

T4 + D4 = T5
The formula for barcode quality control

PRINTRONIX
No1: UK Supplier since 1998



Introduction

Bar code verification is the most certain way to assure that you are printing good codes. The bar code, which began in mainstream industry circa 1975, is now virtually everywhere. You cannot find a product that does not have a bar code associated with it somewhere in its life. It is the least expensive and most reliable method of entering data.

The bar code has gone through three distinct phases.

Phase one was 1975 to 1990. During this phase the codes were printed but not widely used. Bad bar codes did not matter at this time. However, it was a necessary phase, the bar codes needed to be out there before users could justify spending money on equipment to read them.

Phase two was approximately 1990 to 1998. During this phase bar codes were a productivity enhancement tool. A bad code caused productivity degradation. If a code did not scan there was a back up system in place, a person. Grocery stores are an example of an industry in phase two. If the code does not scan, the cashier simply manually inputs the data. Problems that occur in phase two are productivity bottlenecks, potential human error, potential over use injuries and the requirement for a higher level of training.

Phase three is now. Bar codes are enterprise critical. Highly automated systems require barcodes that are readable; readable every time. These systems have no manual back up data entry system. We see examples of phase three industries in automated material handling, medical and large retail store chains just to name a few.

So, how do you get to phase three? It is simple, print perfect bar codes or check the bar codes immediately after or during the printing process.

Why should verification systems be put into place?

Verification should be done to ensure that the bridge between printing and scanning is accurate, to minimise faulty scanning and to ensure that inferior codes do not enter the system. Inferior codes cost time, productivity and money. If a code does not read at all there is a return to the slow, error prone manual data entry and this causes bottlenecks or may stop enterprise critical applications.

Reasons to Verify Bar Codes:

1. Improve Quality

- To ensure maximum reliability in the interface between bar code printing and scanning technologies.
- To meet ISO 9000 requirements.

2. Increase Productivity

- To achieve high first-time read rates
- To minimise the probability of operator injury due to repetitive motion

3. Avoid Unnecessary Costs of Goods

- To enable less skilled labour costs; to reduce the possibility of extra labour costs for remarking.
- To minimise costs of returned products, such as repackaging and shipping.
- To avoid compliance penalties and production line shutdowns.

4. Achieve more accurate MIS information for more informed decisions

- To improve the quality of the entire AIDC system which is compromised by faulty scanning.

Verification methods

Traditional verification analyses how well the code was printed. It looks at parameters such as print contrast, absolute element widths and average bar deviation.

ANSI verification predicts how well a scanner incorporating a particular wavelength of light and a particular aperture size will read a symbol. ANSI looks at eight criteria: edge determination, minimum reflectance, minimum edge contrast, symbol contrast, modulation, defects, decodability and decode. It does this by taking a scan reflectance profile of the code and analysing that profile.

Which industries need verification?

Every industry that has a high cost associated with printing bad bar codes should have a verification system in place. If by printing a bad bar code you receive fines, potentially lose business, have to do costly re-work or have other potential high cost repercussions then a verification system is warranted. This includes:-

- Suppliers to major retail chains who need to avoid getting fined for non-readable bar codes.
- Medical and pharmaceutical suppliers who need to ensure properly marked product to avoid dispensation of incorrect materials.
- Chemical companies who need to ensure properly marked product to avoid costly fines and law suits.
- Suppliers to the automotive industry who need to ensure labels meet the AIAG specification.
- Companies running a highly automated warehouse that use scanners to route packages to avoid bottlenecks and stoppages by putting a verification system in place.
- Any company wanting to avoid or remove unnecessary downtime and reprinting costs for bad codes.

Verification Applications:

Verification should take place right after or during the printing process and before the bar codes enter the system. If you are printing bar codes for others to scan, you should verify with the philosophy that any bad bar codes should be reprinted.

There are 2 common types of companies that use bar coded labels

- ❑ Companies who print their own bar code labels, either by desktop printers or print and apply labelling machines
- ❑ Companies who purchase pre-printed bar code labels, or receive pre-labelled bar coded products

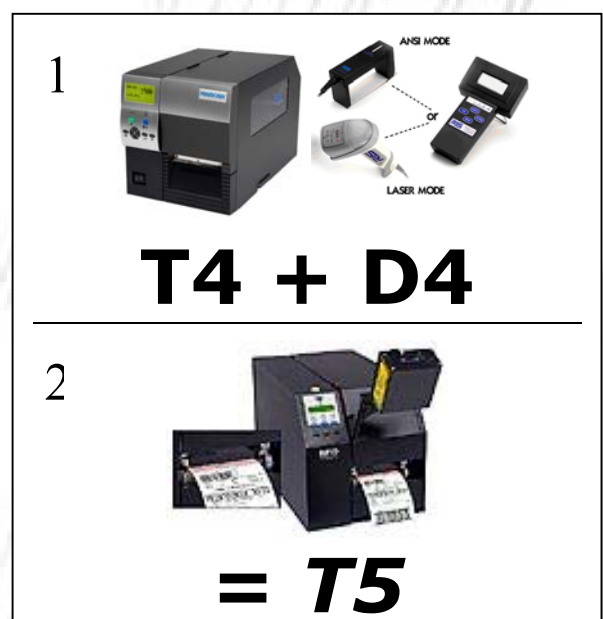
There are 2 common approaches to printing and verifying bar code labels

1. Labels printed on demand and are applied to their chosen product. At some time during the printing process, usually first, middle and last label, portable verifiers are used to verify barcode quality with the assumption that if the first, middle, and last labels scan/read OK, then all the labels in between must also be OK.

This unsecured method requires a printer (T4M) and portable verifier (D4000)

2. Becoming more common, and compliant with customer, or industry standards is the requirement to scan and verify barcode as they are being printed, with label retraction and automatic re-print of any labels that can not be scanned.

This secure method requires a printer fitted with an on-line scanner (T5000r with ODV)



"The most practical and cost effective method for ensuring bad barcodes do not enter the supply chain is to identify and eliminate them at the very first point of failure, at time of print"

**Mr V Obvious
IT, Production and Quality Control Manager**



BMW | The World's Most Advanced Engine Plant Uses Printronix Printers with Online Data Validation (ODV™) to Improve Quality Control in the Supply Chain

Profile

Known as the "world's most advanced car engine production plant," the £400 million, 85-acre BMW plant at Hams Hall in the United Kingdom employs 700 people, and produces approximately 600 four-cylinder petrol engines, from 1.6 to 2.0 litre capacity, per day.

Situation

Each engine produced at Hams Hall is labelled with a Code 39 bar code that holds the engine's serial number. The labels have a touch face coating and are applied using strong adhesive, so that they will remain affixed for the life of the engine. Code 39, or Code 3 of 9, is one of the most popular alphanumeric bar codes used for identification, inventory and tracking in the automotive industry. If the bar code cannot be read properly, when the engine arrives at a BMW automotive assembly plant in Germany, North America or South Africa, production and the plant's automated processes can be significantly impacted.

Goals

To place readable, durable bar codes on each engine in order to:

- Streamline production
- Improve quality control in the supply-chain
- Enable the tracking of an engine over its entire lifetime

Results

Since initiating production, Hams Hall has been using Printronix thermal printers — six T5306s and four T5308s — with Online Data Validation to print and validate the Code 39 bar codes. The labels, which have a tough face coating and are applied using a strong adhesive, are affixed for the life of the engine.

Online Data Validation (ODV™) performs 100 percent inspection for linear bar codes and conducts a complete print quality check on PDF417 bar codes to allow for dependable quality control in automotive supply-chain environments. This eliminates failures, which often translate into rejected items, the need for manual correction, productivity delays or heavy fines. If a label does not pass the validation check, it is fed back into the printer, voided and then reprinted and revalidated.

Reaction

"We have quality targets as part of our key performance indicators (KPIs), which could be adversely impacted by barcodes that don't read properly. This is why Printronix's Online Data Validation is so important to us — it has brought significant improvements."

Steven Davis
Project Engineer

For details, evaluations or prices please contact the UK's leading Printronix supplier since 1998.

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ACCURATE BAR CODES HELP DRIVE SUPPLY CHAIN EFFICIENCY

Almost every industry today is affected by the reliance on bar code technology. A bar code provides the world's least expensive and most robust method of data entry – every product has a bar code associated with it at some point in its life. From automotive to healthcare, retail to pharmaceutical, consumer packaged goods to department stores, business utilizes bar codes for internal logistics, cross docking and manufacturing operations. Accurate bar codes are key in maintaining the efficiency in today's supply chain.

This has increased the importance for bar code quality and assurance. Every bar code must read every time. The implication of bad bar codes at any point in the supply chain is great and far reaching.

- Chargebacks
- Delayed shipments
- Lost productivity
- Non-compliance fees
- Slow production lines

THE PRINTRONIX SOLUTION

Printronix has recognized this growing need since 1999 and has stayed committed to providing customers with an array of comprehensive bar code verification solutions. The results have had a positive impact on operations, costs and the competitive advantage of customers worldwide.

- Improved efficiencies in distribution centers
- Reduction in costly downtime
- Maximized productivity
- Increased vendor compliance
- Stronger customer relationships





ONLINE DATA VALIDATION (ODV™)

Printronix Online Data Validation (ODV), in conjunction with the high performance T5000 thermal bar code printers and the SL5000 RFID printers, identifies and corrects bad bar codes before they enter the production or distribution system.

ANALYZING THE BAR CODE

Completely automated ODV follows a series of specific steps every time to assure 100% bar code accuracy.



- Analyzes incoming data stream to identify bar codes commands for very label
- Once the label is printed the bar code image is scanned and tested to assure the print image falls within the bar code's published quality/symbology specs
- ODV then correlates to the bar code commands
- If the label does not meet specifications, ODV cancels the bad label
- Immediately a replacement label is printed

The benefits are immediate as these simple steps, conducted as part of the printing process, save time, minimize costs and maintain productivity, all without human intervention.

ODV DATA MANAGER

Printronix closed-loop quality control system monitors the critical bar code process with ODV Data Manager.

- Allows enterprise wide remedies for error conditions by capturing and displaying all bar code quality data and detailed validation information
- Store all of your bar code quality data in common database such as Oracle and DB2

Combined with Printronix PrintNet® Enterprise Suite, ODV closes the loop on bar code quality control and provides unprecedented visibility of mission-critical print operations.

CALCULATE THE SAVINGS

To compare your current printing costs with that of a fully implemented Printronix T5000r/ODV/supplies solution visit Printronix online at www.primtronix.com.

CUSTOMER SUCCESSES

48% IMPROVEMENT IN SCAN RATES

An international distribution center responsible for millions of SKUs, thousands of shipping points and trading partners relied heavily on innovative supply chain techniques to move merchandise quickly to the consumer.

Current systems generated a high volume of non-compliant bar code labels resulting in problems throughout the supply chain. To improve inventory operations and keep distribution lines flowing, it was critical that the company implemented an integrated solution to ensure 100-percent bar code accuracy.

To resolve these issues, Printronix recommended the T5000 printer with Online Data Validation, which provided a cost-effective, hand-free quality control process that ensures faulty bar codes would not be affixed to products.

This solution allowed the company to move 250,000 additional cartons and improve scan rates by 48%.

PRINTRONIX

Expected Cost Savings Through Use of Printronix T5000^r Printers with Online Data Validation Internal Logistics and Manufacturing Applications ROI

This spreadsheet will allow you to analyze ROI for Internal Logistics and Manufacturing Applications, comparing the current situation with a fully implemented Printronix T5000^r/ODV/Supplies solution. This analysis assumes that label usage, ribbon usage, and maintenance costs will remain constant over a 3 year period. If label usage is expected to increase, the cost savings will be expected to increase as well.

Please fill in the green shaded areas with the appropriate data.

COST ASSESSMENT	
Number of labels printed per day (quantity)	0000
Percent of labels not readable/scannable (%)	1%
Number of labels reworked per day (quantity)	50
Cost to rework each label (in Dollars)	\$3.00
Total bar code rework cost per day	\$150
Working days per year	250
Total bar code rework cost per year	\$37,500

TOTAL 3 YEAR SAVINGS

\$103,900

Avg. Monthly Savings \$2,886
ROI in Months 2.29

CURRENT COST	Year 1	Year 2	Year 3	3 Year Total
Estimated Label Cost (per year in Dollars)	\$15,000	\$15,000	\$15,000	\$45,000
Estimated Ribbon Cost (per year in Dollars)	\$10,000	\$10,000	\$10,000	\$30,000
Estimated Printer Maintenance (per year in Dollars)	\$2,500	\$2,500	\$2,500	\$7,500
Rework Costs	\$37,500	\$37,500	\$37,500	\$112,500
Total Costs - Current Situation	\$65,000	\$65,000	\$65,000	\$195,000



RJS SCANNERS AND VERIFIERS

For companies currently utilizing non-Printronix printers, other verification systems offering excellent performance are available.

ONLINE VERIFICATION SYSTEM

The SV Series Scanner/Verifier provide both fixed position scanning and high-speed on-line ANSI method verification for a turnkey method of monitoring the printing process with some human intervention.



- Identifies errors by checking for burned out pixels, ribbon wrinkle, and clogged inkjet nozzles
- Scans the bar code, then decodes and reports the encoded data
- Stops to wait for an operator to correct the problem if a bad bar code gets printed
- Available for most thermal printer models and high-speed or conveyor applications

PORTABLE VERIFICATION SYSTEMS

Portable verifiers are ideal for checking bar codes at QC checkpoints or receiving.



- INSEPECTOR® D4000 adapts to practically any linear bar code verification application requiring a portable unit
- INSEPECTOR® 4000 fulfills the ANSI method standards like no other verifier on the market
- INSEPECTOR® 1000 designed for maximum ease of use, even traditionally hard to verify bar codes are accurately analyzed



CUSTOMER SUCCESSES

\$250,000 IN FEES ELIMINATED

A national apparel manufacturer distributes over 720,000 garments a day, via 36,000 outbound cartons to thousands of locations with bar code labels affixed to each garment and carton shipped.

Their customer has strict requirements regarding bar code compliance. In this case low-bar code quality was costing the company more than \$225,000 per year. The current process of visual validation often resulted in overlooked smudged or unreadable bar codes. The company needed a streamlined solution to eliminate mistakes and improve bar code printing.

The Printronix solution was the T5000e thermal printer with Online Data Validation, which helped to streamline printing of 100% scannable bar code labels and reduce employee training. The most compelling aspect was the system's ability to store data allowing the company to better manage customer claims.

During a two-month period the company experienced a 90% drop in bar code failures. Within 90 days the company had recouped its investment and was compiling valuable data.