

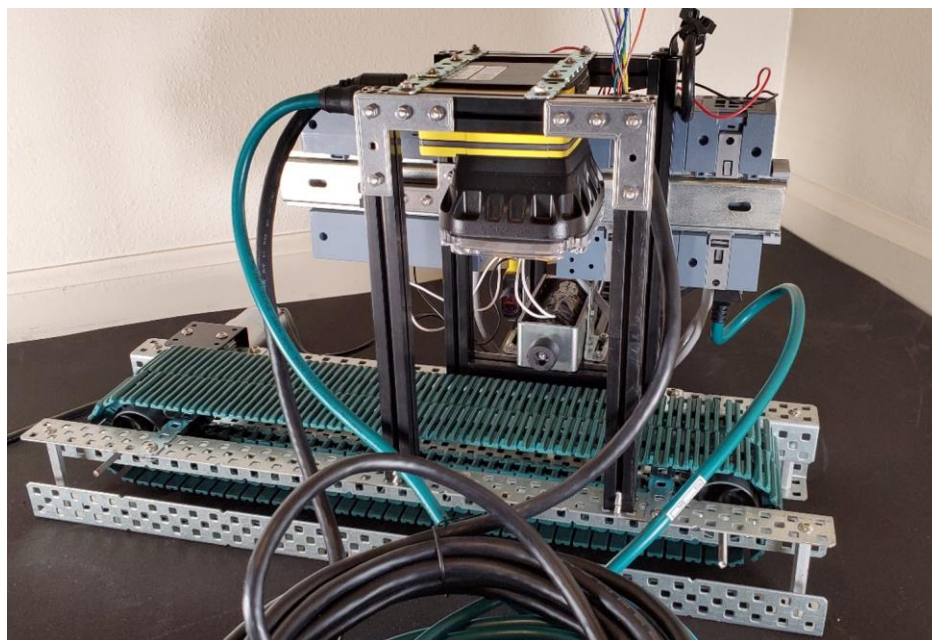
Chapter 30 Conveyors and Cognex

Everything in an automation system moves with conveyors. The following four conveyor systems have been used or are capable of being used to provide practical programming of the conveyor and some part delivery system.

The first is a very strong conveyor from the German toymaker Bruder. Attached to it are a motor at left and a diverter at the right end. Controlling the diverter is a stepper motor mounted under the conveyor. This system was used by a capstone group to sort different color poker chips. The part was placed on the conveyor at left and allowed pass under a sensor. The sensor gave a 1 or 0 for the part if a specific color. Then the part was tracked to right end where it was diverted either to the left or right. This conveyor was found to be ok but not good at moving parts. Some parts would jiggle off if the conveyor were to run too fast. Good but not great.



The next conveyor was built by a student and combines a PLC, a Cognex camera and a conveyor in a complete system. This conveyor was easy to build and robust.



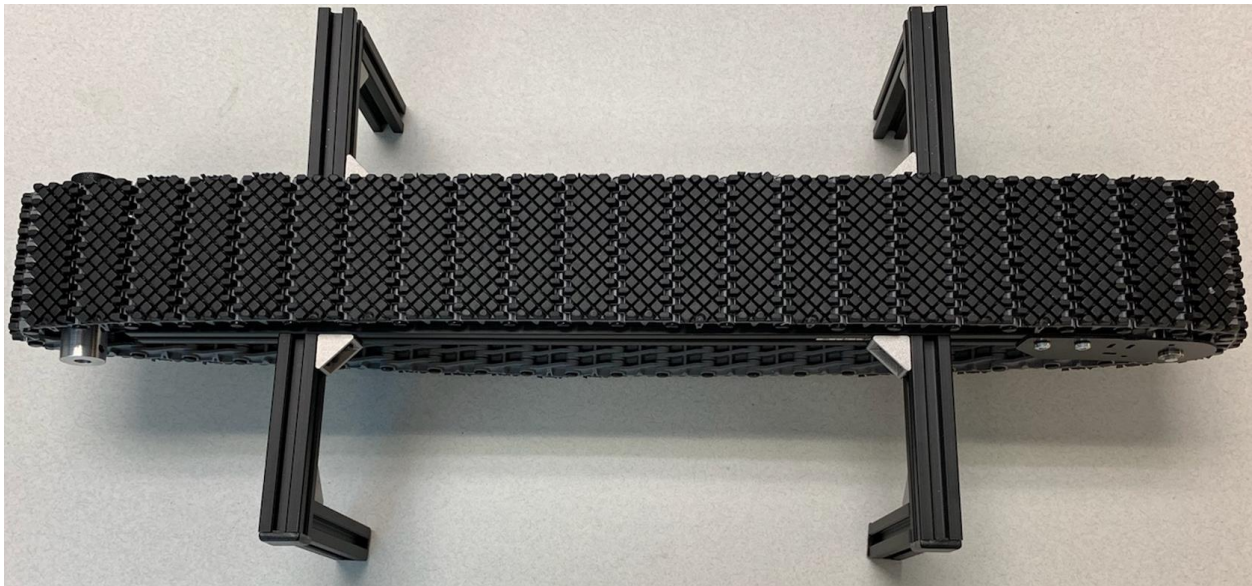
Directions for purchasing it are given here:

VEX Tank Tread Kit

<https://www.vexrobotics.com/276-2168.html?q=&locale.name=English>

The Cognex camera system and conveyor worked very well.

Next is a conveyor from a kit. This conveyor has never been used to date with a project. It, however, is very robust and could accomplish many different tasks and is ready to be used.



Specifics about this conveyor are given below. It was purchased from the Robot Shop.



[Click to enlarge](#)

Be the first to review this product

Lynxmotion (LSS) - Conveyor HD Kit

by Lynxmotion

In stock

Product Highlights

- Lynxmotion (LSS) - 650mm Conveyor Kit
- Perfect for educational or hobby assembly system
- Frame made from durable aluminum extrusion, composite G10
- 3" wide Modular track segments with rubber friction pattern top
- Lynxmotion robotic arm(s) sold separately
- Directly compatible with LSS-HT1 servo (sold separately)

USD \$263.99

Pay as low as \$44/mo. Klarna.
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Qty

1

10 to 100 USD
\$242.87 each
100 and more
USD \$223.44
each

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Ask a question on the
RobotShop

This conveyor is big and strong. It is 650 mm (~27") long and 3" wide. It has rubber gripping tread which makes it very stable at conveying stuff. It has risen in price from the \$263 one shown above to now \$373. It is a good buy even at this price due to its rugged construction and rubber track segments. It will still need a motor (~\$40).

Why not use a kit with tank tread and build a conveyor around it. That is what was done with the conveyor shown below. It, as well, has not been used with a project to date but is fully capable for use in a variety of conveyor projects. While it has feet, there are not rubber track segments as with the one from the Robot Shop. But, it costs only \$23. It does require additions, however, which may or may not be easy. We have an excellent machinist who added the components seen here.

This kit was purchased from Amazon and given to the machinist who filled in the blanks. There were a few.



Its dimensions are 15" long and 1 3/4" wide. Shown here, it stands 3 3/4" tall. It is very flexible in that it can have various feet attached to give a ramp. What is not known is whether it will support various types of parts. Remember the problem with the Bruder conveyor (parts tended to vibrate off at higher speeds). At any rate, it is a good small conveyor and will probably be very useful in a number of labs.

Where to look for labs? Chapter 17 of the Hybrid Text gives a number of good examples. Remember the hat above the box? There are a number of these kinds of two conveyor problems ideal for PLC control. Also, placing a part on the conveyor, inspecting it with either a photo-eye system or a camera similar to the Cognex system described later in the chapter are possible. The diverter shown on the Bruder toy conveyor may also be used by adding a stepper motor. Stepper motors are very useful in moving a part aside. Also, the robot from Ch. 31 of this text may be useful in placing a part on the conveyor or removing the part. Remember that the four axes of the toy robot use up all available PWM outputs from the 1215 so multiple 1215's are needed if

there is tracking involved with the conveyor. This adds the complexity of communicating from PLC to PLC.

Intelligent RC Robotic Platform with 4PCS TT DC Motor, Robotic Caterpillar Moving Tank Chassis with Track & Metal Plate for Arduion Code Programming ROS Project Learning Education Tool Science Kit

Brand: SmaringRobot
 ★★★★★ 1 rating

\$22⁹⁹
 ✓prime One-Day & FREE Returns

Thank you for being a Prime Member. Get \$125 off: Pay \$0.00 \$22.99 upon approval for the Amazon Business Prime Card. Terms apply.

Brand SmaringRobot
Age Range (Description) Kid
Item Dimensions LxWxH 7.6 x 6.42 x 2.36 inches

\$22⁹⁹
 ✓prime One-Day & FREE Returns

FREE delivery **Tomorrow, June 14.** Order within **3 hrs 16 mins**

📍 Deliver to William - Maumee 43537

In Stock.

Qty: 1

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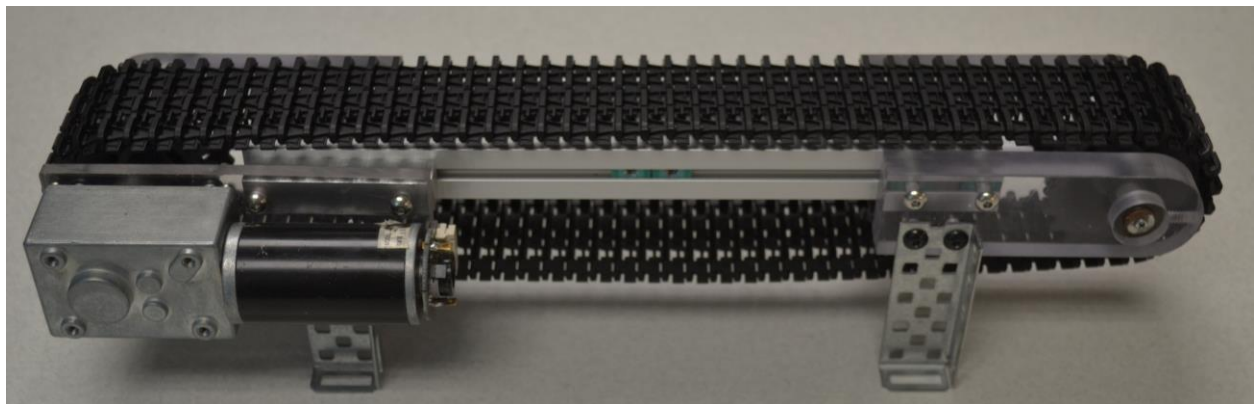
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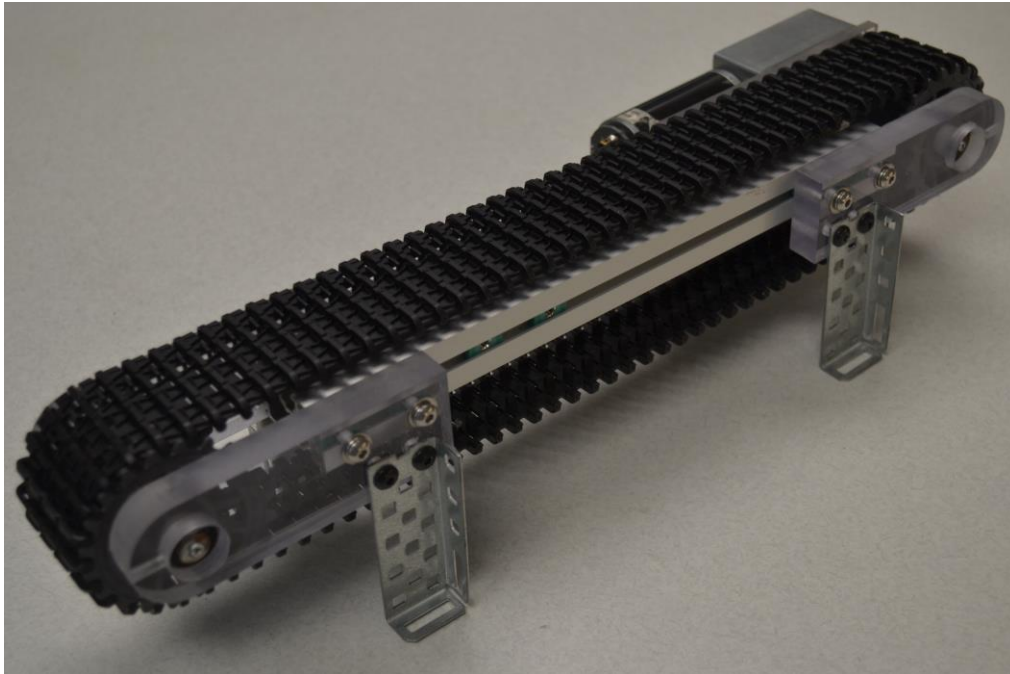
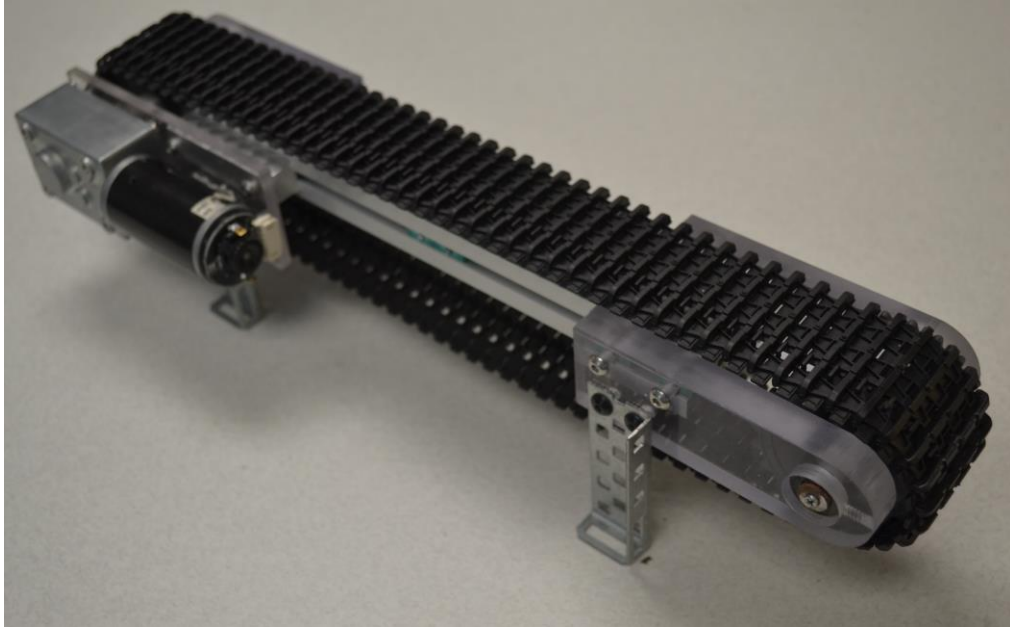
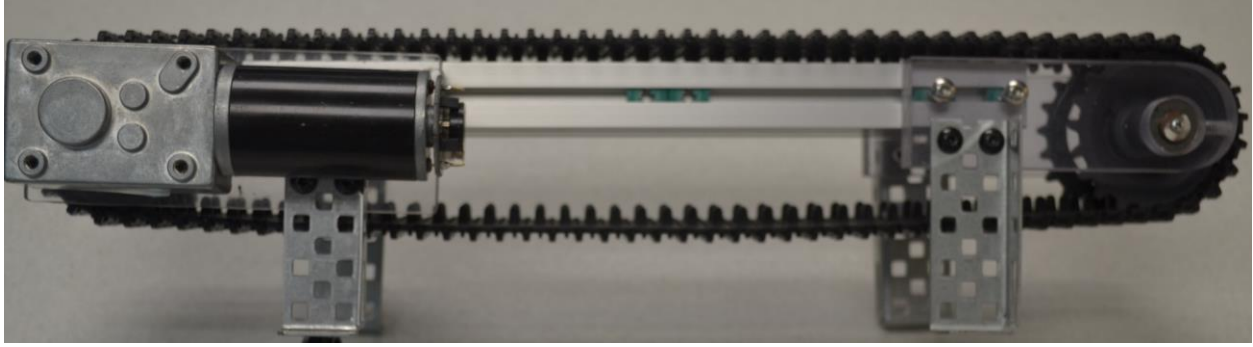
Ships from Amazon
 Sold by XRZN-US

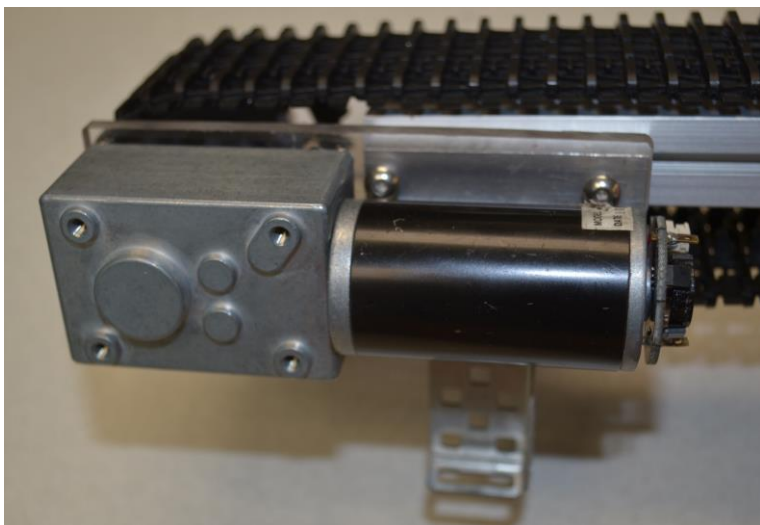
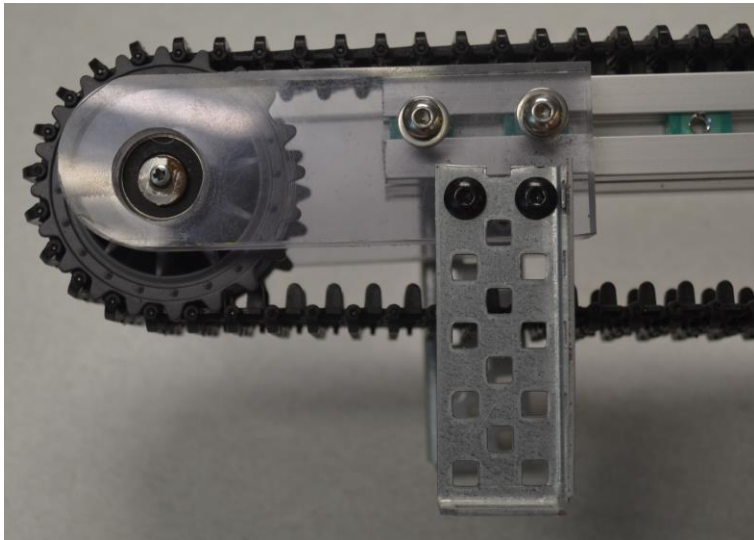
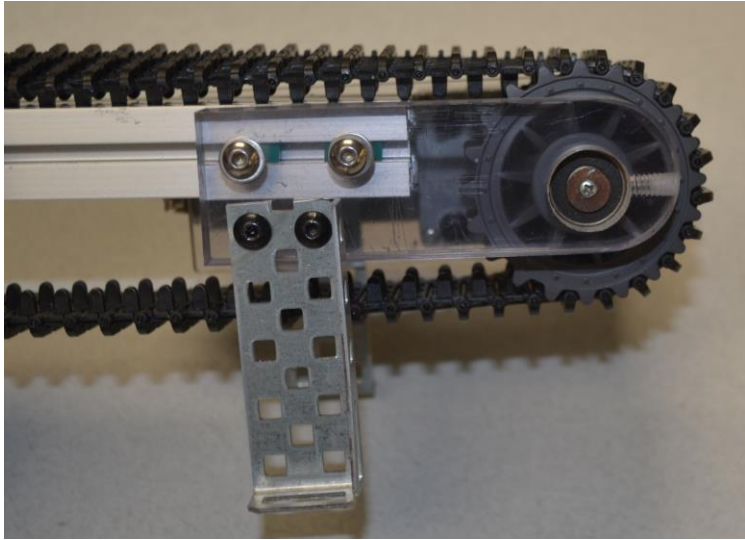
Return policy: **Eligible for Return, Refund or Replacement within 30 days of receipt**

Add a gift receipt for easy returns

The following figures give a better view of this conveyor. This will be the conveyor that will be used in classrooms and labs for various projects. The piece of 80-20 used is 20mm x 40mm. It provides the foundation for the rest of the conveyor.



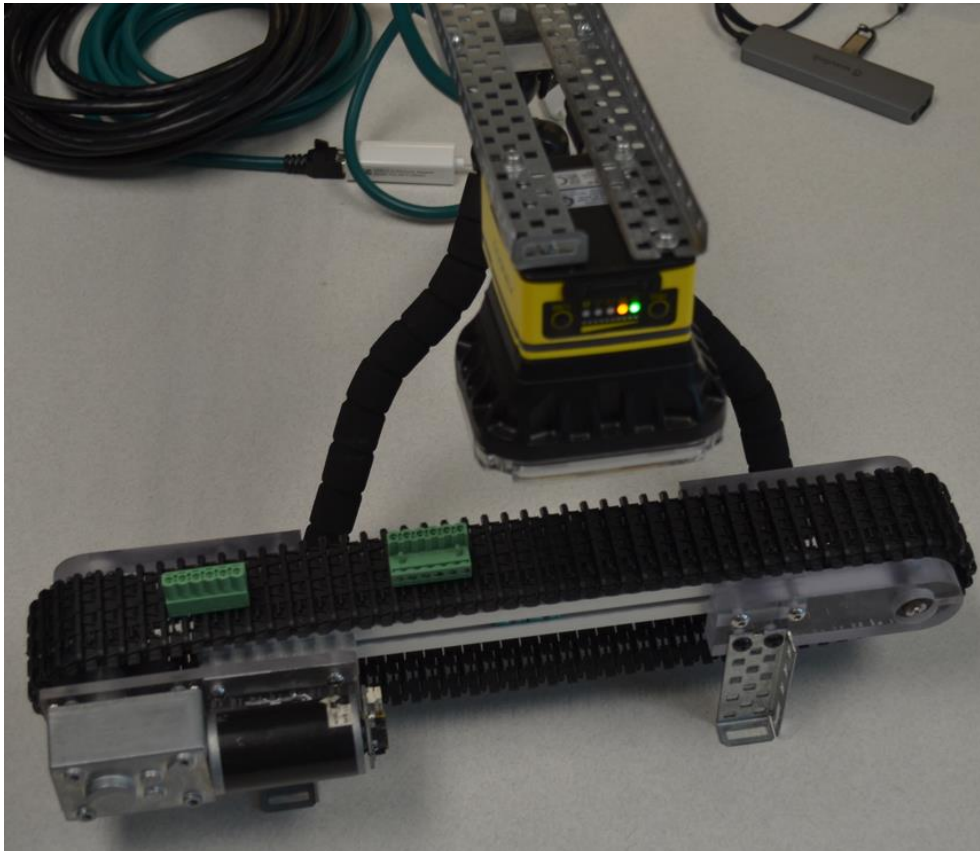




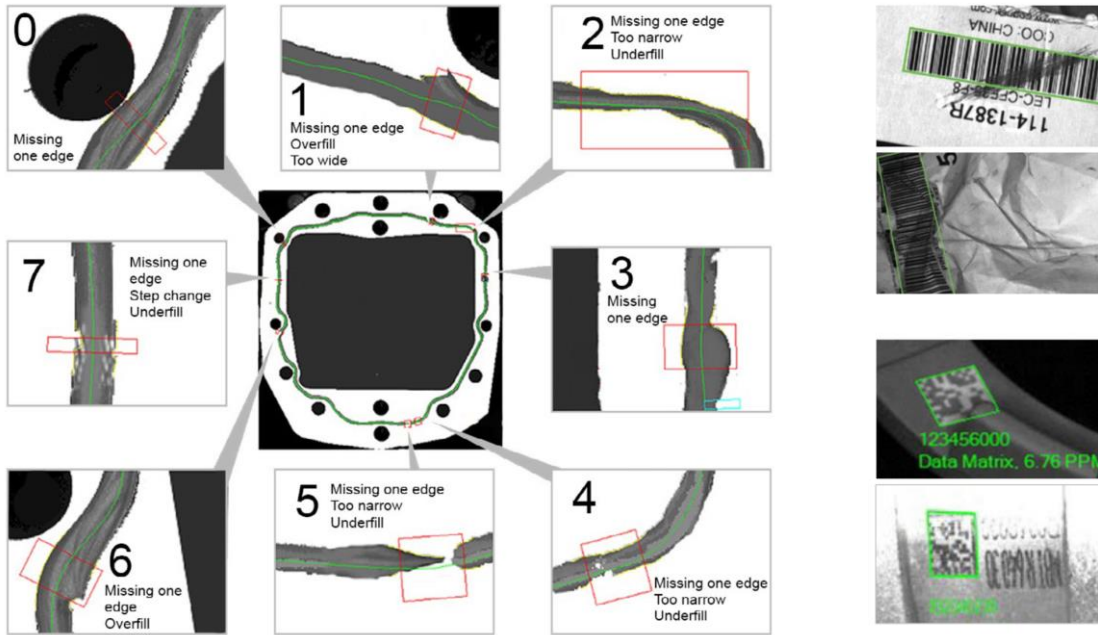
Cognex Vision System - 7802M-363-50



The Camera/Computer system pictured here is from Cognex. It is used to inspect parts for a number of different functions outlined later in this section. Here the camera inspects these parts proceeding down the conveyor for defect and length.

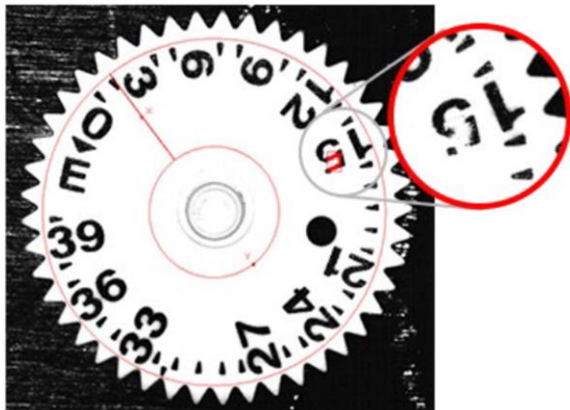


Features of this inspection system include:



Bead Inspection

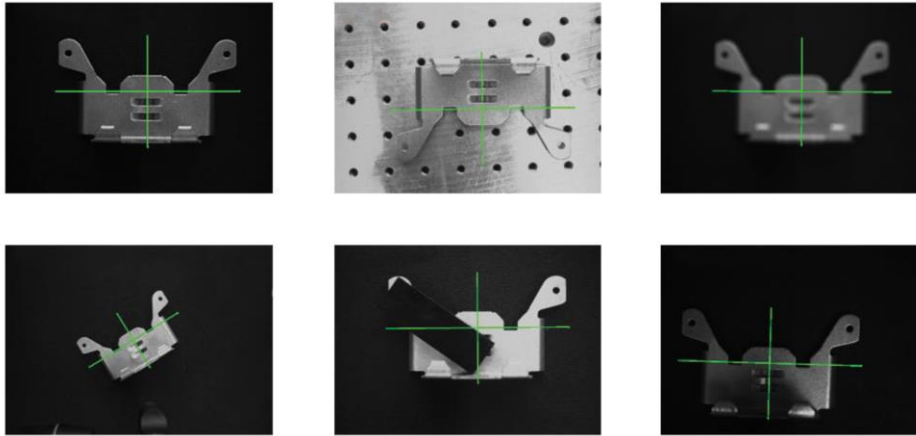
Read Codes, Characters



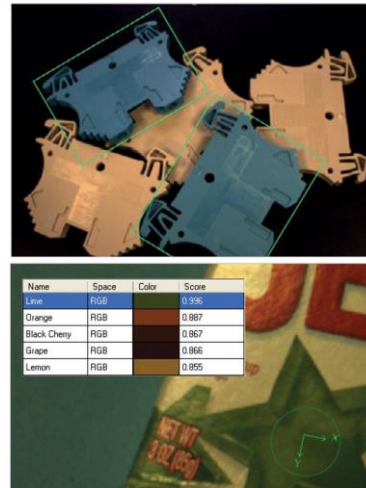
Flexible Flaw Detection



Difficult to Read Characters (OCR)

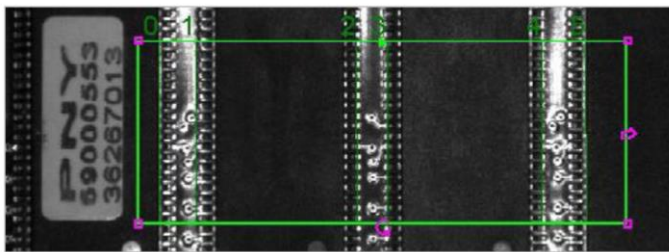


Object Location using PatMax:

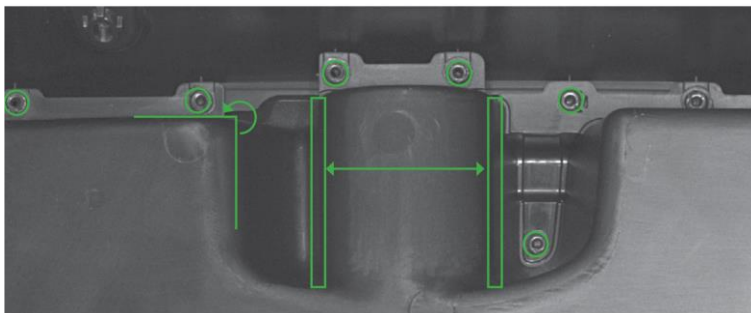


SearchMax Feature Location Technology

Color, Color Match



Edge Detection



Measurement

The Spread Sheet Course for Cognex is found as a download following this chapter. Videos as well as PowerPoints and Labs are included. The course is described here with connections to the videos:

Spreadsheet Standard Course

01 HW Connections

In-Sight Explorer - Hardware and Connections

You will learn about different In-Sight product offerings, including the 7000 Series, the Micro Series, the 5000 Series, VisionView Operator Interface, and In-Sight...

02 Spreadsheets Image Acquisition

In-Sight Explorer - Software and Image Acquisition

You will learn how to manage multiple networked In-Sight systems from a single PC, save job files, and load job files. You will also learn the properties of the In-Sight camera,...

03 PatMax Logic

In-Sight Explorer - PatMax

You will learn how to effectively utilize PatMax - Cognex's patented feature-based pattern matching tool. PatMax allows you to train a model of a feature, and then it looks for...

04 ExtractHistogram Edges

In-Sight Explorer - Histogram and Edges

You will learn how to correctly describe and apply Property Sheet parameters and auto-inserted information for ExtractHistogram and Edge functions to a sample image, how to...

05 Blob Image

In-Sight Explorer - Blobs and Image Processing

You will learn how to correctly describe and apply Property Sheet parameters and auto-inserted information for ExtractBlobs to a sample image, and how to correctly apply to a...

06 Calibration

In-Sight Explorer - Calibration

You will learn how to correctly implement in a job a non-linear Calibration using the calibration wizard, cell state dependencies, and error handling functions, how to...

07 Discrete I/O

In-Sight EasyBuilder - Inputs & Outputs

You will learn to describe the difference between Cognex I/O Expansion Modules, describe the difference between Online Mode and Offline Mode, and configure both a Discrete...

08 Network Communications

In-Sight Explorer - Network Communications

You will learn how to describe different forms of communication, including PLC protocols, FTP, and TCP/IP, and how to communicate between In-Sight and a PC using TCP/IP device...

09 Operator Interface

In-Sight Explorer - Operator Interface

You will learn how to correctly describe the operation of Graphics functions, including Button, CheckBox, ListBox, EditRegion, Color Label, and StatusLight, and how to...

10 Deployment

In-Sight Explorer - Deployment

You will learn to understand and employ the utilities available to deploy the system, including user lists, back-up/restore, upgrade firmware, and auto-starting system. You...

11 Lighting

In-Sight Explorer - Lighting and Optics

You will learn how to correctly identify the basic purpose of lighting, which types of lights, lenses, and color filters are best for particular applications, including...

12 Images

13 SS Standard Skills Journal

The Cognex equipment is state-of-the-art. It includes all that one needs to successfully implement a complete vision inspection station. These units are priced about \$2,600/each and a Cognex system in industry will cost north of \$10K. The experience on these small units, however, give a very good experience in how to set up and program these more sophisticated industrial systems. Cognex is the leader in vision systems world-wide and knowledge of set-up of their systems is highly sought after. If possible, the labs above are encouraged for anyone entering the automation field.

Emulator Setup in InSight Explorer Software

<https://support.cognex.com/en/downloads/detail/in-sight/4113/1033>

Note: All Cognex programs can be executed using the emulator instead of live equipment except the actual set-up of the camera. The pictures supplied with the downloads include all you need to execute the programs in the Spread Sheet Course without a camera present.

Three Common Software Pkgs for Cognex:

1. DataMan Setup Tool – Barcode Readers
2. InSight Explorer – InSight Systems
3. InSight Vision Suite – InSight Deep Learning Systems & InSight 3D (Program 3D inspections in Spreadsheet)



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