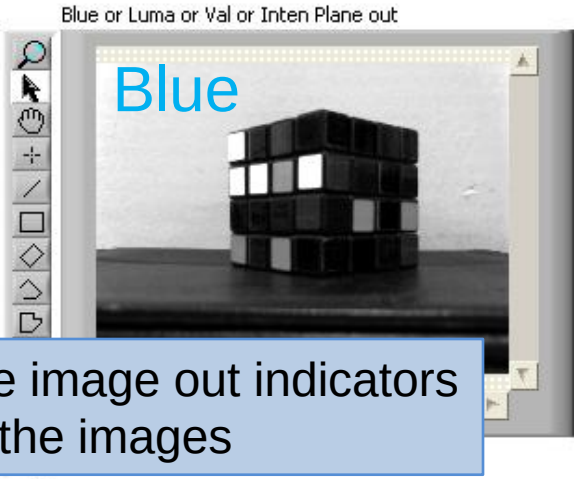
Select the “Extract Color Planes” vi

Working with color



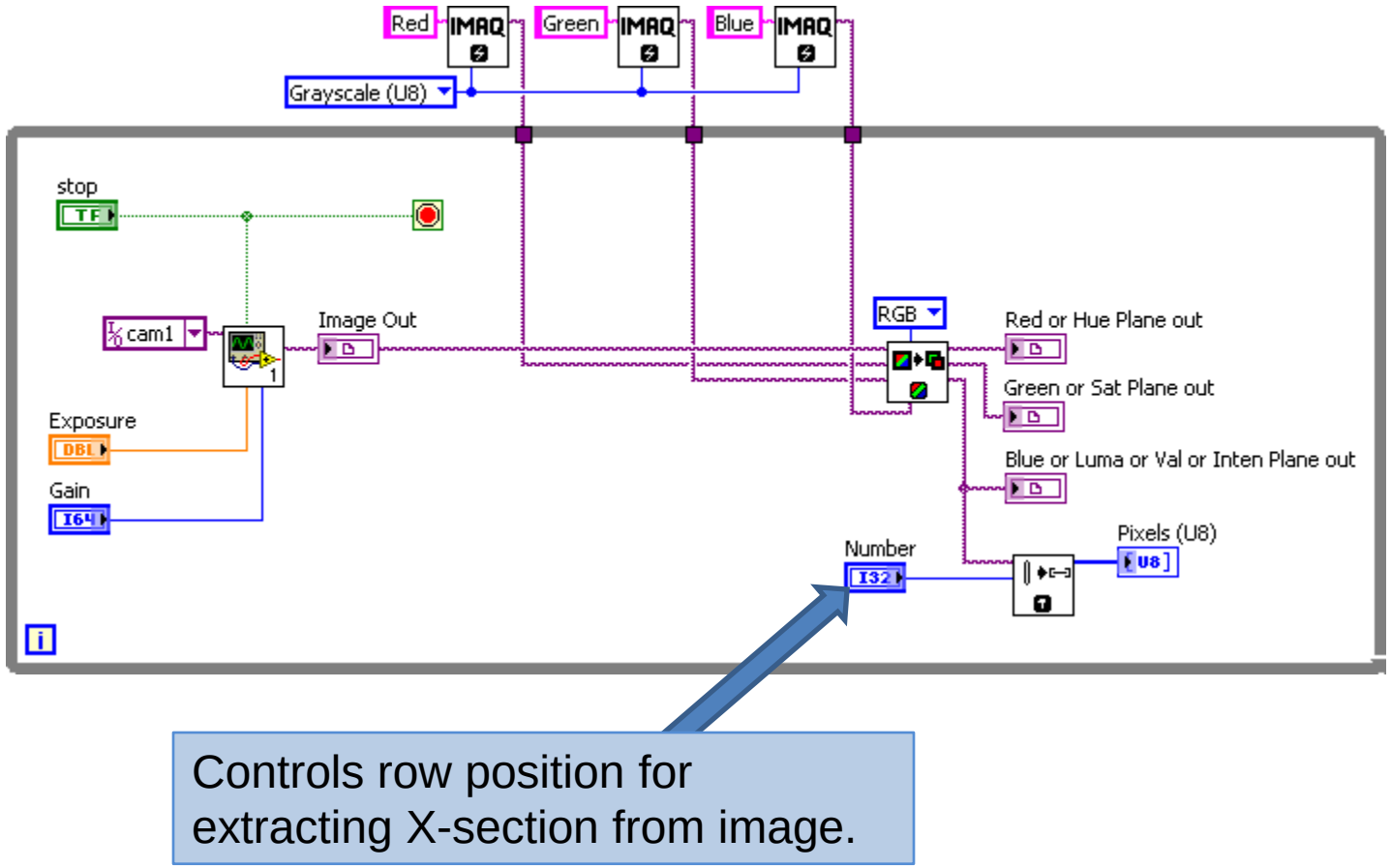




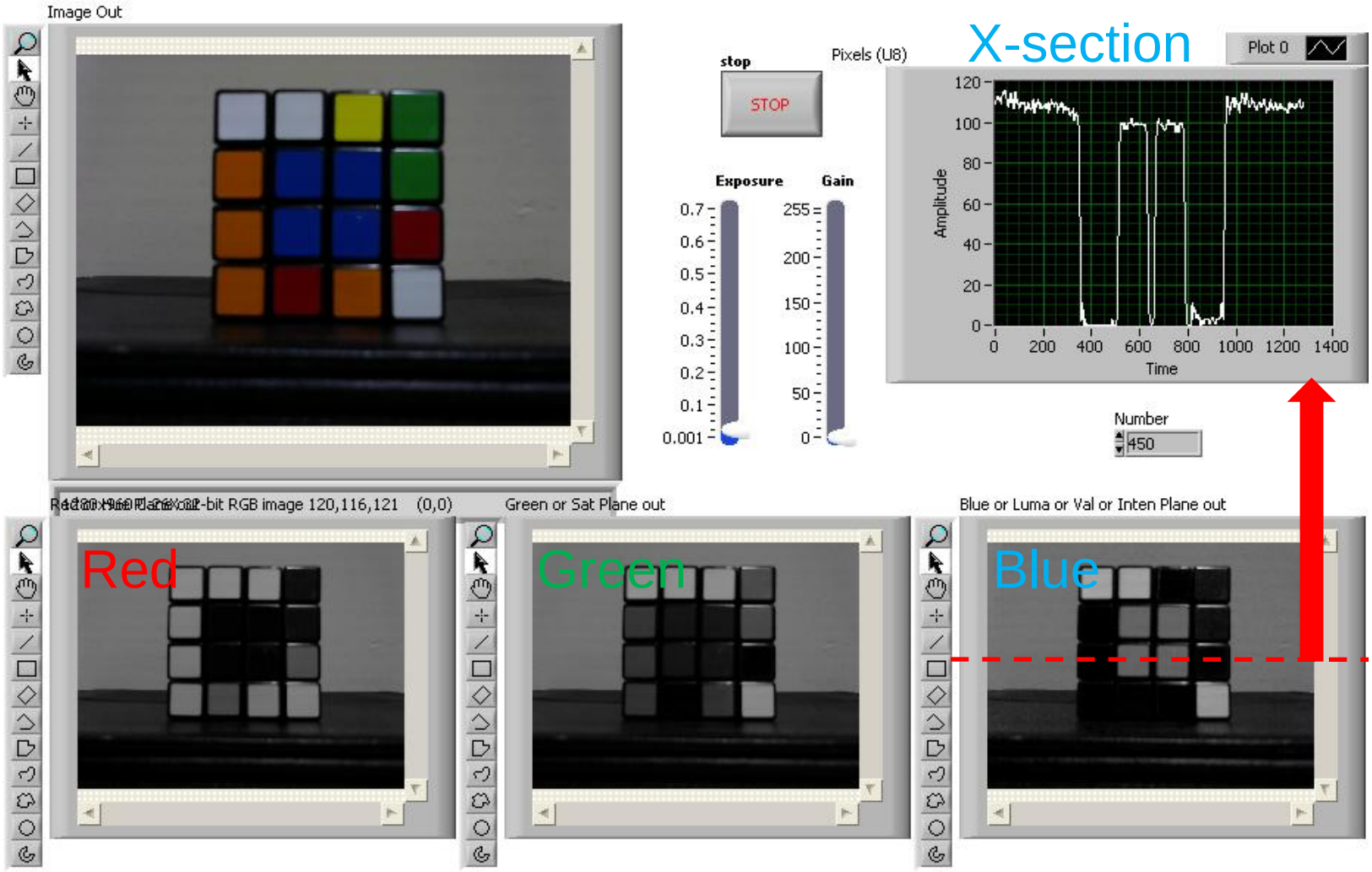


Update the image out indicators to display the images

Extracting a row from the image

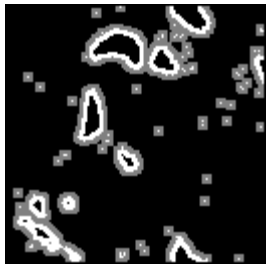


Extracting a row from the image



Further reading

IMAQ™
IMAQ Vision
Concepts Manual



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