

ALCATEL

Alcatel telecommunications uses 2D codes to provide a low-cost systems interface

Solution Overview

Industry

Telecommunications

Application

Manufacturing testing

Teklynx Software Products

Label Design Software
LABEL MATRIX

Hardware

ID3100 2D Scanner from RVSI
Zebra Technologies 95Xi thermal printer
DataMatrix symbology

Alcatel Network Systems investigated bar coding, software interfaces and other possible solutions to reduce cycle times and automate configuration of sophisticated test equipment. MIS manager, Mike Wald investigated programming internally and discovered there was no easy way to write an interface between the test controller and the UNIX-based system. Wald next considered encoding the test performance parameters onto a label affixed to the module itself and then scanning the data into the UNIX system. He selected the ID3100 2D scanner from Auto Image ID (now RVSI) along with LABEL MATRIX® label design software. The result was an easy way to capture test data without having to reprogram the system.

Two-dimensional symbologies are making news these days in a host of new data-intensive applications. Yet, despite all the press, 2D is still in its infancy and rarely thought of as a low-cost solution.

The following example, however, illustrates how competent use of the technology has enabled a simple, cost-efficient network "fix" which would have been otherwise impossible with existing technologies or traditional linear bar codes.

Alcatel Network Systems supplies telecommunications equipment and related devices to the telecommunications industry. Part of the \$30 billion international telecommunications giant, Alcatel Alshom, Alcatel Network Systems is the largest Alcatel Telecomm division in North America.

Its manufacturing facility in Richardson, Texas, produces SONET backbone multiplexers, which compress more than 32,000 phone calls onto a single fiber optic cable. This high-capacity, customer-configured light-wave connection equipment is used by major telephone companies all over the world for their primary communication paths.

Alcatel Network Systems performs final assembly, testing and alignment of all transport products and cross-connect systems manufactured in Richardson, testing hundreds of different modules on a monthly basis. The company investigated bar coding, software interfaces and other possible solutions to reduce cycle times and automate configuration of sophisticated test equipment.

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Mike Wald
MIS Manager
Alcatel

The Challenge

As MIS manager for Alcatel's Richardson operations, Mike Wald had the responsibility of bringing data from existing testing equipment on-line. "Our coupling efficiency test was off-line. It's an older system used to test fiber-optic assemblies prior to their installation into larger PC-board assemblies. The coupling-efficiency test controller was not easily interfaced with our newer UNIX-based manufacturing information system.

"The test data from the coupling-efficiency test controller affected subsequent testing setups on the fiber-optic module," continues Wald. "So the test parameters had to be manually keyed into the UNIX system, and that was time-consuming and prone to errors. Re-testing PC assemblies due to misalignment was costly. About a year ago, we began looking for a solution."

He investigated programming internally and discovered that there was no easy way to write an interface between the test controller and the UNIX-based system. "It couldn't be done easily, cheaply or in real time," he explains.

Wald next considered encoding the test performance parameters onto a label affixed to the module itself and then scanning the data into the UNIX system. But a one-dimensional, linear bar code can't hold the 130 characters of data necessary to accommodate the test data. Fitting the data into the 1 square inch of available space on the fiber-optic module eliminated the possibility of using even high-density one-dimensional codes.

"Our plant manager had become familiar with the ID3100 2D scanner from Auto Image ID (now RVSI) and recommended it," says Wald. The symbology chosen was DataMatrix because of its high-data density, small size and error-correction capability. Labels are created using LABEL MATRIX label design software resident on a stand-alone PC interfaced to a Zebra Technologies 95Xi thermal-transfer printer equipped with a 300 dpi printhead. Each 1-square-inch label contains the coupling-efficiency test parameters for subsequent testing setups encoded in the DataMatrix symbology. The labels are manually affixed to the module's fiber pigtail before further testing.

How it Works

"An optical module has to put out a certain level of coupling efficiency which gets measured, and then the parameters are used to set tuning levels for the next level of assembly where it's installed on a PC-board assembly," Wald says. "The test parameters from the test controller are put in a text file in the label program along with the module's serial number. Hand scanning the module's 1D serial number into the label program retrieves the text files and prints the label. The coupling-efficiency test parameters, along with the module serial number, are sent to the printer and printed on a DataMatrix label which is affixed to the fiber-optic module.

The modules, as well as other products, are identified with a 12-digit serial number, encoded in a TCIF-standard Code 39 bar code. (Alcatel Network Systems' other products are hand scanned down the line to associate manufacturing information with the products' serial numbers in the IS database. The fiber optic module is an exception to this traditionally 1D bar code-based work-in-process system because it must pass through the coupling-efficiency test controller).

For More Information

For more information about Teklynx products or services, please visit our Web site or call us at (414) 535-6200 in the US or Canada. Outside the 50 United States and Canada, please contact Teklynx at +33 562-601-080. To access information via the World Wide Web, go to:

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At the coupling-efficiency test station, the 2D label on the fiber optic module is scanned by the Auto Image ID ID3100 2D presentation scanner mounted on the test system. The data is read directly into the test station computer. The appropriate quality tests are then applied to each assembly and, upon completion, test results are automatically stored on the database for later reference or analysis. "The only paper record in this system is the 2D label," says Wald.

The 2D scanning system was implemented on three production tests early last year. The increased accuracy and time savings resulting from the system prompted the company to expand its use of 2D codes to automate functional areas in which the use of traditional 1D codes is unsuitable. For example, Alcatel is planning to encode information and label components because data sheets occasionally get separated from their respective modules.

Benefits

"This system met our cost criteria," says Wald. "In terms of benefits, this was a special case. Basically, moving the older system on line was a kind of high-tech fix. It was an easy way to do it without spending the great deal of time and money we would have had to spend in order to reprogram the system. We're reading text in and out of a simple file, moving from one independent system to another, a record at a time. Any time you can avoid having to re-key text, it saves time and mistakes."

Alcatel's commitment to total quality extends to all facets of its business operations as the company strives towards its ultimate goal of achieving six-sigma design capability with all processes meeting ISO 9000 requirements. A company with vision, Alcatel considers the system just one example of its continued commitment to excellence. Alcatel Network Systems became ISO 9001-certified at all locations in 1993 and was awarded the Shingo Prize for Excellence in American Manufacturing in March 1994.