Title **Interfacing a Gocator to Halcon**

Purpose

This document explains how to interface a Gocator sensor to Halcon.

Equipment

Gocator Firmware Release 3.2 or later
Halcon Version 10.0 or later

Table of Contents

1 Overview 2
2 Setting up Halcon with a Gocator for the First Time 3
3 Halcon Procedures 6
4 Halcon Acquisition Code 9

1 Overview

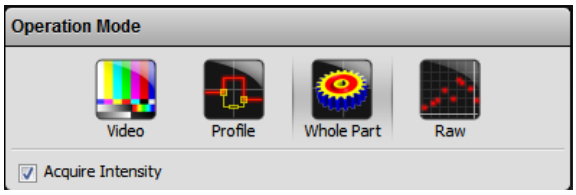
Halcon is a comprehensive software package for machine vision applications with an integrated development environment. Gocator includes a GenTL driver that can be used to stream 3D point clouds and intensity data into Halcon in real-time.

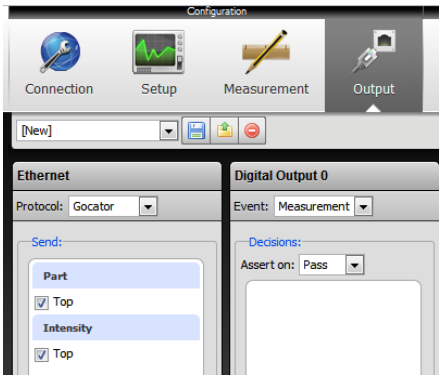
This document assumes that Halcon is already installed. Refer to the GenTL chapter in the Gocator's User Manual on how to install and setup the Gocator GenTL driver. This document describes how to configure Halcon to acquire data from the Gocator. Users are assumed to be already familiar with the operation of the Gocator Whole Part mode.

2 Setting up Halcon with a Gocator for the First Time

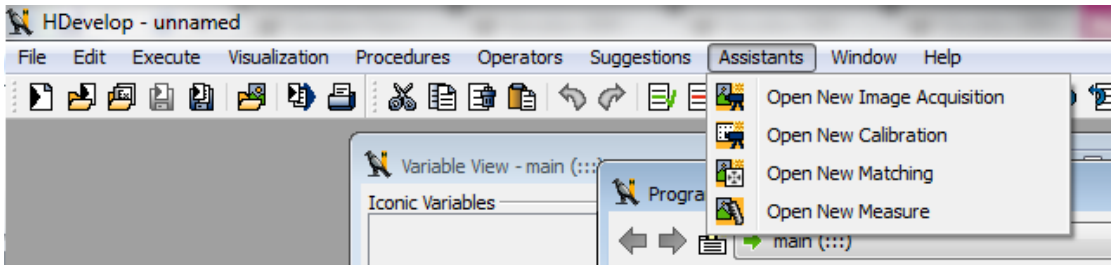
Follow the steps below to setup Halcon with the Gocator sensor for the first time:

1. Connect a Gocator to the PC running Halcon.
2. Power up the Gocator and put the Gocator into Whole Part mode and enable the Ethernet output. Check Acquire Intensity if intensity data is required.

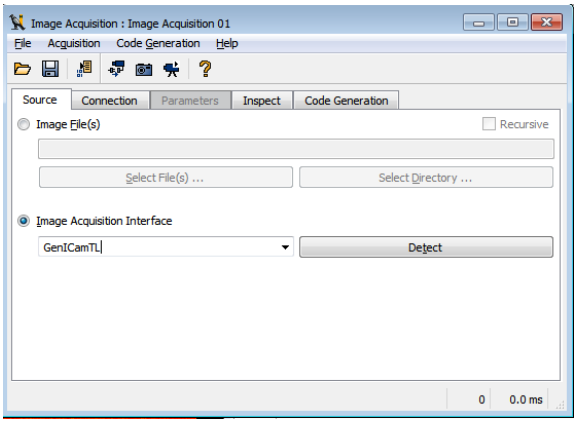




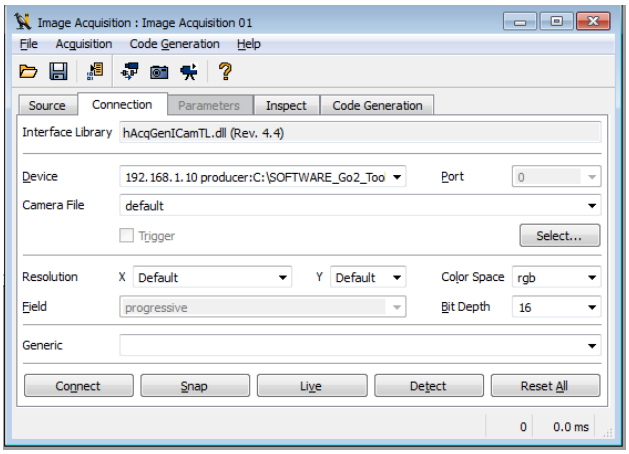
3. Start Halcon.
4. Click Assistants->Open New Image Acquisition.



5. Select GenCamTL in the Image Acquisition Interface.
   Note that the Gocator must be running and connected to the PC for this step to be successful.



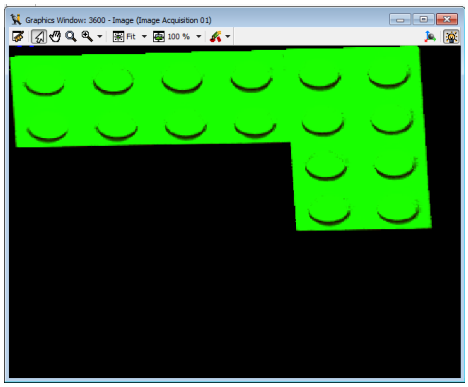
6. Click the Connection Tab.
   If a Gocator is detected, the device will be listed under “Device”. Set the Color Space to “RGB” and Bit-Depth to 16.

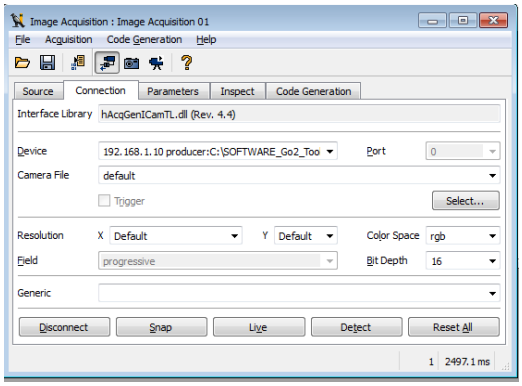


Device in the example is: 192.168.1.10 producer:C:\SOFTWARE_Go2_Tools\GenTL\x86\Go2GenTL.cti interface:0:XX::GenTL vendor:LMI model:Gocator.

The IP address and the directory may be different depending on the directory the Gocator tools package is installed to and the Gocator networking setup.

7. Press Snap and trigger the Gocator to output a part object.
   The method to trigger the Gocator output depends on the Gocator setup. The output will be displayed in the Graphic Window.





3 Halcon Procedures

The Halcon example code includes internal procedures that could be used to decompose the RGB image and to control registers opened by the GenTL driver.

User can import the procedures into their own programs by selecting “File->Insert Program->Insert Procedures” and select the example code *Continuous_Acq.hdev* under the *Examples/Halcon* directory.

The following section describes each of these procedures in greater details.

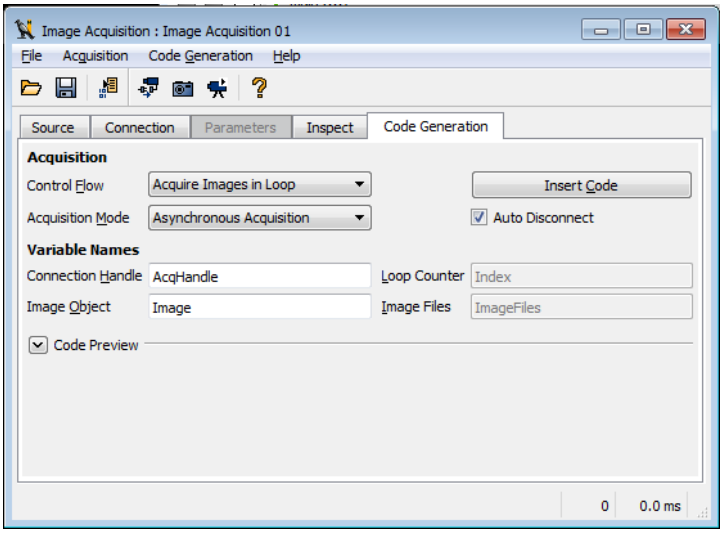
Function Name	Explanations
Go2GenTL_ParseData	The Gocator GenTL driver packs the height map, intensity and stamp information into a 16-bit RGB image. The function is used to unpack data out from the RGB image. Refer to the GenTL chapter in the Gocator user manual on how the information is packed. The function accepts the image acquired from *grab_image_async*, and return the height map, intensity and stamps. <u>Inputs</u> *Image*: RGB Image acquired from using grab_image_async <u>Outputs</u> *HeightMap*: Height map image *Intensity*: Intensity image *FrameCount*: Frame count *Timestamp*: Timestamp *Encoder*: Encoder position *EncoderIndex:* Last encoder position at which the encoder index occurs *Inputs*: Digital input states *xOffset*: X-offset (um) *xResolution*: X-resolution (um) *yOffset*: Y-offset (um) *yResolution*: Y-resolution (um) *zOffset*: Z-offset (um) *zResolution*: Z-resolution (um) *Width*: Width of the image that contains the part. The part width could be less than the image width requested by the user. (number of columns) *Height*: Height of the image that contains the part (length). The part length could be less than the image width requested by the user. (number of rows) Each output is returned as a two elements tuple. The first element is the least significant 32-bit value, and the second element is the most significant 32-bit value. <u>Example</u> `Go2GenTL_ParseData(Image, HeightMap, Intensity, frameCount, timestamp, encoderPosition, encoderIndex, inputs, xOffset, xResolution, yOffset, yResolution, zOffset, zResolution, width, height)`
Go2GenTL_ResampleMode	Returns the resample mode.

	Inputs *AcqHandle*: Acquisition handle created by *open_framegrabber*. Outputs *ResampleMode*: 'No' or 'Yes'. 'No' – Resample is disabled 'Yes' – Resample is enabled. When enabled, the GenTL driver will resample the height map so that the pixel spacing is the same in the x and y-axis. Example `Go2GenTL_ResampleMode (AcqHandle, ResampleMode)`
Go2GenTL_SetResampleMode	Sets the resample mode. Inputs *AcqHandle*: Acquisition handle created by *open_framegrabber*. *ResampleMode*: 'No' or 'Yes'. Set to 'Yes' to enable the resample mode. When enabled, the GenTL driver will resample the height map so that the pixel spacing is the same in the x and y-axis. Example `Go2GenTL_SetResampleMode (AcqHandle, 'Yes')`
Go2GenTL_ConfigFileName	Returns the current live sensor configuration file name. Inputs *AcqHandle*: Acquisition handle created by *open_framegrabber*. *ConfigFile*: Name of the configuration file. The file name is includes the extension '.cfg' Example `Go2GenTL_ConfigFileName (AcqHandle, ConfigFile)`
Go2GenTL_SetConfigFileName	Sets the sensor live configuration. Inputs *AcqHandle*: Acquisition handle created by *open_framegrabber*. *Outputs* *ConfigFile*: Name of the configuration file. The file name is includes the extension '.cfg' Example `Go2GenTL_SetConfigFileName (AcqHandle, 'test2.cfg')`
Go2GenTL_Encoder	Reports the current encoder value. Inputs *AcqHandle*: Acquisition handle created by *open_framegrabber*. Outputs

	EncoderValue: Current encoder value When this function is called, the GenTL driver retrieves the latest encoder value from the sensor. The value is returned as a two elements tuple. The first element is the least significant 32-bit value, and the second element is the most significant 32-bit value. Example `Go2GenTL_Encoder(AcqHandle, EncoderValue)`
Go2GenTL_ImageSize	Returns the size of the image returned by the Gocator GenTL driver Inputs *AcqHandle*: Acquisition handle created by *open_framegrabber*. Outputs *Width:* Width of the image *Height:* Length of the image Example `Go2GenTL_ImageSize(AcqHandle, Width, Height)`
Go2GenTL_SetImageSize	Sets the size of the image returned by the Gocator GenTL driver Inputs *AcqHandle*: Acquisition handle created by *open_framegrabber*. *Width:* Width of the image *Height:* Length of the image Example `Go2GenTL_SetImageSize(AcqHandle, Width, Height)`

4 Halcon Acquisition Code

To generate acquisition code in Halcon, click the Code Generation Tab and select Asynchronous Acquisition in the Acquisition Mode.



Press *Insert Code* to generate the code to open the acquisition device. To handle cases when the *grab_image* function times out while waiting for Whole Part data, add a try-catch statement around the *grab_image* function code.

After the example code is generated, user should add a *catch* instruction to bypass acquisition timeout event, and uses the function *Go2GenTL_ParseData* to extract information from the returned image.

An example, *Continuous_Acq.hdev*, is included in the *Examples/Halcon* directory and is shown below:

```
* This example illustrates how to
* 1. Acquire data from the Gocator (16-bit RGB image)
* 2. Decompose the returned image into three separate image for height map, intensity and stamps.
* 3. Extract some stamp values from the stamp image.

* Connect to the Gocator device. This code is auto generated by the Image Acquisition dialog box. User can
manually override the directory path by editing the line below.
open_framegrabber ('GenICamTL', 0, 0, 0, 0, 0, 0, 'progressive', 16, 'rgb', -1, 'false', 'default',
'192.168.1.10 producer:C:\\SOFTWARE_Go2_Tools\\GenTL\\x86\\Go2GenTL.cti interface:0:XX::GenTL vendor:LMI
model:Gocator', 0, -1, AcqHandle)

grab_image_start (AcqHandle, -1)

while (true)
    try
        grab_image_async (Image, AcqHandle, -1)
    catch(Exception)
        continue
    endtry
        Go2GenTL_ParseData(Image, HeightMap, Intensity, frameCount, timestamp, encoderPosition,
encoderIndex, inputs, xOffset, xResolution, yOffset, yResolution, zOffset, zResolution, width, height)
        dev_display(HeightMap)

        * Image Acquisition Routines Start

        * Image Acquisition Routines End
```

```
endwhile
close_framegrabber (AcqHandle)
```

Users can enter the processing function in the space between the *Routines Start* and *Routines End* lines.

Note: The IP address and the path could be different depending on the Gocator's IP address and the GenTL installed directory.