Enterprise Labeling An Imperative for the Electronics Industry

A Loftware White Paper by Joe Longo

Executive Summary

The electronics industry today is characterized by an ever-sprawling set of global supply chains, causing an increase in disparate labeling systems spread across the enterprise with an ever increasing volume of duplicated label and redundant master data. This begs the question: how effective is labeling in the electronics industry today? Can labeling be more optimized for large corporations with thousands of printers around the world?

The challenges facing organizations dealing with global supply chains include the need to accomplish the following:

- Increase supply chain transparency for speedy product development
- Centralize and consolidate label printing from one location to thousands of remote printers worldwide
- Integrate labeling with business applications
- Reduce the number of label templates with automation
- Rapidly change labels as customer, geographical and regulatory requirements evolve
- Build "configure to order" solutions in high volumes
- Attain higher yields through fewer defects in labels
- Defend against higher costs by safeguarding against counterfeiting
- Reduce manufacturing costs and sustain or improve margins

That's more easily said than done. Why? Because among other things, and most obviously, the success of a collaborative and coordinated global supply chain depends upon operating reliably across borders, over distances, in many languages—and all must be in sync with different time zones in compliance with a variety of different local, regional, and national regulatory requirements.

This discussion is targeted toward electronics industry supply chain and logistics professionals tasked with optimizing their company's partnerships to get more done, in more places, in less time, for the achievement of greater profitability and market share. It speaks to the many components that contribute to partnership optimization and solutions at hand through product labeling and data standards that can lead to supply chain transparency.

The basic concept is simple: if all stakeholders in the supply chain can speak the same language, figuratively speaking, then raw materials and finished products can come and go faster, more reliably, with less waste, and with fewer errors. All this can occur at lower costs for higher margin outcomes, increased customer responsiveness, and strong competitive advantage.

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As Usual, There's No Such Thing as "Business as Usual" in the Electronics Industry

Because the electronics industry continues to innovate, the task of meeting the new objective of supply chain transparency and integration is not merely a matter of engaging in the same, business-as-usual approach to raw materials sourcing, manufacturing, assembly, and shipment processes for a simplistic adaptation to a new supply chain model. For example, the adaptation has to happen in parallel with new trends in unit-level traceability by involving increasingly smaller components that defy conventional labeling processes. Adaptation has to occur while demands increase for faster line changeovers, faster component and assembly verification, and inspection. It all has to happen at a time when many electronics manufacturers are looking to emerging countries with fertile opportunities for low cost manufacturing potential through new or acquired facilities.

Against this backdrop, data and product marketing standards initiatives in the electronic industry cannot expect to gain traction until ongoing trends and developments can be supported. More well-known issues with a long-standing history of adding complexity to the industry need to be solved. In other words, the electronics industry doesn't just need something different, or something new, unless the solution takes away the burden of current processes and simultaneously delivers the opportunity to leverage the industry to the next level.

Common Practices with Uncommonly Burdensome, Costly, Risky, and Wasteful Limitations

If the common systems for product labeling were working flawlessly, there would be no demand for change. But even just a cursory review of all that electronics manufacturers must accomplish in labeling generates a profile of an approach that is unsustainable. Consider, for example, what manufacturers need to do simply to comply with their customers' labeling requirements as the industry continues to grow and expand product lines

Customer labeling requirements often dictate the exact type and placement to be used on the product, box, carton, and pallet. It is not unusual for a major customer to demand exact specifications for label size, data titles, data field identifiers, as well as a dozen or more exacting guidelines for barcode symbologies. For example, one leading electronics buyer provides this guidance: "Barcodes should be within a character density range of 3.7 to 6.9 characters per inch, with a minimum element ration of 2.5:1 to 3.0:1…preferred." And every major customer's labeling directives can be different.

Customers today also want the manufacturers to exhibit faster, more reliable, more secure turnaround for the use of new label designs that evolve as products change. This comes at a time when products are changing faster than ever. The industry is already coping with possibly the largest number of serial numbers and labeling configurations of any industry in the world.

Failure to meet customer labeling requirements, especially across multiple customers with differing standards, leads to shipping errors, higher freight costs, returns, repackaging expenses, late penalties, compliance issues—and worse—customer dissatisfaction. For an industry already undergoing increased pressure on prices and margins, these outcomes negatively exacerbate corporate growth and profitability objectives.

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Satisfying Customers While Taking Unsatisfactory Delivery of Unidentifiable Materials

The above example is about outgoing finished product. But electronics manufacturers have an incoming raw materials labeling challenge—and opportunity. At the same time, the electronics manufacturer's business sustainability depends on meeting customer labeling guidelines. In many cases, the manufacturer is taking delivery of raw materials or components with labels that bear no compatibility or consistency with their labeling system. This means it takes time to determine what exactly has been delivered and from which provider. It means these materials or components have to be re-labeled or over-labeled with product label substitutes aligned with the manufacturer's system. This takes time, and contributes to added expense.

The contemporary objective is to have raw materials providers label their products in ways that are consistent and compatible with the manufacturer's operations and labeling methodology. Unfortunately, "homegrown" patchwork systems and solutions that are not enterprise-driven, and do not provide integration capabilities with secure access to a provider of raw materials or components, cannot easily meet this objective, if at all.

Reliance on Compliance: Evolving Industry Standards

The variety of product labeling standards set forth, or under consideration, by organizations such as the Electronics Components Industry Association (ECIA), Electronics Components Association (ECA), Joint Electron Device Engineering Council (JDEC), Government Electronics and Information Technology Association (GEIA), now part of TechAmerica, Telecommunications Industry Association (TIA), and Consumer Electronics Association (CEA) present additional labeling challenges.

Among these are:

- **CEA-556:** Outer Shipping Container Bar Code Label Standard
- **CEA-556C:** Shipping and Receiving Transaction Bar Code Label Standard
- **CEA-621A:** Consumer Electronics Group Product and Packaging Bar Code Standard for Consumer Electronics
- **CEA-706:** Requirements for Using 2D Machine Readable Symbols for Marking and Identifying Electronic Components

Beyond these standards in electronics, global supply chain labeling demands to meet guidelines, standards, and regulations are increasing at a rapid pace in almost all industries. In the field of electronics, which crosses over with peripheral industries such as chemicals and consumer goods, evolving labeling standards and regulations, sooner than later, will require enterprise-wide labeling solutions in response to corporate concerns about risk mitigation and consumer safety.

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Hewlett-Packard recently acknowledged it "maintains information on about 240 chemicals that could be in electronics parts but are not regulated, so it knows where the chemicals are being used in case they end up restricted by laws." "With so many chemicals used in the manufacturing of electronics, and the increasing regulations in the chemical industry such as the Globally Harmonized System for Hazard Communication (GHS), electronics companies may have to address the associated challenges of labeling chemicals accurately. But all point to an unmistakable pattern: globalization, environmental concerns, chemical substance monitoring and control, counterfeit prevention, industry regulations, customer responsiveness, best practices, supply chain transparency, data standards, and the need for commonly understood product labeling are all critical factors in the smooth operation of a reliable global supply chain."

This trend can be temporarily avoided or delayed, but inevitably the industry is facing a future where partners and consumers will demand to know more about a product's origins, contents, and whereabouts.

The following regulatory initiatives are admittedly environmentally focused. As such, what are the implications for quality enterprise barcodes tied to core applications? The point is this: the information required by these rules, directives, guidelines and regulations is not going to be managed at a desk using a notepad and a three-drawer manual filing cabinet system. Not, at least, for electronics manufacturers who hope to survive and thrive in this second decade of the 21st century.

Electronic data systems tied to product labeling solutions are going to capture, follow, measure, evaluate, track, and monitor the required information. For a long time to come, standards-based traditional and 2D barcodes will indisputably remain at the center of establishing and managing a product's identity and all of its various characteristics.

These directives, rules and regulations include:

The RoHS Regulation (Directive 2002/95/EC) and RoHS II: EU Member States shall ensure that new electrical and electronic equipment put on the market does not contain any of the six banned substances: lead, mercury, cadmium, hexavalent chromium, poly-brominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE), in quantities exceeding maximum concentration values.

The WEEE Directive: Together with the RoHS Directive, WEEE sets collection, recycling and recovery targets for all types of electrical goods.

The ErP Directive2009/125/EC (Formerly EuP): This European directive establishes a framework under which manufacturers of energy-using products (EuP) will, at the design stage, be obliged to reduce the energy consumption and other negative environmental impacts that occur during the product's life cycle.

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The Packaging Directive: This directive aims to harmonize national measures in order to prevent or reduce the impact of packaging and packaging waste on the environment. It contains provisions on the prevention of packaging waste, on the re-use of packaging and on the recovery and recycling of packaging waste.

The CE Mark: This is a mandatory conformance mark on many products placed on the market in Europe to ensure the product conforms to EC directives.

IPC-1752: This is an Institute for Printed Circuits materials declaration management standard for material declaration forms and electronic data exchange formats to facilitate electronic reporting for suppliers and customers along the electronics supply chain.

The Electronic Industry Code of Conduct: This is a set of best practices adopted and implemented by some of the world's major electronics and telecommunications brands and their suppliers to implement a single supply chain social responsibility code of conduct in the sector.

Green Supply Chain Management (GSCM): GSCM has been adopted as a proactive strategy by leading electronics industry companies, including Dell, HP, IBM, Motorola, Sony, Panasonic, NEC, Fujitsu, and Toshiba. It represents a proactive approach for improving the environmental performance of processes and products in accordance with the requirements of environmental regulations.

How Bad Can Bad Get?

The following should be cut and pasted, or cut and posted, at the end of every electronics manufacturing line, every warehouse, every distribution center, and even every executive suite. It is a list of the eight most common bad outcomes that can occur from labeling errors, and is derived from more than two decades of experience in manufacturing labeling mishaps:

1. Mislabeling and related data errors

The wrong label or a label with incorrect or incomplete data typically sidetracks the product, often in distribution centers, until the problem can be identified and corrected. Delivery deadlines can be missed, inventory carrying costs can soar, or worse, products that linger too long can become obsolete.

2. Customer and regulatory fines

Label production delays due to non-compliance labels mean product shipment delays. With customers having agreements for timely delivery, delays often equate to monetary penalties. Labels in non-compliance with regulatory authorities can trigger recalls and fines as well. With the advent of emerging initiatives for global harmonization of product labeling, this is more important than ever.

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3. Loss of business

Chronic label issues resulting in delayed shipments, customer fines, or the delivery of the wrong product can turn customers away to seek alternate sources of supply. “This negatively affects market share and margins, leads to loss of brand credibility, and increases customer dissatisfaction.”

4. Label-related safety compliance

Beyond the regulatory implications of labeling-related safety compliance, failures in this area can dramatically impact a company’s overall brand and reputation. In severe cases, many companies do not survive the reputational effects of a major product recall.

5. Inability to scale labeling operations in manufacturing, shipping and distribution centers

In today’s electronics industry supply chain, speed and efficiency are two areas most manufacturers examine for value-added opportunities and improved economies of scale. When labeling inefficiencies such as improper load dividing or redundant relabeling slow everything down, or even bring operations to a halt, the bottom line suffers.

6. Label-related recall execution; track and traceability solutions

One of the reasons for the dreadful effect of a major product recall relates to how long it can take to identify and find the product and complete a recall cycle. Contemporary track and trace labeling solutions speed the process, thereby minimizing costs as well as the potential downside to a company’s reputation in the marketplace.

7. Global readiness for evolving industry standards

Emerging product labeling standards, some mandated by governments, can mean the difference between market entry and exclusion. For companies working with supply chain, manufacturing, and distribution partners in these countries, compliance with regional standards can streamline the supply chain. The need to support language requirements and compliance variability based on each country’s regulations is becoming more and more complex.

8. Inability to meet customer-specific labeling requirements

More than ever, customers are driving requirements for both label layout and data content for labeling. Both a baseline requirement and a point of differentiation against the competition, labeling is a critical factor when considering businesses’ ability to quickly and seamlessly distribute their products from supplier to customer. If manufacturers lack responsiveness to these customer requirements, a loss in market share is a real possibility

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The Unintended Consequences of Organic Growth: IT Management Stress

On top of all this, many IT professionals in the electronics industry sector are apt to recognize the following profile characterizing the most common labeling technology challenges. For example, organizations often struggle with disparate labeling systems, accumulated over time to meet the needs of various divisions or functional areas. Some are standalone, purpose-driven or silo systems with no relevance or connection to enterprise data and business applications. For electronics manufacturing companies that have grown through mergers and acquisitions, multiple units may have varied labeling methodologies and technologies. Labels may be printed by these disparate systems for case, pallet, customer requirements, regulatory compliance, or other purposes, and may also have unique applications for each type of label. These companies lack an overarching process or global product identification solution that can consistently efficiently generate labels by product, customer, or country.

The situation is likely to become worse, because the industry continues to consolidate. Plus, acquired operations in emerging countries may bring with them their own labeling infrastructure, systems, and processes.

The absence of an enterprise-wide and centrally managed solution for products manufactured in disparate locations generates routine rework. Home-grown work-arounds, numerous extract modes, and broadly fragmented labeling knowledge are often the result. This can lead to conflicting organizational behaviors, brand inconsistencies, mislabeling, and process failures with very costly implications.

There exists, however, a straightforward approach to solving these problems to meet the next generations of opportunity.

The Cure: An Enterprise-Centric Approach to Labeling

1. Consolidation and Centralization

Electronics manufacturers with dispersed, departmental, standalone and multi-regional labeling systems face a daunting task of meeting enterprise-wide consistency and control if the decision is made to sustain these systems. Fixing redundancy of all these separate solutions over many departments and across all labeling geographies is a time-intensive initiative that, in the end, does nothing to resolve the underlying problems of a decentralized labeling approach. Consolidation around a centralized system, tied to enterprise applications and data, insures corporate-wide labeling consistencies, compliance, and security. Electronics manufacturing companies need the ability to easily and quickly manage label data, make label changes, comply with evolving standards, and flexibly support new labeling requirements. Allowing multiple locations and/or suppliers access to centralized data to seamlessly produce labels remotely is crucial to business continuity. Utilizing this centralized approach to label data allows businesses to scale globally and remotely, and drives label production from any of its sites.

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2. Integration

Electronics products manufacturers today know they need—and they already have—systems for version control. This means many electronics manufacturers have systems in place for compliance and regulatory standards with approvals, workflow, revisions, and documented copies; and, they have the right people already in place who are familiar with these systems. With this in mind, it isn't practical to replicate data. Instead, it makes significantly greater sense to simply use the label data in these existing applications for the data to generate the labels, so the ability to connect and integrate to all key sources of label data is essential.

Business partners, too, need to leverage their own sources of label data, and extend labels and data to their partners. Through integration, an unprecedented level of flexibility to enable the use of corporate or partner data to create, manage, and print mission-critical barcode labels across the global supply chain becomes possible. In some enterprise solutions scenarios that include WYSIWYG design and browser-based capabilities, business users can even take ownership of the design process. This eliminates the need for IT at each print location to get involved or write code to handle new label creation and label changes, resulting in significant cost and time savings.

3. Automation Based on Business Rules

In addition to application integration, the forward-looking solution in electronics products manufacturing labeling looks to all major enterprise applications to drive label printing. To ensure an effective global supply chain strategy, customers must consider how labeling intersects with evolving contributors such as globalization of manufacturing, safety and quality of products, shorter lead-times, lean business environments, and changing international market demands. Widely installed enterprise applications from providers such as Oracle, SAP, and others, are considered "a single source of truth," and if these systems are leveraged to drive label printing and label data, then the error-prone practice of manual or redundant label data entry is eliminated. Enterprise labeling solutions include business rules logic that allows customers to automatically meet the rigors of global requirements such as regulations, languages, images, formats, and printers, and to manage variability across multiple industries and regions in one place. Automating these complex workflow processes frees up the organization to use precious labor hours more creatively and efficiently.

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Summary: Why Efficient Enterprise Labeling is the Solution

Once considered a mere tactical necessity, contemporary electronics industry product labeling solutions can have major strategic implications. As noted in this white paper, there are at least eight major negative corporate outcomes that can result from product labeling errors and inefficiencies. Averting these issues is no longer a matter of fixing one label at a time or refitting one product facility at a time with silo or purpose-driven systems. Labeling has become a core component of a manufacturer's strategic mission to create a smoothly operating global supply chain. The solution cannot be found in a patchwork of more systems, but in less and fewer disparities and incompatibilities. For a truly successful outcome, labeling must be integrated with core enterprise applications and data.

Electronics manufacturers of all sizes and scope can gain tremendous value from the intelligent three-step methodology of consolidation, integration, and automation of their labeling environment. Implementing enterprise-wide solutions that centralize global labeling and integrate with core applications and data bring into alliance the parallel goals of corporate growth and supply chain efficiency with labeling agility and accuracy. At a time when regulatory scrutiny and standards initiatives worldwide are on the rise; when customer demands are more specific and varied than every before; and when a single source of truth is the most reliable repository of data, an enterprise labeling solution is an efficient, cost-saving, accurate, and flexible way to quickly meet the critical needs of today's global supply chain.

About the Author

Joe Longo is Electronics Industry Specialist with Loftware and has been working with Loftware enterprise customers in the electronics industry for over seven years. His customers include some of the largest electronics manufacturers in the world: Jabil Circuits, Flextronics, Celestica, Kemet, Plexus, GE and more. Highly knowledgeable about the key issues most EMS manufacturers are facing today, he provides in-depth studies and recommendations to electronics manufacturers on solutions to their labeling requirements. Email: jlongo@loftware.com.

About Loftware

Loftware, Inc. is the global market leader in Enterprise Labeling Solutions with more than 5,000 customers in over 100 countries. Offering the industry's most comprehensive labeling solution, Loftware's enterprise software integrates SAP®, Oracle® and other enterprise applications to produce mission-critical barcode labels, documents, and RFID Smart tags across the supply chain. Loftware's design, native print, and built-in business rules functionality drives topline revenue, increases customer satisfaction, and maximizes supply chain efficiency for customers. With over 25 years of industry leadership, Loftware's Enterprise Labeling Solutions and best practices enable leading companies to meet their customer-specific and regulatory requirements with unprecedented speed and agility. Loftware, with hundreds of electronics industry customers worldwide, is the foremost authority and global market software leader in delivering innovative business solutions for enterprise labeling requirements. Visit www.loftware.com.

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