

Test Tube Remapping - Vision Application

One of the strengths of the EMP Tech Group is our ability to do custom vision systems. Over the years, we have helped several of our customers with parts inspection needs using Cognex's Vision Pro software and Insight cameras. Recently one of our good customers in the agriculture industry approached us with a need to read test tubes in their laboratory operations. There are machines on the market that will just read the tubes, but the customer needed much more than the off the shelf product could provide. They needed an end-to-end solution that included mobile data collection and custom mapping of the test tube layout.



Figure 1 – Bottom view of specimen tray containing 96 test tubes.

The Problem

The customer has specimen trays that contain 96 test tubes per tray. Each tube has a very small serialized 2D barcode on the bottom of it. The tubes are initially mapped in a specific way in their software system before the user goes into the field to collect their specimens. The customer must ensure they know the exact location of each tube within the tray. While they are obtaining specimen samples in the field they write down the tube location and place it back into the tray. On some occasions the tube may accidentally get positions swapped within the tray, thus the sample numbers are incorrect and creates a test that is no longer valid and cannot be used. If the error is not caught before being validated the customer is subject to fines and penalties based on the inaccuracies of the testing that was submitted. There is also a great loss in productivity because the time invested in collecting the specimens is null and void.

Our Solution

EMP Technical Group's solution to the customer's problem was to provide a Cognex vision system to read the 96 barcodes on the bottom of each tube and correlate it to its specific location within the specimen tray. A Motorola MT2070 device was also provided with an EMP application that resides on the handheld to marry the specimen number to the corresponding test tube. They accomplish this by scanning each tube's sample ID, associate it with the specimen, and then scan the 2D code on the bottom of the tube to marry the two items together. Once the specimen is placed back in the tray, the process begins again. The user can then verify which location each tube is positioned in and remap the data file if needed to correspond to the correct position within the tray. This error proofing of the process ensures that all tests will be fully validated and accurate at the end of collection. EMP built a custom jig to hold the tray in place and provide the proper fixture for the vision system. The entire system is controlled by a custom software package EMP Technical Group developed to control the camera and read the barcode values as well as write out the new mapping sequence file data that is then integrated and pushed into the customer's host system. The customer was eager to move forward with the project because the whole application including the software and hardware will pay for itself after just 2 sample errors are caught and remapped to the correct locations.

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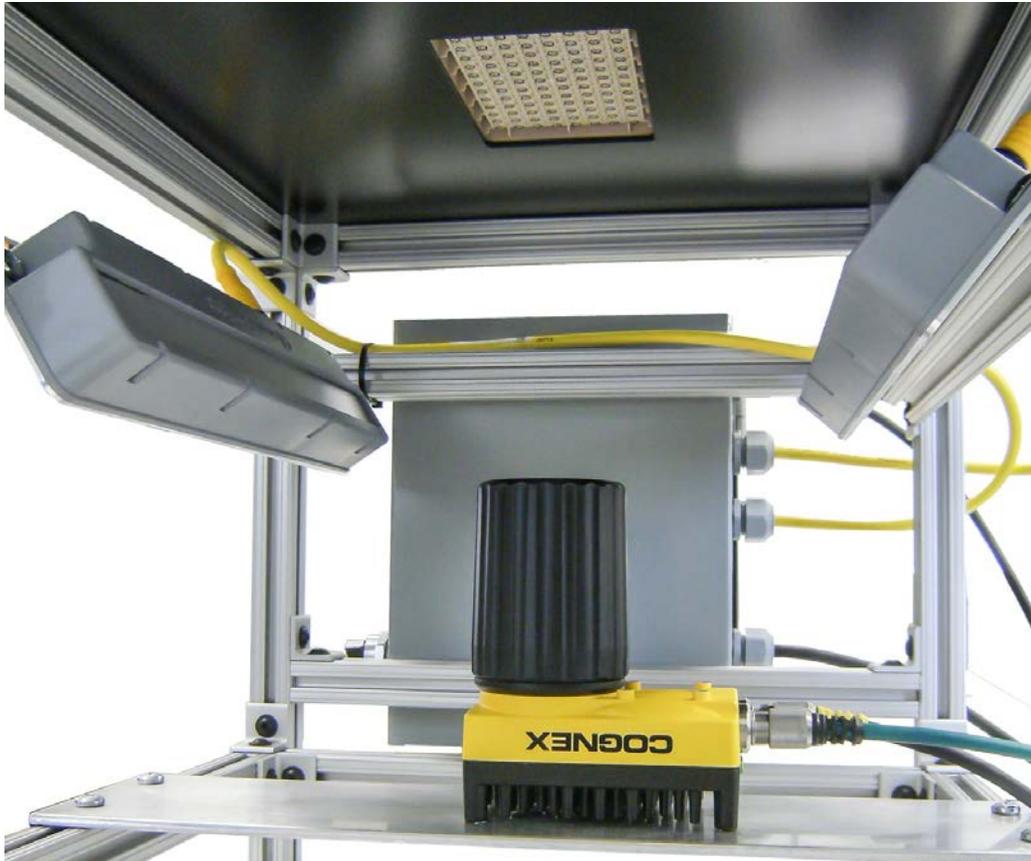


Figure 2 – Side view of fixture with Cognex camera, light bars, and specimen tray.