

HIGH RESOLUTION CAMERA KIT

C-MOUNT ASSEMBLY

This quick reference guide provides instructions for assembling the mounting arm and setting up the high resolution camera in Qbit-DB. Before beginning, ensure that you have all the necessary components, including the mount assembly and camera.

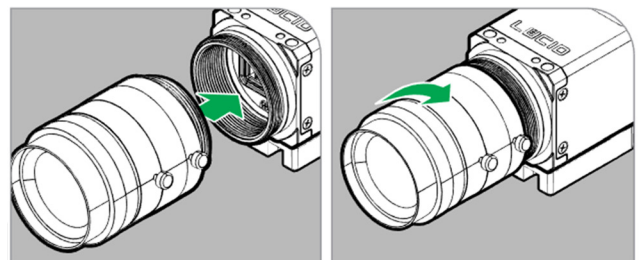
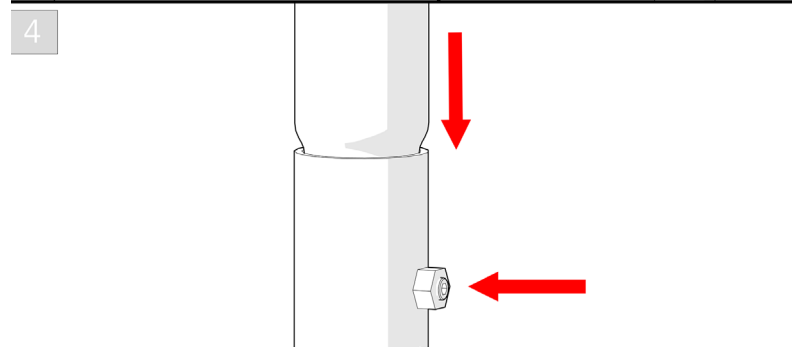
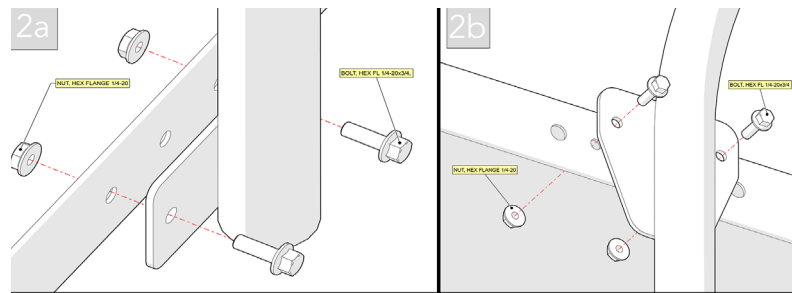
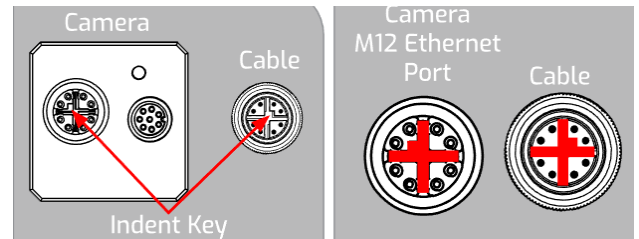
CAMERA SETUP

Follow the steps to attach the mounting arm to the side of the cart and set up the camera.

1. Before mounting the camera, locate the M12 X-Coded cable and plug it into the camera's M12 Ethernet port. When plugging in the cable, align the indentation so that the cable and port pin holes line up correctly.

Do not force the cable into the port, as it may damage the pins. Once the cable is correctly aligned to the port, screw in the cable.

2. Attach the lower assembly of the mounting arm to the side of the cart with the provided 1/4" hex bolts and flange nuts. Two bolts secure the (a) lower plate and two the (b) upper plate.
3. With the lower assembly securely affixed to the cart, assemble the upper arm. Slide the upper arm into the base of the lower arm. Rotate the upper arm as needed to ensure the camera is properly aligned with the gate.
4. Secure both pieces with the provided M3 screw.
5. Remove the dust cap from the camera and screw on the lens until there is contact with the front base of the camera.
6. A small indicator light will blink red, when the camera is powered on. This light will begin blinking green when the camera is ready to stream.

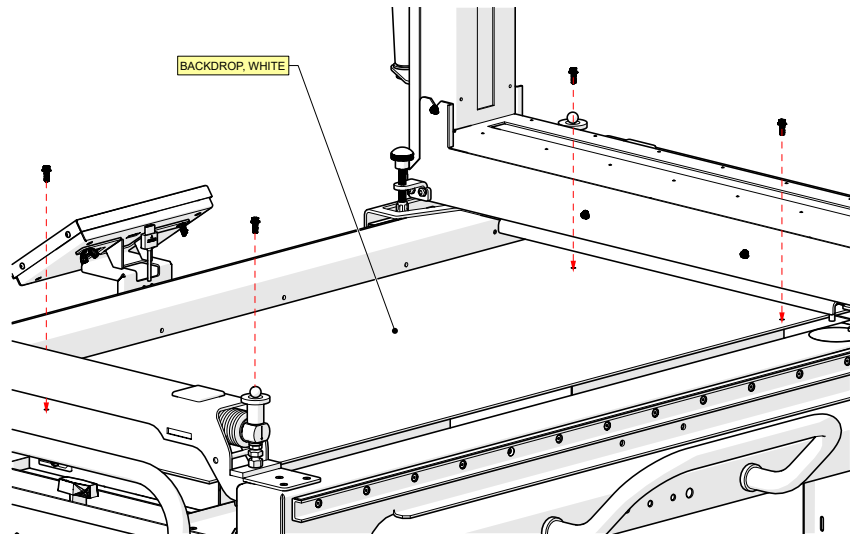


INSTALLING BACKDROP

To attach the white backdrop to the CS 325, complete the following steps:

1. Remove the four corner screws securing the black Cubiscan cover.
2. Slide the white backdrop over the Cubiscan cover. The backdrop should be aligned with the back of the cover, allowing free movement of the chain belt.
3. Secure the backdrop and cover with the four 5/8" screws included with the kit.

If necessary, lift the glass off of the Cubiscan to access the screws.



CONNECTING TO QBIT-DB

Complete the following steps to connect the camera to Qbit-DB:

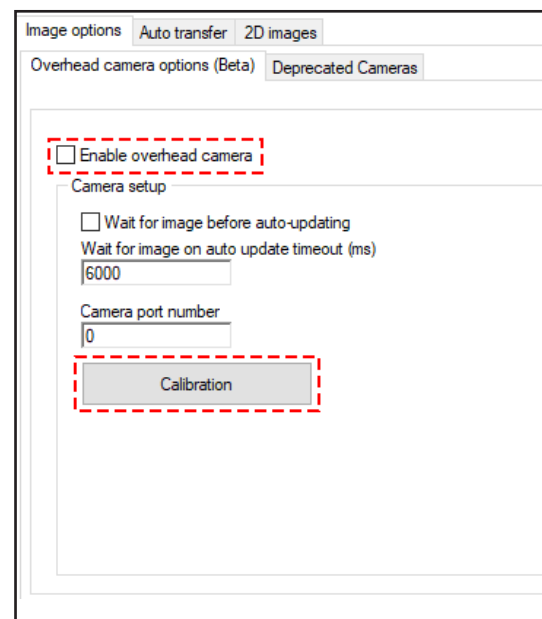
1. Install and open Qbit-DB on your computer. The status window of the main screen will indicate that the camera has connected correctly.

If this is not shown, ensure the camera is powered on. You may also restart the camera and computer.

If the problem persists, please contact **Cubiscan Service and Technical Support** at **801.451.7000** for assistance.

2. Once connected, navigate to the Images tab located under **Tools > Options**.
3. Select the **Image options** tab. Under **Overhead camera options**, check the box next to *Enable overhead camera*.
4. Click [**Calibration**] to set up the camera according to your desired specifications.

```
11:19:14:076 Application startup ...
11:19:14:134 Select "Tools / Options" to set the serial port number
11:19:14:134 Starting overhead camera interface
11:19:14:134 Connected to QBIT_DEFAULT
11:19:14:134 Successful connection to overhead camera socket...
11:19:14:134 Opening table --> ITEM_INFO
11:19:14:146 CubiScan Model 325 Selected
11:19:17:018 Successful connection to overhead camera...
11:19:17:990 Please wait while the overhead camera streaming process is started...
11:19:19:726 Overhead camera streaming started...
```



CALIBRATION OPTIONS

The Calibration menu has four tabs: General, Raw Crop/Zoom, Exposure, and Object Detection. Under each tab are options to calibrate the camera.

General Tab

Rotate image: Images may be rotated 180 degrees (0 = disabled, 1 = enabled).

File extension type: Click the drop-down menu to select the image output file type. Options include jpg, bmp, tiff, or png.

Debug mode: The value may be set from 0 to 5.

Raw Crop/Zoom

Raw image crop/zoom: Determines the default zoom percentage used when no other manual override is performed (0 = disabled, 1 = enabled).

Raw image crop/zoom percentage: Enter a value between 0 and 100, representing the percentage of zoom (larger percentage = greater zoom, smaller percentage = lesser zoom).

Exposure

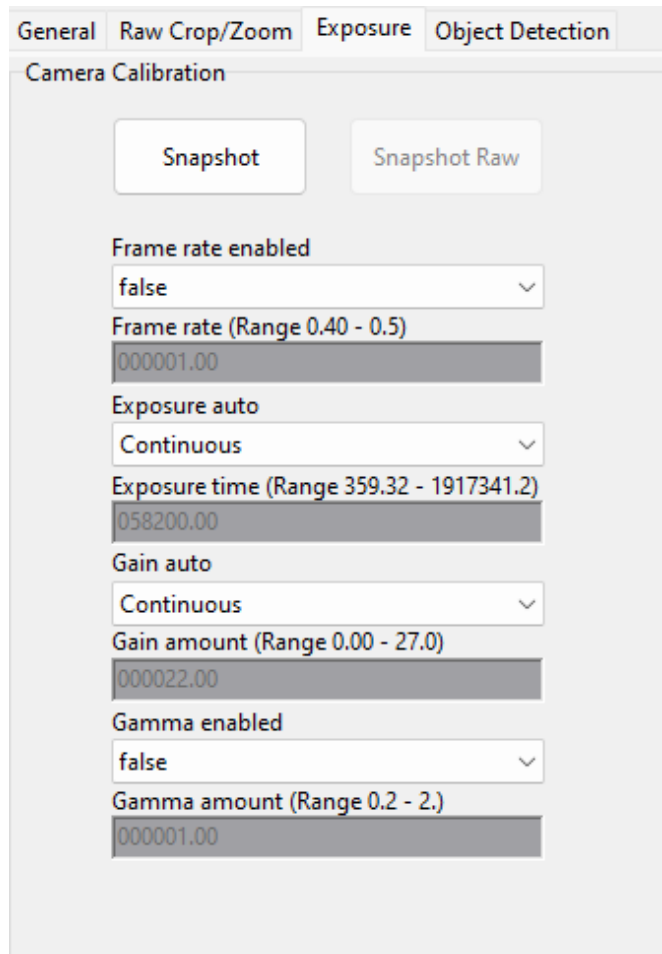
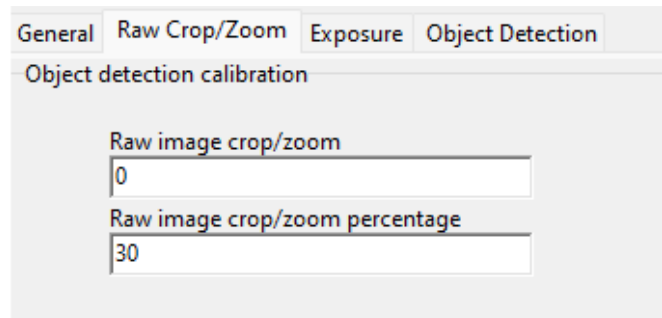
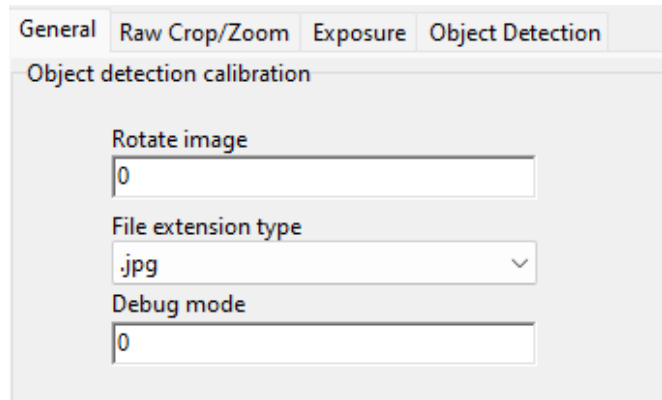
Most values in this tab are preset according to best performance under most conditions. These values should only be adjusted for specific reasons to allow for better image capture.

Frame rate enabled: Enables custom frame rate.

Frame rate: A larger frame rate will affect exposure. Use this value to adjust brightness and performance.

Exposure auto: Sets to continuous, allowing the camera to detect the best lighting exposure. Set this to manual to enter preferred values.

Exposure time: The exposure time may be set manually with ranges dependent on camera settings. Increasing the exposure time will allow the aperture of the camera to remain open longer, allowing for a brighter, more robust image.



(Note: long exposure times can also lead to blurring of the image)

Gain auto: Defaults to continuous, allowing the camera to determine the best gain. Set this to manual to enter preferred values.

Gain amount: The gain may be set manually with amounts depending on camera settings. The gain amount increases the signal intensity of each pixel, increasing overall brightness.

Gamma enabled: Enables gamma correction with images.

Gamma amount: Set the gamma correction with amounts depending on camera settings. The greater the value, the more the gamma correction, resulting in a brighter more contrasted image.

Object Detection

Detection type: Enter a value of 1, 2, or 3 according to the detected object's features (1=largest object, 2= highest object, 3=closest to center).

Color threshold: Sets the allowed pixel difference between the calibration image and current image, measured in number of pixels.

Noise filter level: The set value determines the amount of noise to filter out.

Edge threshold: Determines the threshold at which detected objects on the edge are ignored.

Minimum object pixel count: Determines the minimum pixel count an object may have before the algorithm ignores it.

Cropping buffer: Allows for extra white space along the image's border when cropping.

White border buffer: Creates a white border of set width around the image after it has been cropped.

Bypass object detection/cropping: Enable or disable object detection and cropping (0=on, 1=off).

General Raw Crop/Zoom Exposure Object Detection

Object detection calibration

Snap calibration image

Detection type
1

Color threshold
20

Noise filter level
1

Edge threshold
10

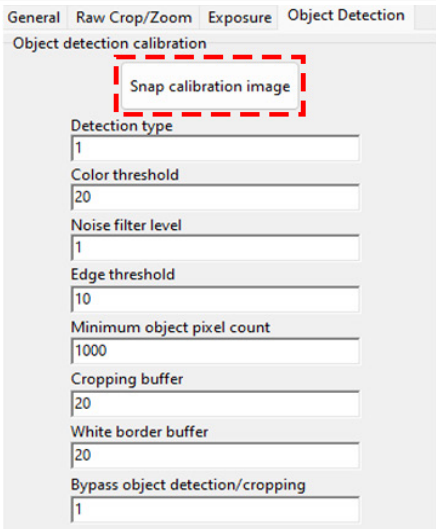
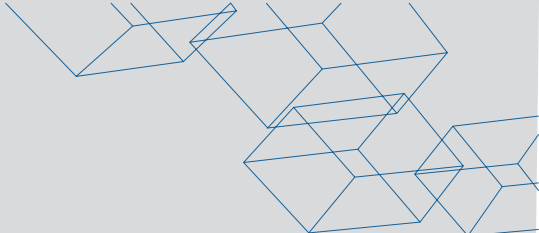
Minimum object pixel count
1000

Cropping buffer
20

White border buffer
20

Bypass object detection/cropping
1





CAMERA CALIBRATION

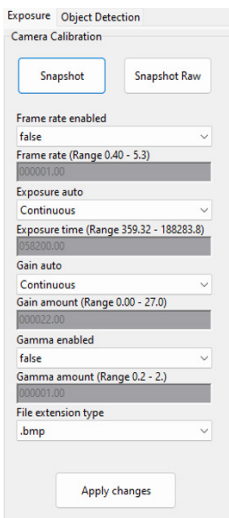
The camera may be set to the default of **Raw image crop and zoom** or **Object detection** depending on the type and variety of scanned objects.

1. Before taking snapshots, the camera must be calibrated to the existing backdrop. This can be done by clicking **[Snap Calibration Image]** under the **Object Detection** tab in the Calibration menu.

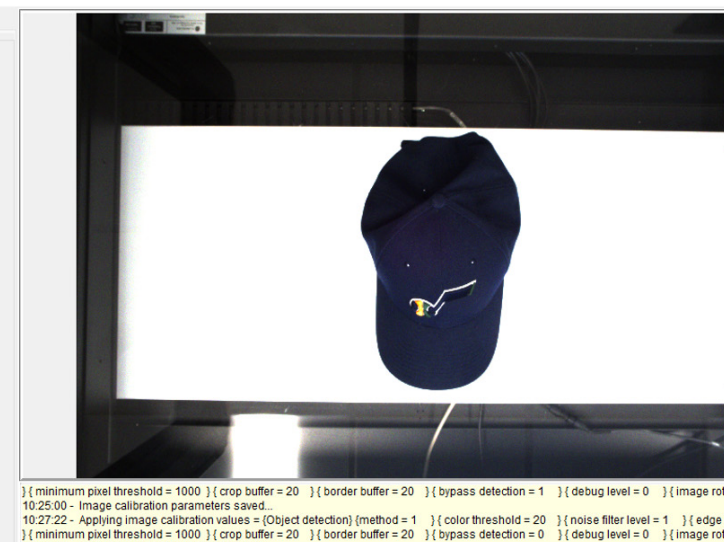
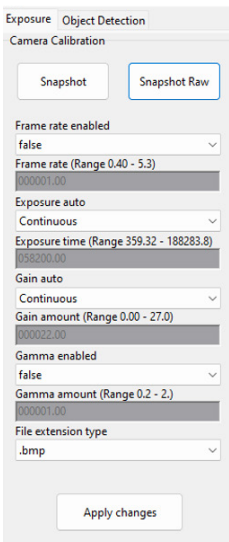
When calibrating the camera, ensure the platform is free of all objects. It may take a few clicks before the camera is properly calibrated.

The camera should be recalibrated each time the camera parameters are changed to ensure proper function.

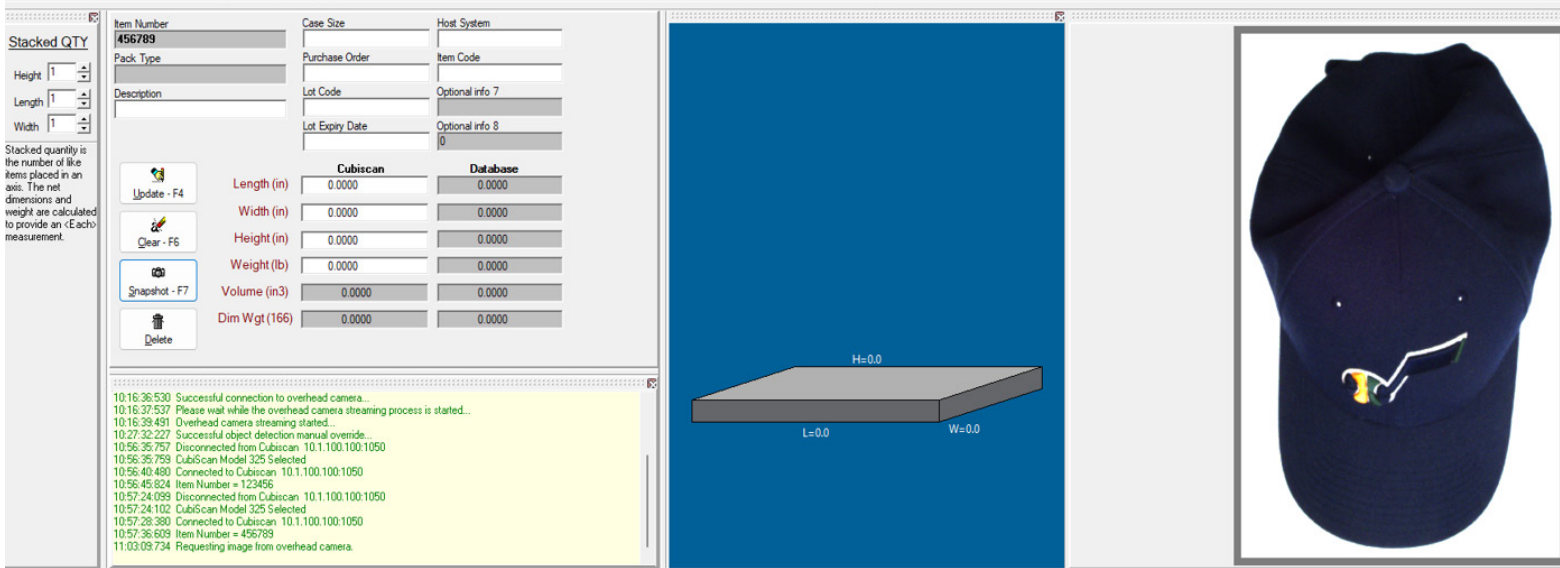
2. Once preferred parameters are set, go to the Exposure tab. Place an object on the platform and click **[Snapshot Raw]** to ensure the camera captures the entire platform. Adjust the lens on the camera as needed.



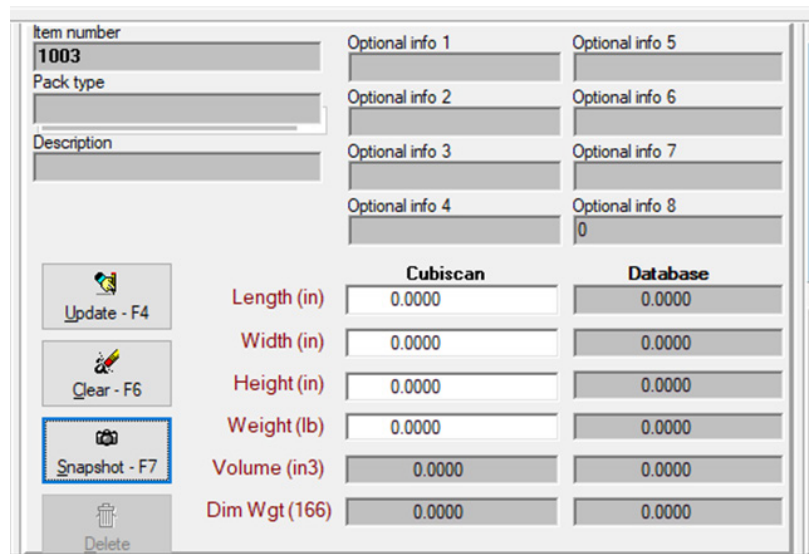
```
}}{ minimum pixel threshold = 1000 }}{ crop buffer = 20 }}{ border buffer = 20 }}{ bypass detection = 1 }}{ debug level = 0 }}{ image rotation = 1
10:25:00 - Image calibration parameters saved...
10:27:22 - Applying image calibration values = {Object detection} {method = 1 }}{ color threshold = 20 }}{ noise filter level = 1 }}{ edge threshold
}}{ minimum pixel threshold = 1000 }}{ crop buffer = 20 }}{ border buffer = 20 }}{ bypass detection = 0 }}{ debug level = 0 }}{ image rotation = 1
```



```
}}{ minimum pixel threshold = 1000 }}{ crop buffer = 20 }}{ border buffer = 20 }}{ bypass detection = 1 }}{ debug level = 0 }}{ image rot
10:25:00 - Image calibration parameters saved...
10:27:22 - Applying image calibration values = {Object detection} {method = 1 }}{ color threshold = 20 }}{ noise filter level = 1 }}{ edge t
}}{ minimum pixel threshold = 1000 }}{ crop buffer = 20 }}{ border buffer = 20 }}{ bypass detection = 0 }}{ debug level = 0 }}{ image rot
```



3. Next, click **[Snapshot]**. A cropped image of the object should appear. If the object is partially cropped, adjust settings to ensure the full object appears.
4. Click **[OK]** from the Options window when you are finished to close the window and save desired settings.
5. Return to the measuring screen. Click on the **View** dropdown to ensure that **Camera image** is selected. This will ensure the Camera image panel is displayed on the measuring screen.
6. Enter the item number for the item that you want associated with the picture into the **Item number** field (primary field).
7. Below the item number field are a series of buttons. When the **[Measure]** button is clicked, an image will be snapped and shown.
8. If the camera was connected to Qbit-DB successfully, the picture should display in the camera image window on the main Qbit-DB screen (shown above).
9. You may alternatively click **[Snapshot]** to take a snapshot of the object before a measurement is taken.



If a measurement is taken after **[Snapshot]** is clicked, no new snapshot will be taken.

If the **[Snapshot]** button is clicked after a measurement, a new snapshot will be taken, replacing the previous snapshot taken during the measurement process.

Right-click on **[Snapshot]** to open a menu displaying various snapshot options to choose from. The Snapshot menu gives quick access to settings without returning to the **Options** menu.

CAMERA SETTINGS

If the camera is having difficulty identifying the object or struggling to crop the image properly, the Snapshot menu gives alternative ways for the camera to search for the object. It also allows for a raw image to be taken at various zoom percentages.

If scanning a wide variety of object sizes and shapes, it is preferable to set the camera to **Raw image with no crop or zoom** or **Object detection**, making all possible options available at the Snapshot menu for possible manual override.

The following options are available from the Snapshot menu:

Raw image crop/zoom: Opens a side menu with various zoom percentages. The higher the percentage, the greater the zoom.

Detection type = largest objects: Sets the camera to detect the largest object on the platform.

This option is best in cases where the object detection algorithm cannot identify the object due to shadows or distinct features that distract it from the main object.

Detection type = highest objects: Sets the camera to detect the highest object on the platform.

This option may be helpful in cases where taller objects are being imaged.

Detection type = closest to center: Sets the camera to detect the object closest to the platform's center.

This option is most helpful if a shadow or other feature at the edge of the camera view prevents the camera from detecting the object.

Raw image crop/zoom	>	10%
Object detection		20%
Detection type = largest object		30%
Detection type = highest object		40%
Detection type = closest to center		50%
"Tools / Options" to set the serial port number		60%
g overhead camera interface		70%
cted to QBIT_DEFAULT		80%
ssful connection to overhead camera socket...		90%
g table --> ITEM_INFO		
an model 100 selected		
ssful connection to overhead camera...		



TROUBLESHOOTING

Images are too dark

If images are too dark, brightness may be corrected using the settings *exposure time*, *gain*, and *gamma correction* (see *Camera Settings*).

If changing these settings does not correct the issue, the F-stop on the camera may need to be adjusted manually.

1. The set screw closest to the camera housing adjusts the F-stop. Loosen the set screw and set the F-stop value to 8.
2. Snap a new picture to see if the exposure has improved. Continue adjusting the F-Stop value until the image is at the desired brightness.

Images are blurry

If images are blurry, the focus will need manual adjustment as follows.

1. Loosen the set screw that is closest to the end of the lens. This screw holds the focus ring in place.
2. After loosening the screw, turn the numbered ring closest to the lens to adjust the focus. The preferred setting is slightly off of infinity, somewhere between 1 and 2.

