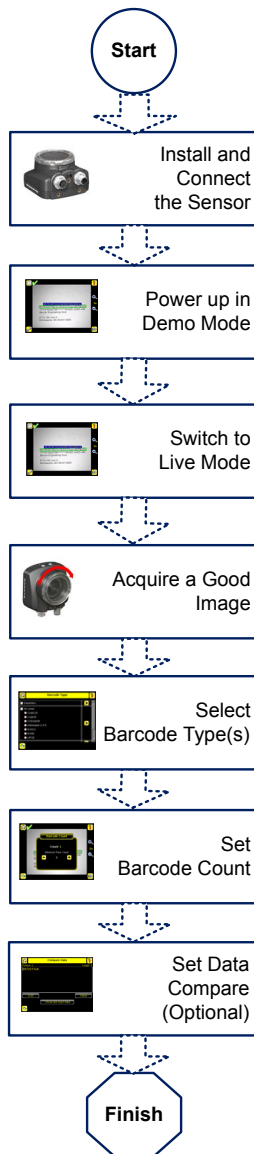


## Introduction

The iVu BCR sensor is a barcode reader used to read a variety of barcodes (see [Barcodes Read by the iVu BCR](#) on page 10). The sensor has an integrated color touch screen display making installation, setup and configuration easy without requiring a PC.



### Quick Start Overview


This guide is designed to provide the necessary information to get the iVu BCR up and running quickly. It provides an overview of the sensor and illustrates how to set up the sensor to read barcodes. The flow chart at left provides an overview of the process.

### Related Information

The following documentation is available on the Product CD:

- *iVu BCR Datasheet* (P/N 148758)
- *iVu BCR Sensor Reference* (P/N 148759)
- *iVu BCR User's Manual*

In addition, there is integrated Help built into the sensor itself.

 **Note:** Before setting up the sensor, remove all packaging. Carefully remove the plastic cover from the sensor's touch screen display, and put aside. You should replace the cover after configuring the sensor to protect the display.

## Install and Connect the Sensor



The iVu Series sensor requires a bracket for mounting. Four brackets are available from Banner. The brackets allow the sensor to be mounted either perpendicular to the part or at an angle.


### Available iVu Brackets

SMBIVURAL	SMBIVURAR	SMBIVUB	SMBIVUU
			

Thread three M4 x 4mm screws through the bracket into the mounting holes in the bottom of the sensor. Tighten all three screws.


### Cable Connections

The power and I/O cable for the iVu Series sensor is available in 2, 5, 9, and 15 m (6, 15, 30, 50') lengths. The 12-pin connector on the sensor is shown below (**B**). See the table below for details.

	Pin #	Wire Color	Description	Direction
	2	Brown	10-30V dc	Input
	7	Blue	Common (Signal Ground)	Input
	6	Pink	External Trigger	Input
	5	Gray	Remote Teach	Input
	1	White	Output 1	Output
	8	Red	Ready	Output
	4	Yellow	Strobe Out (5V dc only)	Output
	3	Green	Output 2	Output
	9	Orange	Not used	N/A
	10	Light Blue	RS-232 TX	Output
	11	Black	RS-232 Signal Ground	Output
	12	Violet	RS-232 Rx	Input

## Demo Mode

The first time you power up the iVu Series sensor, it starts in Demo Mode. Demo Mode uses stored images and inspection parameters that demonstrate how the sensor is set up without having to worry about focus, lighting, or triggers. In this mode, you can learn how to make adjustments while observing how the adjustments affect the sensor results. To exit Demo Mode, go to **Main Menu > System > Sensor Mode** and select Exit Demo Mode. When you exit Demo Mode, the sensor reboots into its normal operating mode with default settings.

 **Note:** You may return to Demo Mode any time by going to **Main Menu > System > Sensor Mode** and selecting Demo Mode.

## Overview of Sensor Operation in Live Mode

The iVu BCR can be configured to evaluate one or more of the supported barcode types, and can look for a specific number of barcodes from 1 to 10. The barcode types are selected on the integrated touch screen by accessing **Main Menu > Inspection > Barcode Type**. The barcode count is selected on the touch screen by going to **Main Menu > Inspection > Barcode Count**.

This section describes some general iVu BCR concepts.

### Read/No Read, Pass/Fail

The following describes what is meant by Read/No Read and Pass/Fail:

- A Read condition occurs when the configured number of barcodes are found in a scan. These barcodes must be error-free.
- A No Read condition occurs when the configured number of barcodes are not found in a scan.
- If the sensor is configured where Data Compare is **disabled**, Pass and Fail are the same as Read and No Read.
- If the sensor is using the Data Compare feature, Pass indicates that a good barcode was found, and the data compared.
- If the sensor is using the Data Compare feature, Fail indicates that either no good barcode was found, or the data did not compare.

### Trigger Modes

The iVu BCR has three trigger modes that determine how the sensor captures and processes images:

- External - Single
- Continuous
- External - Gated

You can select one of the trigger modes by accessing **Main Menu > Imager > Trigger** on the iVu integrated touch screen display. The following describes these trigger modes in more detail.


### External-Single Mode

In External-Single mode, the sensor depends on an external trigger. For each trigger, the sensor captures an image and executes one scan through the configured barcode types looking for the specified number of barcodes. This trigger mode uses the Scan Timeout parameter (**Main Menu > System > Sensor Configuration > Scan Time Limit**) to limit the amount of time the sensor will attempt to scan for barcodes on an image.

## Continuous Mode

In Continuous mode, the sensor uses internal timing to continuously capture images. For each captured image, the sensor scans through the configured barcode types looking for the specified number of barcodes. If the specified number of barcodes is found, a Read event occurs. If the specified number of barcodes is not found, the sensor captures another image and repeats the scan. There are two parameters that are used to fine-tune how Continuous Scan mode operates:

- Same Code Reject Time (set at the bottom of **Main Menu > Imager > Trigger**)—time in seconds that must elapse before the scanner will report a previously scanned symbol again. A different symbol will be read immediately.
- Scan Time Limit (**Main Menu > System > Sensor Configuration > Scan Time Limit**)—limits the amount of time the sensor will attempt to scan for barcodes on an image.

 **Note:** A No Read conditions will **not** occur in Continuous mode, as another image capture and scan automatically follows.

## External-Gated Mode

External-Gated mode is similar to Continuous mode. While an external trigger input signal is active, the sensor continues to capture images and run barcode scans until a successful Read occurs or the External Trigger input signal becomes inactive. The External - Gated mode uses the Scan Timeout parameter (**Main Menu > System > Sensor Configuration > Scan Time Limit**) to limit the amount of time the sensor will attempt to decode barcodes on an image.

 **Note:** No Read conditions will **not** occur in External - Gated mode while the external trigger is active.

## Compare Data

The iVu BCR has a data compare feature for comparing read barcode data against reference data. Data can be manually entered by accessing the **Main Menu > Inspection > Data Compare > Set Data** screen. Data of up to 3200 characters can be entered. Additionally, the data compare features provides for masking characters within the data.


There are two other ways to enter compare data:

- by importing the last read data while viewing the **Set Data** screen. The new data is effective on the first trigger that occurs after this action.
- using Remote Teach. When a Remote Teach occurs, the data of the first read barcode is saved as Data Compare input. Inspections executed on the next trigger will use the new data for comparison with subsequently read barcodes. If the previous input data contained any masked characters, Remote Teach will retain the masked characters **only** if the new data is of the same length as the previous input data. If the length does not match, masking is removed.

The sensor tries to compare full length of this string with the data read from the barcode. If not equal, inspection should be marked as Fail.

## Output 1 and Output 2

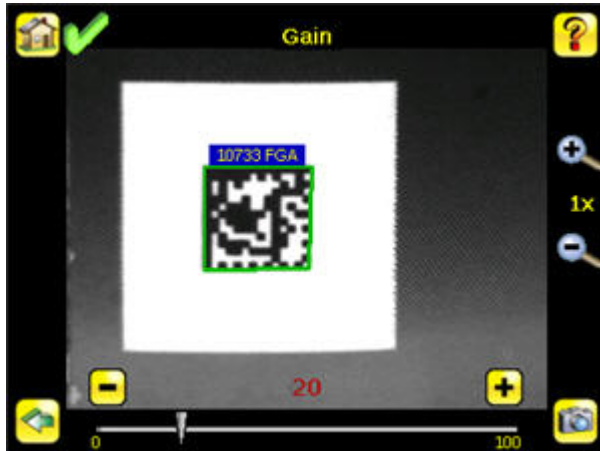
The sensor has two output signals that you can configure for Pass, Fail, Read and No Read. The default settings are Pass for Output 1 and Fail for Output 2.

 **Note:** For both Output 1 and Output 2, the default setting is Latched, which means that the signal is active until the results of an inspection cause a change in the signal output. If Pulsed is selected, the default pulse width is 50 ms.

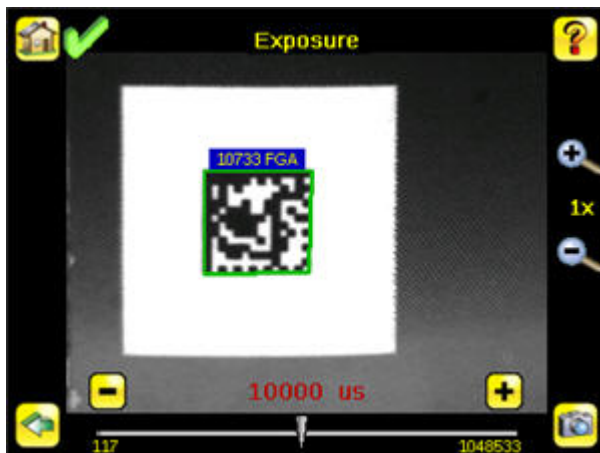
## Acquiring a Good Image

The iVu Series sensor needs to capture a good image to ensure that it can read the barcode(s) correctly.

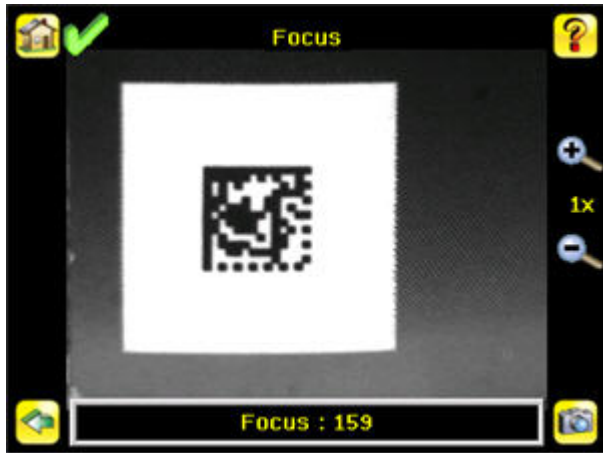
1. Go to **Main Menu > Imager > Auto Exposure** to run the **Auto Exposure** routine.
2. Check the lighting.
  - Make sure that the lighting is constant and consistent (unchanging over time, no shadows or hot spots).
  - Capture the barcode with lighting that optimizes its contrast and separates it from the background. Depending on the target, this may mean the integral ring light is not the best choice and other Banner lights should be considered.
  - Adjust the mounting angle to provide the clearest image of the barcode. The mounting bracket lets you easily position and adjust the sensor on your line. Typically, a slight angle will help with read robustness.
3. If needed, go to **Main Menu > Imager > Auto Exposure** to run the **Auto Exposure** routine a second time, or adjust **Gain** and **Exposure** manually:
  - **Main Menu > Imager > Gain**



- **Main Menu > Imager > Exposure**



4. Go to **Main Menu > Imager > Focus** to adjust the focus while monitoring the **Focus Number**:



- a. Use the supplied 1/16" hex key to loosen the Focusing Window locking screw (**D**), then adjust focus on the iVu Series sensor using the clear Focusing Window (**B**).

	A	Lens
	B	Focusing Window
	C	Locking Clip
	D	Locking Screw
	E	Filter Cap (optional)
	F	Filter (optional)
<b>Note:</b> Filter Kits are available separately.		

- b. Adjust focus while monitoring the focus number. To ensure the best image, adjust the focus until the Focus Number peaks.

**Note:** Turning the Focusing Window counter-clockwise focuses on closer objects, while turning the Focusing Window clockwise focuses on more distant objects.

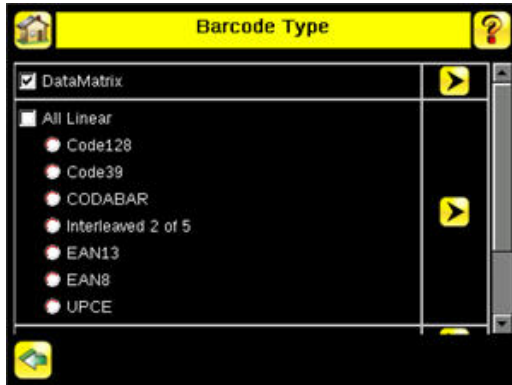


- c. Once the best image has been acquired, lock the focusing window.

## Setting Up a Barcode Application

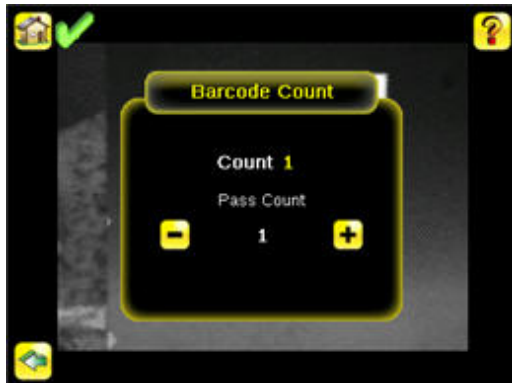
This section describes how to set up the iVu BCR sensor.

1. Go to **Main Menu > Inspection > Barcode Type** to select one or more Barcode Types from the list.



- Note:** To ensure optimal performance, select only the barcode types for your application. For example, if you use only one of the of the barcode types listed for All Linear, uncheck the box next to All Linear, and select a radio button next to the desired linear barcode type. If you use only DataMatrix, uncheck all the boxes except the one next to DataMatrix.

2. Go to **Main Menu > Inspection > Barcode Count** to select the number of barcodes (1 to 10) to be read at one time.



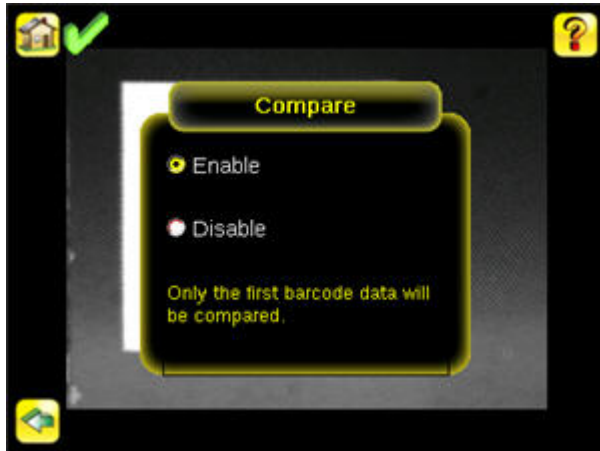
Once the sensor has been set up as described:

- Each successfully read barcode is marked by a green bounding box. If annotations are on, the barcode data is also displayed.
- Any barcodes that have been detected but not successfully read are marked with a solid red bounding box. If the barcode is marked with a dotted red bounding box, this indicates a checksum error or quiet zone violation.
- Any barcodes in the field of view that the sensor does not detect (for example, because they are not one of the barcode types selected), are unmarked.

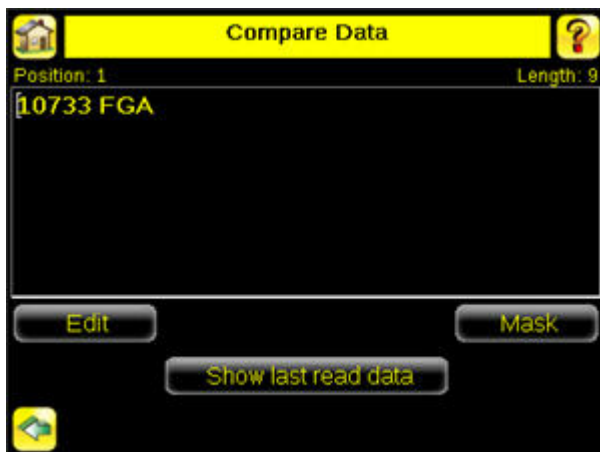
## Setting up for Data Compare

This section describes how to set up the iVu BCR sensor to compare decoded barcode data against some reference. For this example, the reference data will be from a previously decoded barcode.

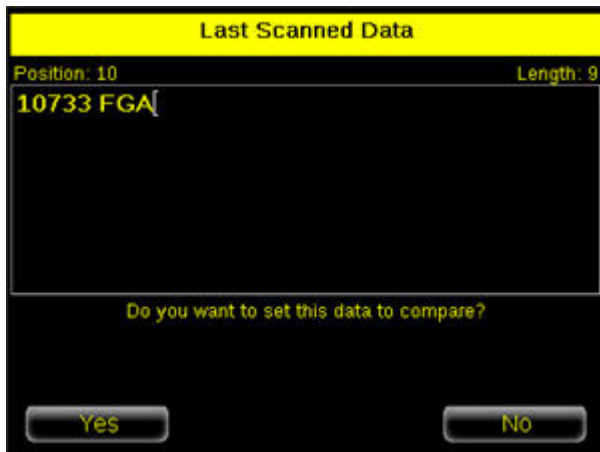
1. Go to the **Main Menu > Inspection > Data Compare > Compare** to Enable data compare.



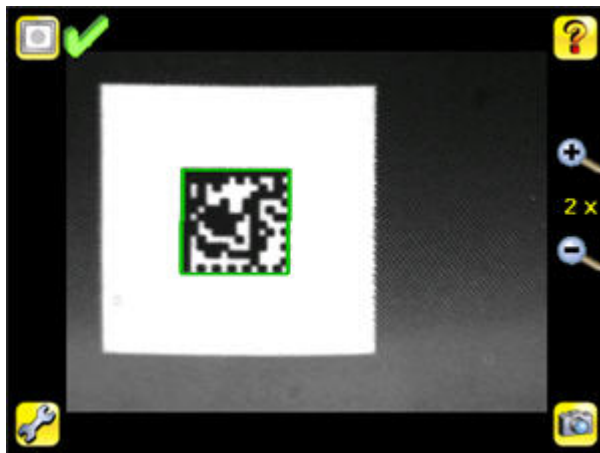
2. Go to the **Main Menu > Inspection > Data Compare > Set Data**, and click the **Show last read data** button.



3. Press the **Yes** button.













4. Press the Home icon to return to the main screen.




For all subsequent triggers, when the sensor reads the barcode data, it will compare it against this reference data.

## Barcodes Read by the iVu BCR

Barcode	Date	Format	Industries	Notes	Example
Codabar (NW-7 in Japan, USD4, 2 of 7)	1972	linear	<ul style="list-style-type: none"> <li>• blood banks</li> <li>• cotton industry</li> <li>• libraries</li> <li>• photo labs</li> <li>• air parcel express</li> <li>• information processing industry</li> </ul>	<ul style="list-style-type: none"> <li>• 16-characters</li> <li>• self-checking</li> <li>• variable length</li> <li>• discrete</li> <li>• start/stop characters</li> </ul>	 A40156B
(Code 25, ITF-14, ITF, "I" 2 of 5, I25) NOT included: 2 of 5 Industrial OR 2 of 5 Matrix	1972	linear	<ul style="list-style-type: none"> <li>• Distribution industry</li> <li>• warehousing</li> <li>• product/container identification</li> <li>• general industrial</li> <li>• automotive</li> <li>• can be printed directly on corrugated cartons</li> </ul>	<ul style="list-style-type: none"> <li>• 10-characters (numeric only)</li> <li>• optional check-sum</li> <li>• variable length</li> <li>• continuous</li> <li>• start/stop characters</li> </ul>	 12345670
Code 39 (USD-3, 3 of 9, LOGMARS) includes: Code 39 extended	1975	linear	<ul style="list-style-type: none"> <li>• LOGMARS (Department of Defense standard)</li> <li>• HIBCC (health industry standard)</li> <li>• AIAG (automotive industry standard)</li> <li>• general industry</li> </ul>	<ul style="list-style-type: none"> <li>• Most common non-UPC (i.e. non-retail) code</li> <li>• 43-characters</li> <li>• optional check-sum</li> <li>• variable length</li> <li>• discrete</li> <li>• start/stop characters</li> </ul>	 TEST8052
EAN-13 (UPC-A)	1976	linear	Retail products worldwide (point-of-sale)	<ul style="list-style-type: none"> <li>• 10-characters (numeric only)</li> <li>• check-sum</li> <li>• continuous</li> <li>• Like an international UPC symbol, EAN-13 includes the UPC-A standard, fixed length (10 data digits plus 2 or 3-digit country code and 1 check digit)</li> <li>• The only difference between UPC-A and EAN-13 is UPC-A has a single digit country (or product type) code.</li> </ul>	 0188837367678

Barcode	Date	Format	Industries	Notes	Example
UPC-E	~1976	linear	Small retail products in USA and Canada (point-of-sale)	<ul style="list-style-type: none"> <li>• 6-characters (numeric only)</li> <li>• check-sum</li> <li>• continuous</li> <li>• Commonly called a “zero-suppressed” version of the standard UPC-A symbol, this barcode is used on small items or crowded labels where space is at a premium</li> </ul>	
EAN-8	1976	linear	Retail products worldwide (point-of-sale)	<ul style="list-style-type: none"> <li>• 10-characters (numeric only)</li> <li>• check-sum</li> <li>• continuous</li> <li>• A shortened version of EAN-13. Fixed length (5 data digits plus 2 flag digits and 1 check digit)</li> </ul>	
Code 128 (GS1-128, EAN-128, UCC-128, UCC/EAN-128) includes: Code 128/EAN 128 subsets A, B, & C	1981	linear	<ul style="list-style-type: none"> <li>• Retail distribution</li> <li>• carton tracking</li> <li>• inventory control</li> <li>• general industrial</li> </ul>	<ul style="list-style-type: none"> <li>• Most compact linear code</li> <li>• All 128 printable ASCII characters</li> <li>• check-sum</li> <li>• variable length</li> <li>• continuous</li> <li>• start/stop characters</li> </ul>	
Postnet includes: Delivery Point Barcode(DPBC)	1980	linear	Mail sorting for US Postal Service	<ul style="list-style-type: none"> <li>• 10 characters (numeric only)</li> <li>• check-sum</li> <li>• discrete</li> <li>• Three main data strings are stored in Postnet codes: a 5-digit ZIP code (with check digit), a 9-digit ZIP+4 code (with check digit), and an 11-digit ZIP+4 plus delivery code (with check digit)</li> </ul>	
IMB	2006	linear	Mail sorting for US Postal Service	The Intelligent Mail barcode (IMB) replaces the POSTNET and PLANET barcodes. It is a 65-bar code for use on mail in the United States	
Pharmacode		linear	Parmaceutical Binary Code and is used for packing control in the pharmaceutical industry.	Pharmacode can represent only a single integer from 3 to 131070.	

Barcode	Date	Format	Industries	Notes	Example
Data Matrix (ECC 200)	1990	2D	<ul style="list-style-type: none"> <li>• Integrated circuit</li> <li>• printed circuit boards</li> <li>• automotive</li> <li>• aerospace</li> <li>• electronics</li> <li>• semiconductor</li> <li>• medical device industries</li> </ul>	Stores up to 3116 numbers or 2335 ASCII characters. Banner supports only the latest version of this standard, ECC-200.	



### **WARNING . . . Not To Be Used for Personnel Protection**

**Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death**

This product does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or deenergized sensor output condition. Consult your Banner Safety Products catalog for safety products that meet OSHA, ANSI and IEC standards for personnel protection.



### **CAUTION . . . Electrostatic Discharge**

**Avoid the damage that electrostatic discharge (ESD) can cause to the Sensor**

Always use a proven method for preventing electrostatic discharge when installing a lens or attaching a cable.