

BoxDim User Guide

Ioline Corporation



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Introduction

The **Ioline BoxDim** system measures rectangular/cuboid objects on-demand. It is intended to work in conjunction with an existing scale. Dimensions are sent to Windows[®] PC based applications over either an ethernet or USB connection. Typical uses for the BoxDim system are for measuring packages in shipping environments and inventory measurement for stocking databases. Measurement data and images are saved within the device (limited only by storage capacity) and are accessible from the BoxDim PC application. Mounting the scanner exactly 48 inches above the scale and perpendicular to a scale edge is critical for accurate measurements.

Specifications

Tolerance: +/- 0.5 inches (2 cm)

Size Limit at Two Sample Heights:

Dimension	Minimum	Maximum
Length	6.0 in. (2 cm)	24 in. (60 cm)
Width	6.0 in. (2 cm)	30.0 in. (76 cm)
Height	6.0 in. (2 cm)	11.0 in. (28 cm)

Dimension	Minimum	Maximum
Length	6.0 in. (2 cm)	12 in. (30 cm)
Width	6.0 in. (2 cm)	22.0 in. (56 cm)
Height	6.0 in. (2 cm)	28.0 in. (70 cm)

Rotation Limit: <15° from parallel with scanner edges

Required Scanning Surface Mounting Height: 48 in. (1219 mm), +/- 1/32 inch (1mm)

Shapes: Cuboid (square and rectangular solid objects)

Required Surface Condition: Non-reflective surfaces. Acceptable surfaces include cardboard, manilla, paper, and many others. Tape, labels, and other decoration is OK.

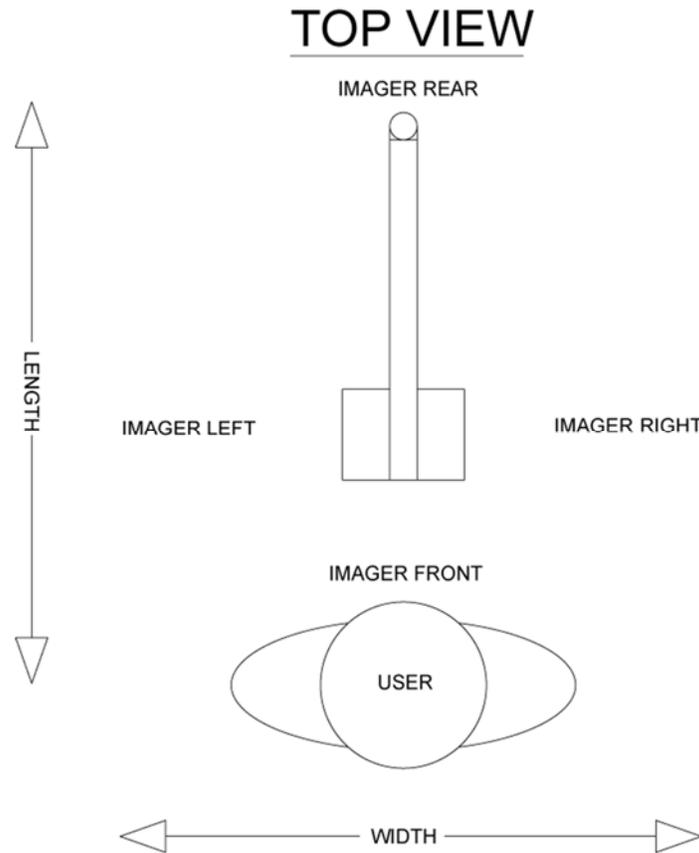
Measurement Time: <1 second

Operating Temperature: 14° F - 104° F (5° C - 35° C)

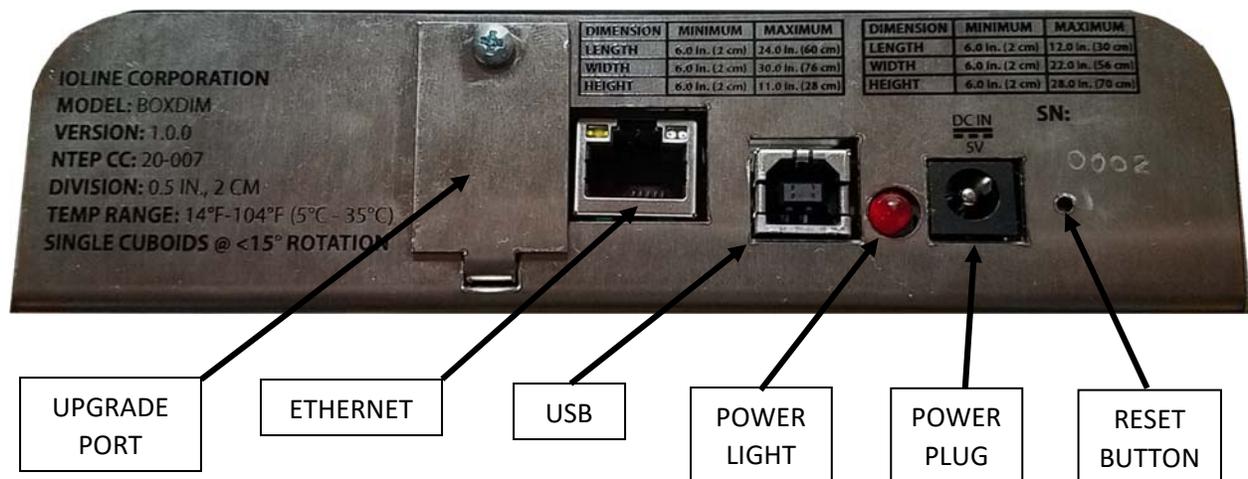
Compatible Operating Systems: Windows[®] 10

Certification: NTEP CC 20-007

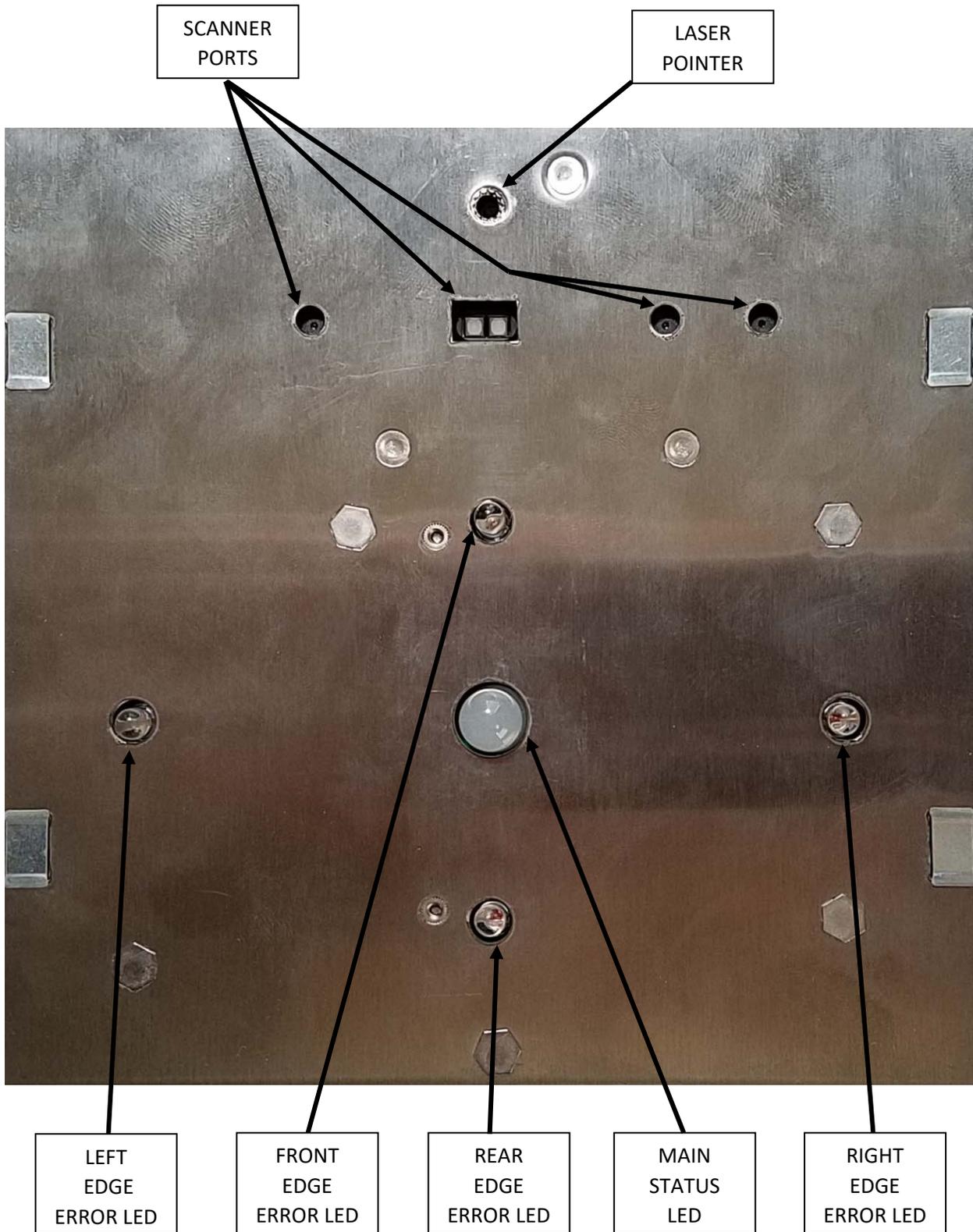
Orientation and Axes



Back Panel Features



Scanning Surface (Bottom)



Setup

Setup Summary

1. Unpack and check the scanner and stand parts
2. Assemble the stand
3. Install and adjust the scanner
4. Download and Install software

Check Package Contents

- BoxDim Scanner (1)
- Stand Base (1)
- Stand Upright Pole (2), 28 inches long
- Stand Upright Joint (1)
- Stand Scanner Pole (1), 24 inches long with drilled holes
- Stand Scanner Pole Clamp (1)
- Power Supply (1)
- Power Supply Extension Cord (1)
- USB Cable, 15 foot (1)
- Hardware Kit (1)
 - o Upright Pole Cap (1)
 - o #10-32 Scanner Screw (2)
 - o #1/4 Lag Screw (3)
 - o #1/4 Washer (3)
 - o Allen wrench for stand assembly (1)
 - o Measuring tape (1)
 - o Velcro straps (3)
 - o Level (1)

Tools Required

- Phillips screwdriver
- Hammer
- Drill and drill bit for #1/4 lag screw pilot holes
- 7/16 wrench for tightening #1/4 lag screws
- Depending on installation location, a ladder or tall step stool
- Allen wrench, 5mm (included)
- Level (included)
- Tape measure (cloth tape included as a backup)

Build the Stand

1. **Prepare the Area:** Ensure the installation area is free of objects and obstructions within 20 inches from the center of the scale.
2. **Choose the Stand Base Location:**
 - a. **Counter mounting:** Find a location on the mounting surface so that the center of the base is approximately 21 to 24 inches from the center of the scale **and** so that the stand base is directly behind or to the side of the scale. It is important the stand is perpendicular to an edge of the scale.
 - b. **Wall Mounting:** Make sure the base is mounted on a wall or post so that the distance from the mounting surface to the center of the scale is 20 to 23 inches. It is important the that the scanner pole is perpendicular to an edge of the scale. Use different mounting hardware if required by the wall mounting location. **Do not install the base now.**
3. **Install the Stand Base (*Counter Mounting Only*):**

WARNING: A strong connection of the base to the mounting surface is important for user safety.

- a. Use the included ¼ inch lag screws and washers to secure the stand base to the mounting surface.
 - b. Use a drill to make a pilot hole for each screw, usually 3/32 – 3/16 inches for wood depending on the density of the material. Check the pilot hole diameter for your application.
4. **Assemble the Upright Pole (*Counter Mounting Only*):**
 - a. Find the upright poles. There are two, they are the same length, and **do not** have holes drilled in them.
 - b. On a flat surface insert both upright poles into the open ends of the upright joint making sure they are inserted as far as they will go.
 - c. Snugly tighten the Allen screws with the included 5mm Allen wrench. Take turns tightening both screws 1/2 turn each alternating back and forth between them to ensure the joint is evenly tightened onto both poles.
 - d. Make sure the poles stay completely inserted in the upright joint during assembly.



5. **Install the Upright Pole (*Counter Mounting Only*):**
 - a. Insert the upright pole assembly into the stand base then tighten the set screw with the included 5mm Allen wrench to hold the pole in place.

- b. Insert the plastic cap into the exposed top end of the upright pole using a hammer to lightly tap into place. Insert a piece of cardboard or wood over the cap to prevent damage to the cap.

6. Install the Scanner Pole:

WARNING: A tall stool or ladder is required for the following steps if the scanner is installed on a countertop or a wall that is beyond reach when standing on the floor. Get assistance for another person and follow all safety instructions for the stool or ladder.

- a. Place the scanner pole within reach.
- b. *If counter mounting*, make sure the scanner pole clamp pieces are interlocked together on the side opposite the Allen screw.



CLAMP **NOT**
INTERLOCKED
CORRECTLY



CLAMP
INTERLOCKED
CORRECTLY

- c. *If counter mounting*, loosen the Allen screw until it is just about to fall out. Slide the scanner pole clamp over the upright pole and hold it in place with one hand.
- d. *If counter mounting*, while holding the scanner pole clamp in place, *fully* insert the end of the scanner pole **without drilled holes** into the scanner pole clamp and lightly tighten the Allen screw so that pole remains in place.
- e. *If wall mounting*, insert the scanner pole into the stand base and lightly tighten the set screw. *The stand base is NOT mounted to the wall yet.*
- f. Rotate the scanner pole so that the drilled holes face upwards.
- g. The scanner pole requires adjustment later so do not snugly tighten yet.



Install the BoxDim Scanner Device

WARNING: A tall stool or ladder is required for the following steps if the scanner is installed on a countertop or a wall that is beyond reach when standing on the floor. Get assistance from another person and follow all safety instructions for the stool or ladder.

1. Choose the Installation Holes:

- a. Choosing the installation holes to mount the scanner to the scanner pole requires finding a hole that is roughly above the center of the scale. There are seven (7) mounting holes
- b. Hold the included cloth ruler so that one end hangs from the scanner pole and the far end is roughly over the center of the scale.
- c. Choose a hole that is closest to the end of the ruler at the scanner pole end of the tape. This is the front mounting hole for the scanner.
- d. Make sure that another hole is available 3 inches behind that hole (closer to the upright pole or wall) which is the rear scanner mounting hole. If there is not one there, choose the next hole forward.

2. Mount the Scanner:

IMPORTANT: Keep the bottom scanning surface covered with the foam packaging until it is mounted on the scanner pole.

- a. Hold the BoxDim scanner so that the back of the unit with all the connection openings and labels faces the stand upright pole/wall **AND** the foam-covered scanning surface with the LEDs and holes faces down.
- b. Insert both #10-32 screws through the holes in the scanner pole chosen above and into the threaded holes on the top of the scanner.
- c. Tighten the screws with a Phillips screwdriver so that scanner remains in place. Do not overtighten.
- d. Remove the protective foam sheet from the bottom of the scanner.



3. Adjust the Scanner Location:

IMPORTANT: It is **critical** that bottom of the scanner is exactly 48 inches (1219 mm) from the scale surface. Consistent and accurate measurements depend on this distance. *Completing the adjustment steps below are important.* It is best to use a tape measure for this process. A cloth tape is included as a backup but is not preferred. Having help from a second person makes this process much easier.

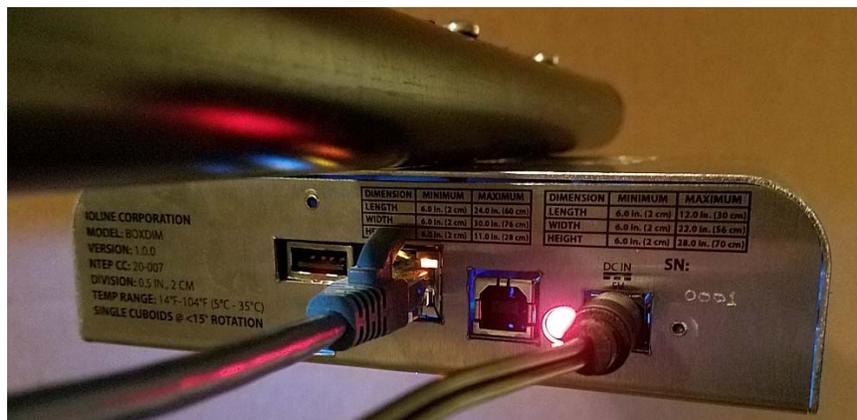
- a. Use a tape measure (or the included cloth tape if necessary) to measure the distance between the bottom of the scanner (the *scanning surface*) and the top of the scale. **The target height is exactly 48 inches (1219 mm).** **NOTE:** If using the cloth tape, make sure to pull it tight to remove wrinkles. This process requires two people to perform.



- b. *If counter mounting*, while holding the scanner pole (do not push on the scanner), rotate it left and right while pulling up or down to adjust the scanner pole height.
- c. *If counter mounting*, tighten the screw on the scanner pole clamp then check the height to confirm the bottom scanner surface is still exactly 48 inches above the scale.
- d. *If counter mounting*, repeat the above steps to make fine adjustments if the measurement is not **exactly 48 inches (1219 mm)** above the scale surface **after the scanner pole clamp screw is tight**.
- e. *If wall mounting*, tighten the set screw in the stand base then hold the scanner and scanner pole assembly firmly against the mounting surface while a second person measures the distance from the bottom scanning surface to the scale surface. When the height is **exactly 48 inches (1219 mm)** above the scale surface, mark the scanner base hole locations. Mount the scanner base with the lag screws in the marked locations as described above.
- f. Place the included vial-level on top of the scanner close to the scanner pole and so the bubble is visible from the front of the scanner.
- g. With the 5mm Allen wrench, slightly loosen the scanner pole clamp screw (counter mount) or stand base set screw (wall mount) then gently twist the scanner pole until the vial-level shows the scanner is level left to right.
- h. Tighten the scanner pole clamp/stand base screw then confirm the height is still exactly 48 inches. Continue adjusting by repeating the above steps if required.
- i. Confirm that all screws in the stand and scanner are tight.

4. Connect Cables:

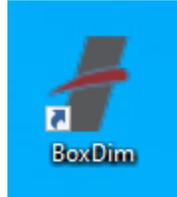
- a. Determine if the scanner is connected to a Windows[®] PC by USB cable or via a network by Ethernet cable.
 - i. ***Ethernet is the preferred connection method*** due to a higher data transfer rate and longer allowable connection distance. If using Ethernet, connect the scanner to a network switch with an ethernet cable plugged into the RJ45 port on the back of the scanner.
 - ii. A USB connection is possible if no network connection is available and the Windows[®] based PC is 15 feet or less from the scanning device. If using a USB connection, insert the square 'B' end of the USB cable into the USB port on the back of the scanner. Connect the other end of the USB cable to an available USB port on the Windows[®] 10 PC.
- b. Insert the male end of the power extension cord into power input port on the back of the scanner.
- c. Use one of the included Velcro straps to secure both the communication cable and the power extension cord to the scanner pole so that the cables do not hang down near the scanner.
- d. Connect the female end of the power extension cable to the male connector on the power supply.
- e. Use two Velcro straps in different places to secure the communication and power cables to the upright stand poles so that the cables do not bulge out into the scanning area.
- f. Plug the power supply into a wall outlet. The power light on the back of the scanner should illuminate red. If it does not, check all connections to confirm that everything is plugged together. If the light still does not illuminate then call Ioline customer service using the contact information on the Ioline support website at <https://ioline.com/support>.



Install and Configure BoxDim Software

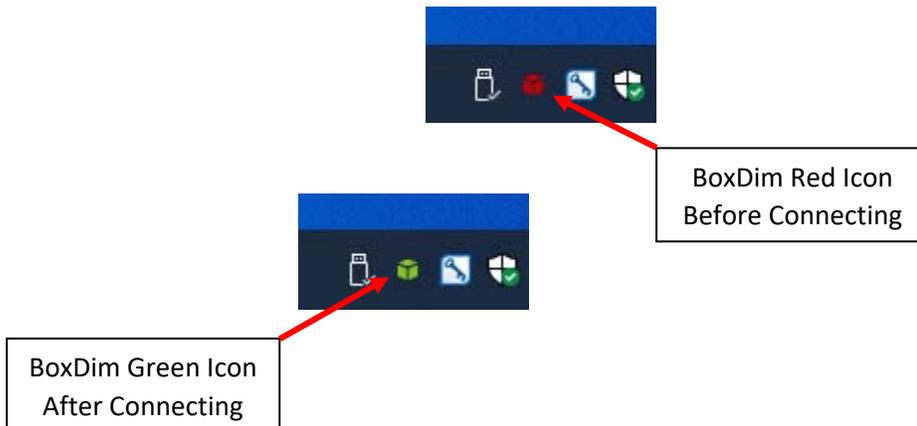
1. Install Software:

- With a web browser visit <https://ioline.com/support/boxdim>.
- Find the BoxDim PC Application and download it.
- Install the program on a Windows® 10 PC by double clicking on the downloaded file.
- The installation program will place an Icon on your desktop called *BoxDim*.



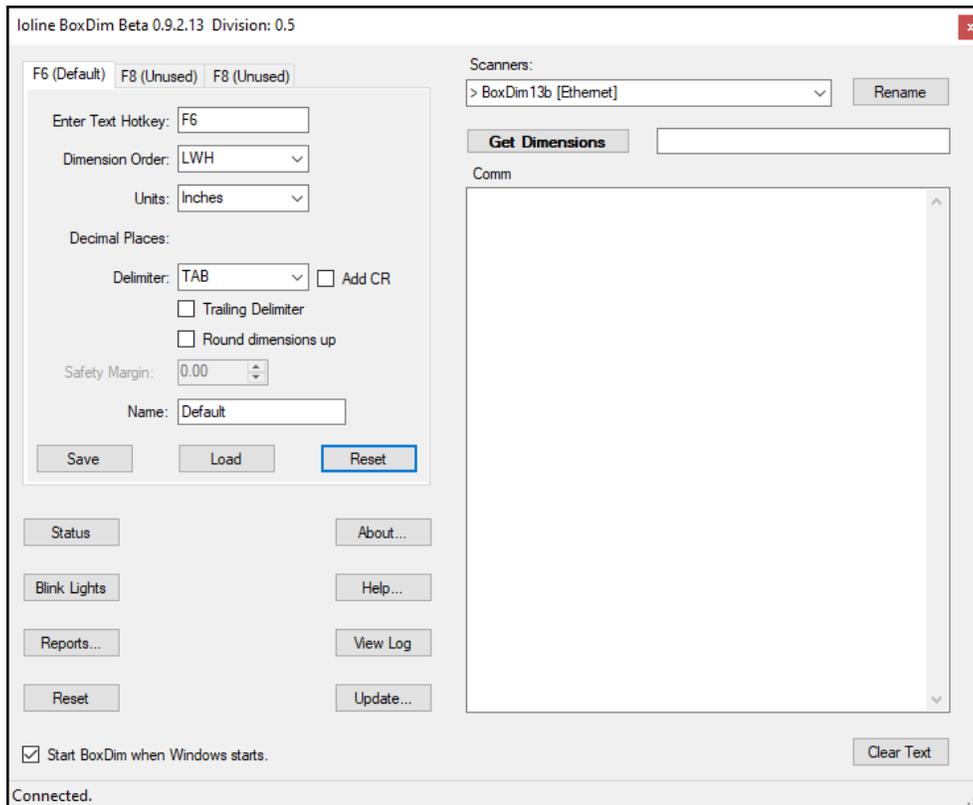
2. Configure BoxDim Software:

- Double click on the BoxDim icon to start the BoxDim program.
- A small cube shaped icon appears in the Windows® 10 System Tray usually located at the bottom of the screen at the right end of the Task Bar. The icon starts out red colored then changes to green after a few seconds to indicate it automatically found the BoxDim scanner.



- Right click the cube icon and choose **Show App**.

d. The BoxDim application interface will appear on the screen.



- e. Change any format settings necessary for the F6 hotkey output. For example, you can change the units used when reporting dimensions. Click the **Save** button if any changes were made.
- f. Review the BoxDim help file for more information on using the BoxDim application. Press the **Help** button in the application to access this file.

3. Test the BoxDim System:

- Place a package that is within the BoxDim size limits under the scanner and on the scale.
- The laser pointer should turn on to show the rough position where to center the box.
- Click the **Get Dimension** button on the BoxDim program window.
- The dimension of the box will appear in the window next to the **Get Dimension** button if the system is working.
- Consult the troubleshooting section if any issues arise during testing.

Operation

Using the BoxDim System

1. Measuring a Box:

- a. Place an object on the scale that complies with the specifications listed above. Make sure the edges are roughly parallel with the edges of the scanner.
- b. The laser pointer will turn on as a guide to show where to position the center of the box.
- c. There are two methods for taking measurements:
 - i. Method 1: The easiest and most efficient method for measuring a box is to use hot keys to automatically insert the dimensions directly into shipping or database software. Place the cursor into the first measurement entry window and press the hot key configured for the software. The default is F6. If the measurements display incorrectly then consult the help file for the BoxDim software to change the configuration.
 - ii. Method 2: Use the BoxDim PC application. Right click on the BoxDim cube icon in the system tray and choose **Show App**. Click the **Get Dimensions** button. The measurement is displayed in the window next to the button.
- d. Make sure to remove the box from the scale or the scanner will blink a blue light as a reminder and prevent further measurements.
- e. The status light will turn solid green when the scanner is ready to measure the next box.

2. Customizing Measurements:

- a. The BoxDim PC app allows many customization options to format the measurement output to match the requirements of the software that uses the data.
- b. Examples of customization:
 - i. Changing hot key assignments
 - ii. Changing measurement order
 - iii. Changing units
- c. By default, the BoxDim software automatically starts when Windows[®] is started. This is adjustable in the BoxDim application interface.
- d. Customization and other application features are covered in detail in the help file accessible by pressing **Help** in the BoxDim application.

Retrieving Historical Measurement Data

The BoxDim system includes a built-in storage system for measurement and image data for each object. It is possible to retrieve these data from the BoxDim PC application. Historical data are preserved until storage space is within 90% of capacity. When this happens, older data are deleted to make room for new data. The data maintenance process is completely automatic. **NOTE:** the date and time for every measurement are stored in Universal Time (UTC). Remember to adjust the search parameters to compensate for the offset between UTC and the local time zone.

1. Start the BoxDim PC Application Report Feature:

- Right click on the BoxDim System Tray icon and choose **Show App**.
- When the application window appears, click on the **Reports...** button.
- The **Reports** window appears.

Search for past measurements using the options listed below.

Closest Match
Enter a date and time to find the closest measurement. Click the Image button in the Results window to see pictures of the measured item.

Date: Time:

List By Range
Enter a start and stop date and time and a list of the measurements in that range will be displayed. Click the Image button in the Results window to see pictures of the measured item.

Start Date: Start Time:
End Date: End Time:

Results

Scanner Name	Date	Time	Measurement (L x W x H)
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2. Find One Measurement:

- a. In the *Closest Match* section, enter the date and time for a measurement.
- b. Click the **Search** button.
- c. The measurement that is nearest to the entered time and date is displayed in the *Results* output window.

3. Find a List of Measurements:

- a. In the *List By Range* section, enter the starting and ending date and times for the measurements.
- b. Click the **Search** button.
- c. The measurements that are within the entered time and date range are displayed in the *Results* output window.

4. View Object Images:

- a. For any item listed in the *Results* window, click the **Images** button to see the images taken for the object.
- b. There is slight delay while the image is downloaded to the PC.
- c. The image window shows the color image first. Clicking on the image switches to the measurement image which is helpful for diagnosing issues. Continue clicking the image to switch back and forth between both images.
- d. Click the *X* in the upper right-hand corner of the window to close the image view.

5. Exporting Data:

- a. It is possible to copy or export data from the results window.
- b. To copy results data to the clipboard, press the **Copy** button.
- c. To export data to a CSV file, click the **Export** button then choose a folder location and file name and press the *Enter* key. The CSV formatted data are saved to a file.

Troubleshooting

Status Light Codes

Status Error Light	Error Condition	Correction
Dark/OFF	Scanner program not running.	Check power connection and red power light. If power light is off, check connections and power supply. If power light is on then unplug scanner, wait five seconds, plug scanner in and test again.
Solid Blue Light	Scanner program is starting	Wait for program to start.
Solid White Light	Scanner system is warming up	Wait for scanner to reach operating temperature.
Solid Green Light	Scanner is ready to measure	None
Solid Yellow Light	Scanner detects motion and turns on the laser pointer	None
Solid Red Light	An internal error has occurred	Unplug scanner, wait five seconds, plug scanner in and test again. Contact support if the issue is not resolved.
Blinking Blue Light	Previous object present	Remove the object that was last measured from the scale.
Blinking Green Light	Scanner is measuring the object	None
Blinking Red Light <i>1 blink /sec</i>	Scanner could not measure the object. Measurement is 0,0,0.	Check the edge error lights (see below) and move object so all edges are visible. Object is rotated more than 15° from parallel with scanner edges. Object is too big in length, width, or height. Object material is reflective or featureless.
Blinking Red Light <i>2 blink /sec</i>	A hardware error has occurred	Unplug scanner, wait five seconds, plug scanner in and test again. Contact support if the issue is not resolved.

Edge Error Lights

There are four orange LEDs lights arranged around the large status LED light on the bottom scanning surface. If any of the edge error lights are illuminated after a measurement, the scanner was unable to resolve the edge of the object associated with the light. For example, if the left edge error light is illuminated, the scanner could not see the left edge of the object. Reposition the object so that the edge associated with the blinking light is closer to the center of the scale then measure again.

If repositioning the object causes the opposite edge light to light up, the object is too big for the scanner to measure.

No Connection

The Ioline BoxDim PC software is designed to automatically communicate with a BoxDim scanner connected to the PC by USB or via a network. If the System Tray BoxDim icon remains red (never turns green) then the application cannot find the scanner. Try following suggestions to resolve the issue.

If connected by USB:

1. Cables not inserted properly at the scanner or the PC. Unplug and re-insert the cable at both ends to confirm a good connection.
2. Damaged USB cable. Replace the cable to confirm it is not damaged.
3. Damaged USB port on PC. Try using a different USB port on the PC. Connect other USB devices to the same port to confirm they work.
4. USB configuration issues on the PC. Contact Ioline support for help checking that the USB drivers are installed correctly on the PC.

If connected by Ethernet Cable over Network:

1. Cables not inserted properly at the scanner or the network switch. Unplug and re-insert the network cable at both ends to confirm a good connection.
2. Damaged Ethernet cable. Replace the cable to confirm it is not damaged.
3. Scanner and PC on different subnets. Make sure that the PC and scanner are connected to the same subnet or that a UDP route between the subnets is established so the scanner can connect to the PC.
4. DHCP disabled on network router. Enable DHCP on the network router so that the scanner can automatically get an IP address assigned.

Incorrect Measurements

BoxDim only measures square and rectangular objects that fit inside of the dimensional limits stated in this guide and printed on the back of the machine. It works best with objects that have matte surfaces like cardboard and have writing or other markings that break up featureless surfaces. If BoxDim is making incorrect measurements (more than 0.5 inches error) then check the object to confirm it is not made of a reflective material, it has well defined edges, and has some markings on the surface facing the scanner. Rotating the object 90° in one or more axes and remeasuring can help resolve measuring problems.

Getting Help

If the information in this guide does not provide enough guidance to setup, use or troubleshoot the BoxDim system, visit the Ioline Support website at <https://ioline.com/support>. Additional support documents, FAQs, and contact information for the Ioline support department are available there.