Electronics

Applications Guide

AB&R
identify. track. manage.
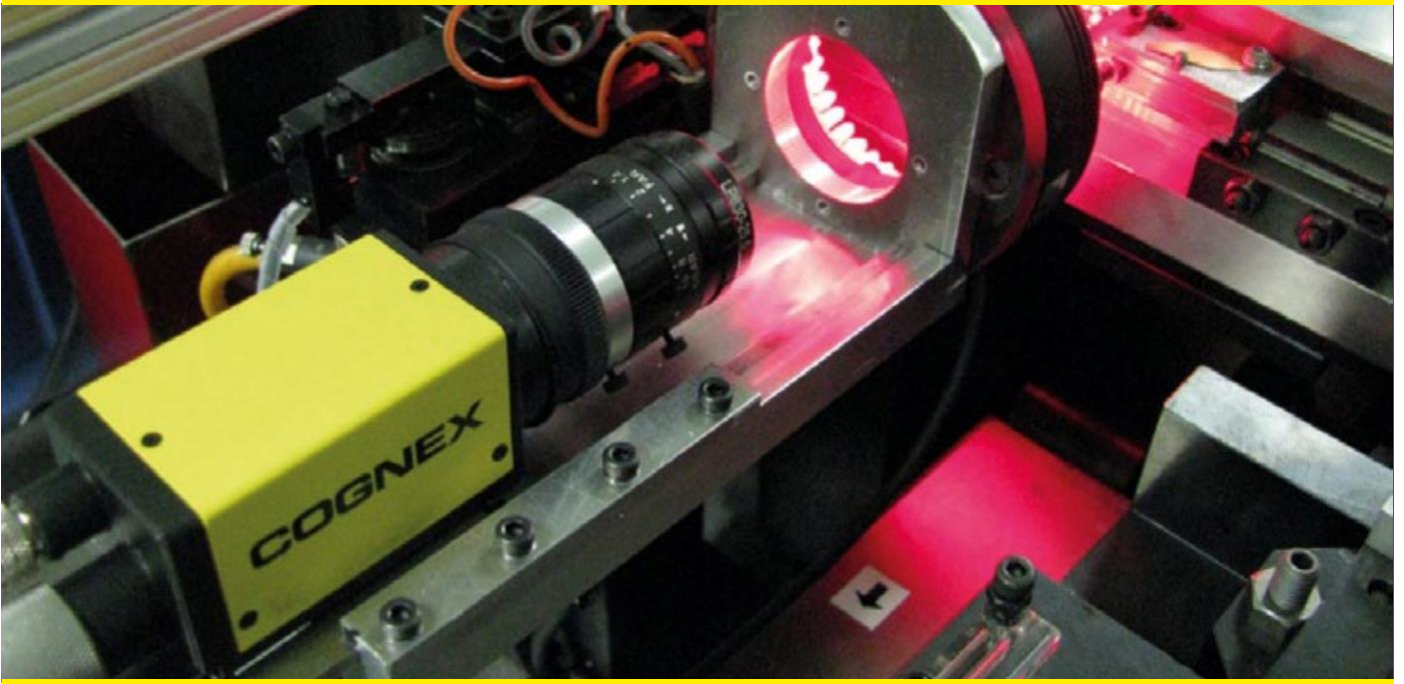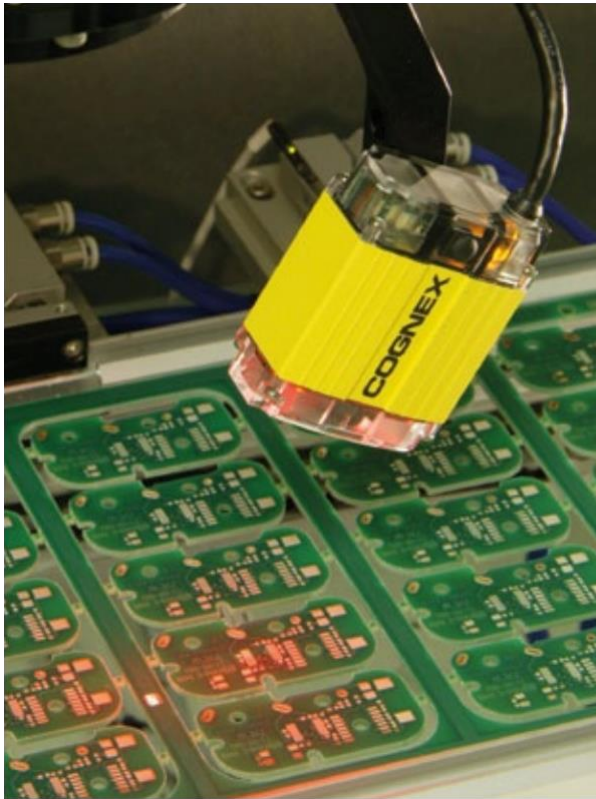
COGNEX

The Right Choice for Electronic Applications

Cognex vision technology helps companies improve their manufacturing quality and performance by eliminating defects, verifying assembly, and tracking and capturing information at every stage of production, to ensure the entire process is completed correctly.

Smarter automation using Cognex vision and ID means fewer production errors, which equates to lower manufacturing costs and higher customer satisfaction. Achieving maximum quality levels, the highest yields and complete traceability are critical issues for every manufacturing engineer and production manager. Cognex has the widest range of inspection, alignment, measurement, OCR and 1-D and 2-D barcode reading systems to match the exact requirements for each application.

Cognex is the world's most trusted vision company, with 700,000+ systems installed in factories around the world, and over thirty years of experience focused on vision and ID technology.

Cognex products are used by many of the world's top electronics manufacturers, suppliers and machine builders to ensure that the products that are being delivered match the stringent quality requirements of the industry.

Global Leader, Local Expertise, Worldwide Reach

Standardizing vision and ID solutions across all production lines reduces the total cost of ownership for any company. As the undisputed global leader in vision-based inspection and identification systems, Cognex is able to deliver and support large scale deployments at multiple global locations.

Customers and consumers worldwide are demanding higher quality products than ever before. To achieve this, it is critical for manufacturers to use products with the highest inspection, guidance and identification performance. Cognex advanced technology ensures the most consistent results, the highest accuracy, total traceability and the minimum setup time.

Leading electronics manufacturers and suppliers rely on local Cognex engineers and a network of over 450 partners to provide assistance wherever and whenever it is needed around the world.

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The Cognex Product Family

Vision Systems

Rugged systems provide easy-to-use interface for configuring applications in a fully integrated package. In-Sight® vision systems are ideal for inspection, text verification and track and trace. A wide range of models, including line scan and color systems, meet all price and performance requirements.

Vision Software

A library of powerful vision tools allows complete flexibility in choice of cameras, frame grabbers, and other peripherals. VisionPro® software combines the power and adaptability of advanced programming with the simplicity of a graphical programming environment.

Vision Sensors

Easy, affordable sensors replace photoelectric sensors for more reliable inspection and part detection. Checker® vision sensors succeed where traditional sensors fail, and allow multiple inspections with a single device.

Fixed-Mount Industrial ID Readers

DataMan® readers offer the smallest size and highest performance in direct part mark and high-speed code reading applications. Reading everything from simple barcodes, the most challenging 2-D codes, DataMan readers are equipped with autofocus and ethernet capability for ease of networking to factory platforms.

Handheld Industrial ID Readers

DataMan offers the widest range of industrial handheld readers in the industry. Innovative lighting, image acquisition, and code reading capabilities provide the most reliable reading of virtually any code on any surface.

Code Verifiers

Handheld and fixed-mount DataMan verifiers are easy-to-use, reliable, and enable accurate evaluation of code quality to ensure the highest read rates through production and the supply chain.

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Cognex Connect

Connecting Cognex systems into virtually every automation system

Cognex products link to a wider range of factory automation equipment than any other range of products. Whether you connect directly to a PLC (Programmable Logic Controller) or robot controller or manage multiple systems remotely from a networked PC or HMI (Human Machine Interface), Cognex Connect™ assures a seamless reliable communications link between Cognex products and all of your equipment on the factory floor.

This table summarizes just some of the communication capabilities with Cognex Connect:

	Factory Device	Checker	DataMan	In-Sight	Protocol	Protocol Type
PLCs	Mitsubishi		✓	✓	MC Protocol	Industrial Ethernet
				✓	CC-Link	Fieldbus
				3	PLC Function Blocks	Pre-configured device commands and attributes
	Rockwell	✓	✓	✓	EtherNet/IP	Industrial Ethernet
				✓	DeviceNet	Fieldbus
		3	3	3	AOP	Pre-configured device commands and attributes
	Siemens	✓	✓	✓	PROFINET	Industrial Ethernet
			✓	✓	PROFIBUS	Fieldbus
		✓	✓	✓	MODBUS TCP	Industrial Ethernet
	Other Protocols		✓	✓	Modbus	Serial
				✓	ASCII String commands	Serial
				✓	OPC	Industrial Ethernet
		✓	✓	✓	TCP	Industrial Ethernet
		✓	✓	✓	UDP	Industrial Ethernet
FTP Server		✓	✓	✓	FTP	FTP Image Transfer
Robots	ABB, Denso, FANUC, Kuka, Mitsubishi, Motoman & Staubli			✓	Pre-configured drivers and ASCII string commands	Serial / Ethernet
	Adept, Epson, IAI, Kawasaki, Nachi, Yamaha & other Robots			✓	ASCII string commands	Serial / Ethernet

If you need to integrate inspection images, quality data, and interactive controls into your own operator interface, Cognex Connect gives you an array of visualization options:

- In-Sight Display Control embeds an In-Sight image and CustomView display in your .NET or ActiveX compatible custom application, or a PC-based HMI/SCADA system from Rockwell, WonderWare, Citect and others.

- In-Sight and Checker allow you upload data to your HMI displays, SPC (Statistical Process Control) systems, plant supervisory systems, and even Microsoft Excel to monitor operations and record statistical data.

- Checker, DataMan and In-Sight all offer SDKs (Software Development Kit) to allow systems integrators to create a custom user interface for managing your systems, tailored to your exact requirements.

Application Categories

VISIon
Guide/Align	Inspection	Gauge/Measure	OCR/OCV	Presence/Absence

ID
1-D High Speed	1-D Low Speed	2-D Direct Part Mark	2-D Printed

COMPONENTS
Components | Inspection
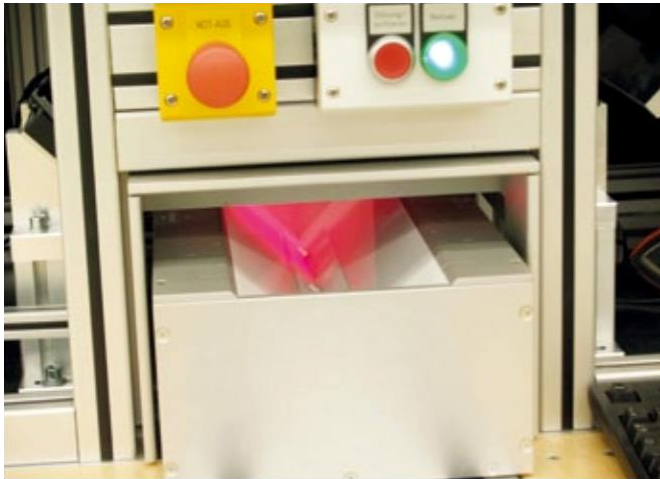
Customer: Weidmüller GmbH & Co. KG

APPLICATION

Weidmüller wanted to come up with a completely new type of automatic inspection station designed to speed up and simplify complex inspection processes on a sustainable basis.
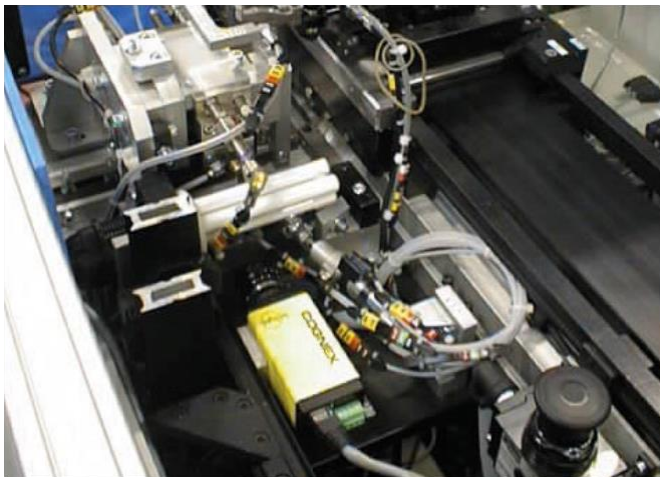
SYSTEM

VisionPro

RESULTS

Where inspections were taking between 30 and 45 minutes for each object, the inspection station installed now examines the same part in just one-half to two minutes, simplifying complex testing procedures, greatly reducing measuring times, and increasing quality assurance to a new level.

COMPONENTS
Circuit Breakers | Inspection

Customer: Schneider Electric

APPLICATION

With a production line creating up to 2,000 different types of circuit breakers from 100 different components, a 100% reliable inspection of individual components was essential in order to verify each breaker before packaging. It was very clear that a mechanical system was not up to the inspection job at hand.
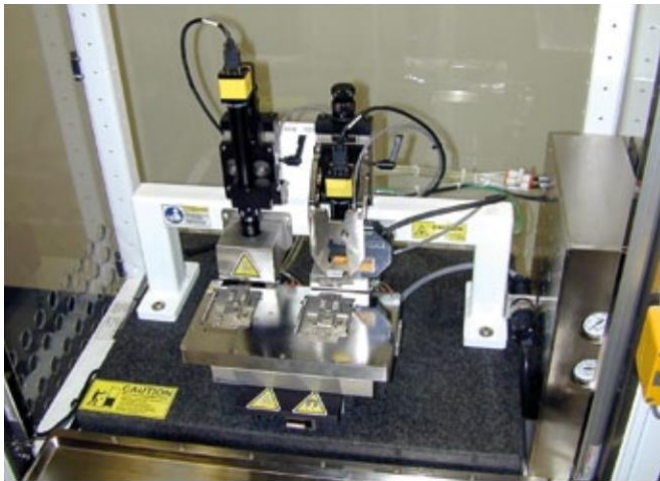
SYSTEM

VisionPro

RESULTS

The installed vision system now allows complete assembly inspection of each component of the different products by analysing the product references. By archiving all statistics from the system, it is now possible to monitor and confirm all non conforming defects, identifying any false rejects if necessary. This kind of control also means total traceability of inspected production.

VISION

COGNEX

COMPONENTS
MEMS | Inspection

Customer: DWFritz Automation

APPLICATION

Microelectromechanical systems (MEMS) need to be positioned in a plastic housing to submicron tolerances to align mechanical components on the die with interfacing components on the housing. Manual inspection with a microscope was taking well over five minutes and could not be able to consistently hold the tolerances required.
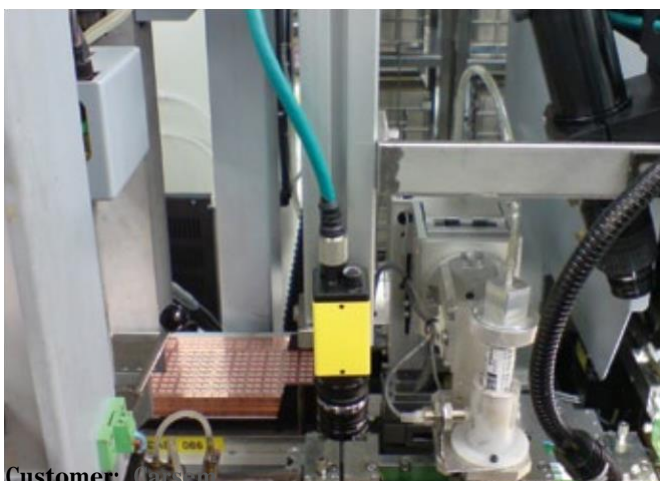
SYSTEM

VisionPro

RESULTS

Using the VisionPro system installed to perform over 500 measurements across nine manufacturing steps, and with a cycle time of no more than 30 seconds per step, the automated inspection system held the required submicron tolerances and the flexibility of the system made it easy to accommodate design changes and process improvements.

COMPONENTS
Semiconductors | Lead Frame Inspection

Customer: Carsem

APPLICATION

Carsem needed a custom-designed Lead Frame Verification System (LFVS) that would incorporate a vision system as an integral part, responsible for the detection and verification.
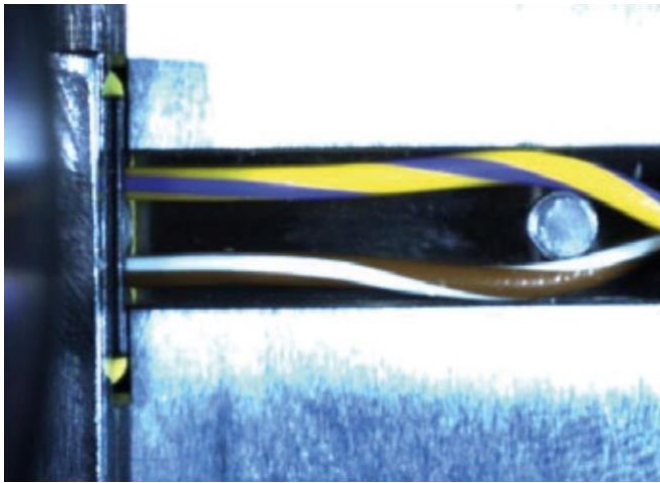
SYSTEM

In-Sight

RESULTS

The vision system installed featured In-Sight Micro, which played a critical role in ensuring that the LFVS was fully operational, and working in seamless tandem with the components and specifications of the machines in which it was integrated.

VISION

COGNEX

COMPONENTS
Airbag Sensor | Inspection

Customer: AVI Inc.

APPLICATION

A single misplaced wire in an airbag sensor connector had the potential to cause a fatality. A critical part of making sure the connector was assembled correctly required verification that the right color wire was attached to each connector.
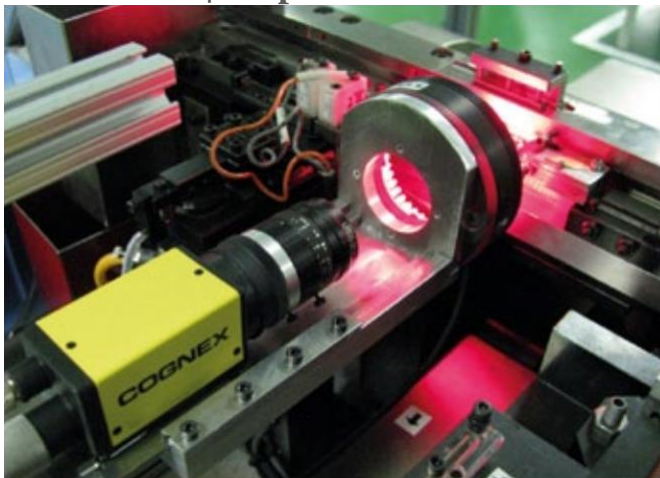
SYSTEM

In-Sight

RESULTS

With the implementation of a color vision system, 100% accuracy for this critical inspection has been achieved. This has greatly reduced timings, making it cost effective enough to use even during early stages of production when manual inspection would normally be used.

COMPONENTS
Connectors | Inspection

Customer: JST

APPLICATION

JST wanted to improve on its already extremely high levels of quality by implementing a vision system that surpassed measurements achieved in the past by a human inspector.

SYSTEM

In-Sight

RESULTS

By implementing a vision system that measured parts to an accuracy of 0.1mm, the number of nonconformances in the latest measurement period was reduced to 0 parts per million (ppm), well below the extremely tough six-sigma quality benchmark of 3.4ppm.

VISION

COGNEX

COMPONENTS
Filtering Antennas | Inspection

Customer: Sarantel

APPLICATION

As a leading maker of the world's most advanced miniature filtering antennas for mobile, wireless and handheld devices, Sarantel found that ever-decreasing sizes of antennas meant their current inspection system lacked flexibility within the programme. They also found the sensor's ability to identify filters and pattern matches was being compromised.

SYSTEM

In-Sight

RESULTS

Even though each antenna is only 9mm in height and 7.5mm in diameter, accurate part location reading with In-Sight cameras has given greater flexibility and allowed experimentation with programming.

COMPONENTS
Packaging | Inspection

Customer: Compex Corporation

APPLICATION

The semi-automated process being used to validate the proper orientation of components during packaging was delaying delivery times and restricting output.
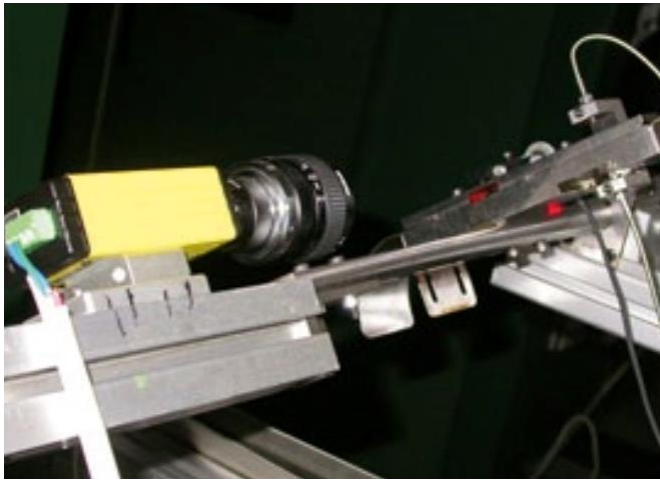
SYSTEM

In-Sight

RESULTS

An In-Sight vision system took over the counting for a tedious and error-prone manual counting system and increased output, accelerated delivery time, and was able to reallocate 80% of their resources after the installation.

VISION

COGNEX

COMPONENTS
Connectors & Cables | Inspection

Customer: **Guangdong Tyco Electronics Co., Ltd.**

APPLICATION

Producing 1,000 sets of equipment per day at a maximum of 1,200 pieces per minute makes on-line product inspection nearly impossible for the operator to consistently control the quality of all products on the line. In this situation, a random inspection was the primary solution; but it was generating a lot of waste and damaged equipment.

SYSTEM

In-Sight

RESULTS

After the system was integrated, all sizes of products were tested for the most common defect—a lack of the pin. The repeatability of the system inspection was 2u, which was within the 10u quality standard required, exceeding the customer's inspection demands.

LEDs
LED surface tester | Inspection

Customer: **Intelligent Manufacturing Systems & nano Tech Co., Ltd.**

APPLICATION

This leader in domestic compound semiconductor test and assembly equipment, needed to develop a high-accuracy LED surface tester that would provide greater accuracy and productivity.

SYSTEM

VisionPro

RESULTS

With a brand new Automatic Optical Inspection machine installed with VisionPro software at its heart, final yield rates significantly increased due to precise detection in various process (e.g., chip damage, metal coating errors, scratches, contamination, markings, double chips, layer peeling, etc.) through a wafer-level chip surface test.

V I S I O N

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PCBs
Spot Welding | Inspection

Customer: MEDER Electronics

APPLICATION

There are many diodes on a welded PCB, and during the inspection process, MEDER required every spot weld on the board to be inspected, whether diode reed switches had moved, as well as PCB electric resistance.

SYSTEM

In-Sight

RESULTS

In order to achieve the level of precision required, a mechanical movement strategy was used, deploying an In-Sight vision system along with three grouped light sources to perform the job. These light sources could be exchanged easily in order to carry out inspections on different objects.

PCBs
MP3 Players | Code Reading

Customer: Sony

APPLICATION

Sony sought a code reading and traceability solution for PCBs in their MP3 players. Previously, badly read codes and the resulting rejection rates were costing the company a lot of money in terms of re-work and rejected units.

SYSTEM

In-Sight

RESULTS

With a 100% successful code reading rate and read time reduced from 10 seconds to 2 seconds per read, the production line no longer has to stop as a result of a badly read code, product repositioning or focus adjustment. These factors are already saving Sony about $5,000 a week and the company predicted a return on their investment within 10 months.

VISION

COGNEX

PCBs

Lasered Codes | Inspection & Evaluation

Customer: Rommel GmbH

APPLICATION

The application of codes and inscriptions by laser was being performed by ablation or by conversion of solder paints, so this delicate process required a detection system that provided the utmost precision.

SYSTEM

In-Sight

RESULTS

The vision system installed provided position data on the production line to the CO_2 laser, checked the quality of the Data Matrix codes and evaluated them simultaneously. As part of the combined laser camera scanning head, the In-Sight 5100 reduced cycle times and ensured accurate results.

PCBs

Spot Welding | Inspection

Customer: MEDER Electronics

APPLICATION

PCB manufacturing involves a high number of specifications, small components and inspections which until recently were carried out manually with one worker needing around two minutes to inspect each circuit board.

SYSTEM

In-Sight

RESULTS

With the installation of an In-Sight vision system to inspect spot welds on the circuit board—identifying skipped welds, incomplete welds and multi-welds—unprecedented functionality and excellent durability was achieved, helping MEDER to increase production rates, ensure product quality, and reduce production costs.

VISION

COGNEX

COMPONENTS
Lasered Codes | Barcode Reading
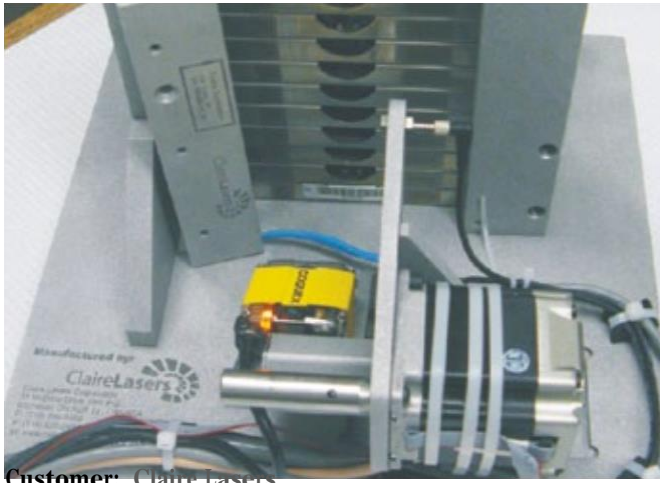
Customer: Claire Lasers

APPLICATION

The manufacturer was experiencing several hundred thousand dollars a year in losses when incorrect parts were added to, and/or the wrong operations were performed on assembly lines that had thousands of different intermixed part numbers of electronic products.

SYSTEM

DataMan

RESULTS

With the introduction of laser marking and image-based readers, identification of the part at each critical station of the assembly system has substantially improved, providing an ability to accurately track the assembly process, avoiding operator error and dramatically reducing scrap and rework rates on the line.

LEDs

LED-Bar | Barcode Reading

Customer: TnGo

APPLICATION

TNGO required a barcode reader which guaranteed high read rates in their LED-bar luminance test, where products moved rapidly, and diffused reflection was severe because of intense vibration.

SYSTEM

DataMan

RESULTS

With a capacity of handling 60 frames per second and up to 45 decodes per second, the DataMan 100 provided the highest read rates under any circumstances such as code deformation.

I ID

INDUSTRIAL

ID

COGNEX

PCBs
Circuit Board | Barcode Reading

Customer: nanjing Golden Dongkang Barcode System Co., Ltd

APPLICATION

Providing electronic products for the automobile, medical equipment and public safety industries— all which have very strict requirements for product quality—the customer wanted to install an automated monitoring and control system with barcode readers in order to ensure excellence throughout.
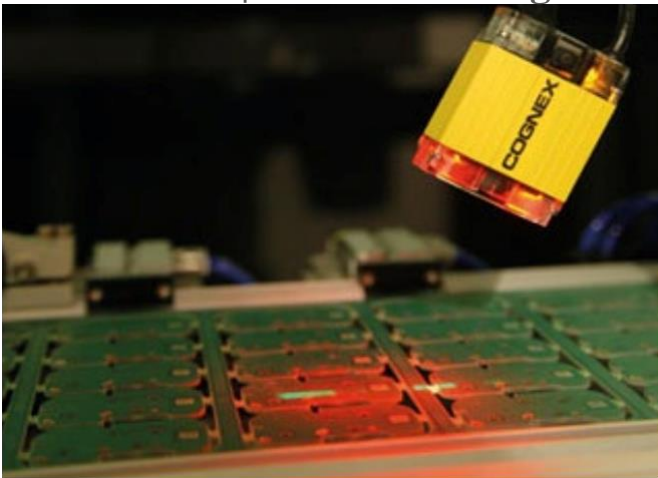
SYSTEM

DataMan

RESULTS

After using the DataMan 100 for this system, the customer was thoroughly satisfied, seeing a high return on investment, saving many man hours and reducing the number of defective products.

PCBs
Circuit Board | Barcode Reading

Customer: Samsung

APPLICATION

Only utilizing manual labor to read the barcodes of two PCBs at a time along the production line, scanning was taking a lot of time as employees needed 20 to 30 seconds to complete the process. Because the manual scanning process was slow, so was the overall system testing time, therefore reducing efficiency.

SYSTEM

DataMan

RESULTS

After the DataMan 100 was trialed on four production lines, it replaced the manual barcode scanning station, and increased production volumes by 20-30%.

INDUSTRIAL ID

COGNEX

PCBs
Circuit Board | Barcode Reading

Customer: Beyonics

APPLICATION

As electronic devices shrink in size, inevitably so do the PCBs that go into them. This means less real estate for the barcode labels. The issue for Beyonics was how to encode even more information like lot code, vendor ID, product number, serial number, etc. onto these ever diminishing labels and still read them.

SYSTEM

DataMan

RESULTS

Switching to 2-D codes and installing DataMan readers solved the issue instantly, and because existing software programming/hardware wiring went untouched, engineers spent little time on this migration, instead concentrating on keeping the production lines up and running.

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AB&R is a certified Cognex Partner. For more information on products and services.
Contact an AB&R Specialist 800-281-3056 or visit www.abr.com

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identify. track. manage.

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Companies around the world rely on Cognex vision and ID to optimize quality, drive down costs and control traceability.

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