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September 18, 2015

Dear Distribution Partner

You are in receipt of the following message as you are listed in our system to be the coordinator for PCNs concerning TDK products.

This is to notify you of a Change in labeling, from the current 1D bar code to 2D Bar Code labeling.

Examples of Product, Carton, and Packing Slip labels are being provided along with this notification.

Please note that the labels with 2D bar Codes that TDK will use are in conformance to the ECIA's **EIGP 114.00 "2D Barcode Labeling Specification for Product Package and shipments in the Electronics Industry".**

Timing: This change is effective immediately and is a running change in production. Product with the new labels will begin arriving anytime from now through the end of this calendar year - depending on which items are ordered and how much product is in the pipeline at a given point in time.

You are kindly requested to acknowledge this change by return e-mail, by the end of September 2015. If we do not receive your acknowledgement, we will consider this change to be welcomed.

Thank you for your cooperation and support

With kindest regards,

Michael Tumminaro Distribution Sales Department TDK Corporation of America mike.tumminaro@us.tdk.com



ECIA

Publication

2D Barcode Labeling Specification for Product Package and Shipments in the Electronics Industry (Including Human Readable and 1D Barcode)

EIGP 114.00

November 2012

Electronic Components Industry Association

Industry Guidelines

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Published by

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The purpose of this specification is to provide current technical information that will help the Electronics Components Industry know and choose appropriate 2D symbology(s), materials, and equipment for their current and future application needs. This document is consistent with current industry standards (see EIA, CEA, ANSI, & ISO/IEC reference documents), and will make recommendations for symbology(s), standardized sets of data, and data identifiers as well as specific barcode placement for each applicable level of labeling applications used in the electronic component supply chain (non-retail).

2D barcode has proven very effective in those applications where it's been implemented. Benefits include single barcode scans, improved data accuracy, and increased efficiency. Because of the design of the 2D symbology, more information can be included on the labels. With the increasing requirements to add attributes (RoHS, REACH, etc.) to labels, the ability to add more information will become ever more important.

As with any new technology, we can expect a transition period. The inclusion of human readable, 1D, and 2D symbologies will help the industry make this transition.

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- IV. Materials & Equipment
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I. Defined Terms Related To This Document

- A. 1-Dimensional (1D) Barcode A barcode symbology in which the symbol is formed of a single row of symbol characters (made up of narrow & wide bars and spaces).
- B. 2-Dimensional (2D) Barcode Optically readable symbols that must be examined both vertically and horizontally to read the entire message. Two-dimensional symbols may be one of two types: matrix symbols and multi-row or stacked barcode symbols. Two-dimensional symbols have error detection and may include error correction features.
- C. Data Identifier (DI) A specified character, or string of characters, that defines the intended use of the data element that follows.
- D. Packing Slip (B Labels in this document)– Also known as a pick list, pack/packing list or delivery note. This document contains the order specific information for the total ship quantity of 1 or more part numbers of a Purchase Order.
- E. Product Package or Unit Pack (Label A1 in this document)

A commercial unit of components defined by the supplier including, if applicable, their means for protection, structured alignment, and for

transporting, storage, and/or assembly. Usually identified with the lowest level package label.

Typical examples of a product package for leaded components (such as Integrated Circuits) are:

- the single reel on which components are taped
- the single ammo box containing taped components
- the single (inner) transportable bag or box containing a unit package such as a reel, tube(s), stick(s), tray(s), or bulk packed components
- F. Intermediate Package

A box, carton or bag or other container used to contain multiple product packages (lowest level packages), trays, reels, boxes or bags of product that consists of a whole or partial quantity of a single line item on a purchase order. Intermediate packages are not always required or necessary.

G. Shipping Container or External Packaging

The outer container that is sufficiently strong enough to be handled by a freight carrier in the transportation of an order from a shipper to a receiver.

H. Consolidated Orders or Mixed Load

These orders are separate line item orders and/or multiple purchase orders that are combined and placed in one or more shipping container(s).

I. Individual Box Shipments

These orders are shipped as a single purchase order with a single line item and not consolidated.

II. Reference Documents

2D Barcode for AVNET Delivery Note, Version 07.05.2008

Avnet Logistics 2D Barcode Labeling Requirements for In Bound Product

QOP07A, Arrow Supplier Labeling and Packaging Specification

Future Electronics Supplier Quality Specification QES 9401

JEDEC JEP 130, Guidelines for Packing and Labeling of Integrated Circuits in Unit Container Packing

CEA-624-A, Linear Barcode and Two-Dimensional Symbols for the Labeling of Product Packages

ISO 22742 - Packaging – Linear Barcode and Two-Dimensional Symbols for Product Packaging

CEA-556-C, Outer Shipping Container Label Standard

ANS MH10.8.2 Data Application Identifier Standard

ISO/IEC 15415, Information Technology - Automatic Identification and Data Capture Techniques – Barcode Print Quality Test Specification – Two-Dimensional Symbols

ISO/IEC 15416, Information Technology -- Automatic Identification and Data Capture Techniques -- Barcode Print Quality Test Specification -- Linear Symbols

ISO/IEC 15417, Information Technology — International Symbology Specification - Code 128

ISO/IEC 15434 Automatic identification and data capture techniques -- Syntax for high-capacity ADC media

ISO/IEC 16388, Information Technology — International Symbology Specification - Code 39

ISO/IEC 15438, Information Technology — International Symbology Specification - PDF417

ISO/IEC 16022, Information Technology — International Symbology Specification – Data Matrix

ISO 3166-1, Codes for the Representation of Names of Countries and Their Subdivisions – Part 1: Country Codes

All industry standard documents should be available from:

Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, Telephone: (800) 854-7179 or (303) 397-7956, Fax: (303) 397-2740, website: <u>http://global.ihs.com</u> (Outside the United States, check the above website for locations in other countries).

Many can also be obtained from:

ANSI, 25 West 43rd Street (between 5th and 6th Avenues), 4th floor, New York, NY 10036, Telephone: (212) 642-4900, Fax: (212) 398-0023, website: <u>http://webstore.ansi.org/ansidocstore/default.asp</u>.

III. Symbologies

- A. 1D Linear Barcodes -
 - 1. Code 39
 - a. Most commonly used barcode, readable by all barcode scanners, approved for use in all major Industry Standards (ISO, ANSI, EIA/CEA, etc)
 - 2. Code 128
 - a. Approved for use in all major Industry Standards.
 - b. Recommended for distribution specifications using 1D Barcode
 - c. Advantage over Code 39 is space efficiency (data compression requires less real estate and faster scan rate when compared to Code 39, for most applications).
- B. 2D Matrix / Stacked Linear Barcodes

Note: Although specific recommendations are contained in this section for uses of the different symbol types, both Data Matrix ECC-200 and PDF417 are acceptable for all 2D purposes in this standard. This is for information only on the two acceptable 2D barcode symbols.

- 1. Data Matrix ECC-200 (Matrix)
 - a. Recommended for distribution specifications on inner/intermediate product packages (bags, boxes, reels). Also recommended for any required Contents List for outer containers, and/or as supplement to "Mixed Load" label.
 - b. Data Matrix ECC 200 uses the automatic error correction to insure reliable performance of slightly damaged labels.
- 2. PDF417 (Stacked Linear)
 - a. Recommended for distribution specifications on outer shipping container, Shipping Content Summary, and Pack list labels (unless amount of auto-id data requires more efficient space utilization, in which case Data Matrix Code is recommended).
 - b. When using PDF417, an error correction level of 3 is recommended to insure reliable performance of slightly damaged labels.

IV. Materials & Equipment

- A. Labels & Ribbon When selecting ribbon and/or label suppliers it is important to qualify them (together) to insure that they meet 3 important criteria:
 - 1. Print Quality
 - 2. Smudge resistance
 - 3. Adhesive requirements (permanent and/or peel able)
- B. Printer Recommendations
 - 1. For label printing only thermal transfer printers are recommend
 - 2. 400DPI minimum is recommended to support 1D & 2D symbologies

Scanners/Print Quality Verifiers – When selecting the 1D and 2D symbologies for your labeling specifications, it is necessary to also select a suitable scanner and print quality verifier for your application(s). Some scanners also double as an inline or standalone print quality verifier (contact your full service 1D-2D solutions provider for more detailed updates). The following "Informative" section may be helpful in determining the best symbology and scanner technology to meet your current and future needs.

V. Informative - Selection and Use of 2D Symbols & Equipment

2D Symbol Selections PDF 417 and Data Matrix ECC 200 are approved for all labels requiring 2D in this standard. Before choosing a 2D symbology and equipment for your application, consideration needs to be made concerning all supply chain materials passing through your application(s) for scan automation and for label space efficiency. The following table illustrates the major differences to be considered when making these decisions.

•	Linear Imager	Area	Linear Laser	Raster Laser	Label Space Efficiency For
Symbology		Imager			Symbology Consideration
					(same "X" dimension)
PDF417	May be	Compatible	May be	Compatible	More efficient than linear
	compatible		compatible		barcode
	(check with		(check with		
	Manufacturer)		manufacturer)		
Data Matrix	Not Compatible	Compatible	Not Compatible	Not Compatible	More efficient than linear
ECC 200					barcode and PDF417
1D Code 39/	Compatible	Compatible	Compatible	Compatible	Code 128 is more efficient
Code 128					than Code 39

Table A – Symbology Comparisons

When evaluating printers and scanners/verifiers, other special considerations should include:

• Printer capabilities (2D capabilities, DPI, Print Quality, Size/Footprint, etc.)

- Print Quality Verifier types and capabilities (application variables handheld, fixed, in-line, etc.)
- Scanner types & capabilities (application variables hand-held, fixed, field of view, depth of field, lighting, etc.)

VI. Labeling Applications & Interface

NOTE: Other fields may be included as required by the supplier as long as the minimum requirements are met. Minimum requirements are listed in Charts A1 and B1.

- A. Product Package or Unit Pack Labeling Application
 - For product packages (inner/intermediate bags, boxes, & reels) used for stocking and manufacturing POU (Point Of Use).
 - Human readable, 1D and 2D required for specified fields. (Chart A1, Label A1)
 - For product package label with multiple date code or lot codes, please follow section VI.E.2.a and VI.E.2.b.

Field Name	Data Identifier	Level	Max Field Length	Specific Requirements
Customer Part Number (if applicable)	Р	Human Readable, 1D, 2D	40	If applicable
Manufacturer Part Number	1P	Human Readable, 1D, 2D	40	
Date Code	9D, 10D, 11D	Human Readable, 1D, 2D	7	Acceptable d/c format is YYWW or YYYYWW.
Quantity	Q	Human Readable, 1D, 2D	9	Quantity in the package
Lot/Trace Code	1T	Human Readable, 1D, 2D	15	Lot or trace number where applicable.
Country of Origin	4L	Human Readable, 1D, 2D	2	Taken from ISO 3166-1.
Content Code / Compliance Statement		Human Readable		Human Readable only required.
Moisture sensitive level		Human Readable		When applicable
Moisture barrier bag seal date		Human Readable		When applicable

Chart A1 – Product Package or Unit Pack Field Description and Use

Label A1 - Product Package or Unit Pack



- B. Shipping & Receiving Application One purchase order line item per packing slip page is preferred but not required.
 - Pack slip and/or accompanying label (Delivery with Single Part # / See Label B1and B2)
 - Human readable, 1D and 2D required for specified fields. (See Chart B1)
 - When direct printing of the 2D barcode on the pack list is not available, a label with all required fields must accompany the pack list. (See Label B1 and B2)
 - When a MIXED load or Consolidated Order is shipped, each line item must have it's own packing slip with human readable, 1D and 2D information or accompanying label with the same.
 - If creation of one 2D barcode label that includes header and item information is not possible, see packing slip examples B3 and B4.

Field Name	Data Identifier	Level	Max Field length	P/S Only	Specific Requirements
Customer PO	K	1D, 2D, HR	13		
Customer PO Line	4K	1D, 2D, HR	5		
Customer Part (if applicable)	Р	1D, 2D, HR	40		If applicable
Manufacturer Part Number	1P	1D, 2D, HR	40		
Packing Slip or Delivery Note Number	11K, 3S, 4S accepted	1D, 2D, HR	25		Unique identification number assigned by the supplier that allows traceability for receipt discrepancies
Quantity	Q	1D, 2D, HR	9		Total line item quantity. This must be the same on the packing slip and any accompanying label.
Date Code	9D, 10D, 11D accepted	1D, 2D, HR	7		Acceptable d/c format is YYWW or YYYYWW.
Trace Code/Lot Code	1T	1D, 2D, HR	15		Lot or trace number where applicable.
Country of Origin	4L	1D, 2D, HR	2		Taken from ISO 3166-1.c
Shipping Date	6D	1D, 2D, HR	8		Doc generation date
ECCN	NA	HR		Y	
Pos of Total Pos/Box count	13Q	HR		Y	DI Available
Manufacturer	1V	HR		Y	DI Available
ROHS/CC	Е	HR			DI Available
Weight	7Q	HR		Y	DI Available
Luminosity	NA	HR when appl.			When applicable
Reel ID (if appl. for lighting)	NA	HR when appl.			When applicable
Moisture Sensitive Level	NA	HR when appl.			When applicable

Chart B1 - Shipping & Receiving Field Description and Use



Label B1 - Pack slip and/or accompanying label (Delivery with Single Part #)



Ship From: ABCDEFGHIJKLMN OPQRSTU VWXY ABCDEFGHIJKLMN OPQRSTU VWXY ABCDEFGHIJKLMN OPQRSTU VWXY	Ship To: ABCDEFGHIJKLMN OPQRSTU VWXY ABCDEFGHIJKLMN OPQRSTU VWXY ABCDEFGHIJKLMN OPQRSTU VWXY			
(K) Cust. PO: ABCDEFGHIJKLM	(4K) Cust. PO Line: 12345			
(P) Customer Part: ABCDEFGHIJKLMNOPQRSTU	WXY ROHS COMPLIANT			
(1P) Manufacturer Part: ABCDEFGHIJKLMNOPQR	STU WXY			
(11K) Packing Slip: ABCDEFGHIJKLMNOPQRSTU	WXY (Q) Quantity: 123456789			
(9D) Date Code: 1234567	(4L) COO: US			
(1T) Lot Code: 123456789012345	(6D) Ship Date: 120130			
n na standar a service de la contra da marca de segundo de la contra da marca nas-anal. En la segunda de la contra da marca de la contra de la cont				

Label B3 -Alternate Packing Slip Label separate header and item barcode using Datamatrix ECC200

Compa	any ABC Packing Slip	
Ship From: ABCDEFGHIJKLMNOPQRSTUVWXY ABCDEFGHIJKLMNOPQRSTUVWXY ABCDEFGHIJKLMNOPQRSTUVWXY	Ship To: ABCDEFGHIJ KLM NOPQR STU VWX Y ABCDEFGHIJ KLM NOPQR STU VWX Y ABCDEFGHIJ KLM NOPQR STU VWX Y	
(K) Cust. PO: ABCDEFGHIJKLM (11K) Pa	acking Slip: ABCDEFGHIJKLMNOPQRSTUVWXY	
(1P) Manufacturer Part: ABCDEFGHIJKLMNOP(QR ST U VWX Y (Q) Quantity: 123456789	
(1P) Manufacturer Part: ABCDEFGHIJKLMNOP((4K) Cust. PO Line: 12345 (9D) Date Code: 1	QR STUVWXY (Q) Quantity: 123456789	
(1P) Manufacturer Part: ABCDEFGHIJKLMNOP (4K) Cust. PO Line: 12345 (9D) Date Code: 1	QRSTUVWXY (Q) Quantity: 123456789	
(1P) Manufacturer Part: ABCDEFGHIJKLMNOP((4K) Cust. PO Line: 12345 (9D) Date Code: 1	QR \$T U VWX Y (Q) Quantity: 123456789	
	Page X of X	

Label B4 - Alternate Packing Slip separate header and item barcode using PDF417



- C. Intermediate, Shipping Container or External Packaging (Single Item/Single PO)
 - 1. Human readable, 1D and 2D required for specified fields. (See Chart B1)
 - 2. All fields the same as CHART B1 with the possible exception of quantity. The quantity on this label must reflect the quantity in the carton. In this situation, this may or may not be the entire line item quantity as requested in the Shipping & Receiving Application. For an Individual Box Shipment, this label will be exactly the same as Label B1.
- D. Mixed Load

Human readable, 1D required for applicable fields. No changes for 2D required.



Label D1 – Mixed load – Intermediate Shipping Container or external Packaging

- E. Mixed Lot Attribute Labeling and Barcoding
 - One date code, lot code and country of origin is preferred per packing slip. Note: One date code and lot code is required for military product. The alternatives below are for commercial product only. For both commercial and military product, this specification does not impact individual agreements between suppliers and distributors regarding date code, lot code and COO restrictions.
 - 2. If more than one of the attributes listed above is shipped on one purchase order, follow the requirements listed below for 2D barcoding:
 - a. Date code
 - 1. Preferred method, when one date code is not possible on a commercial line item, is to list date codes, in human readable, 1D and 2D, oldest first, using a repeatable section.
 - 2. Minimum requirement: Put the oldest date code in the barcode field followed by an M for MIXED or MULTIPLE. Indicate on the packing slip that multiple date codes are present in this shipment
 - b. Lot code
 - 1. Preferred method: When one lot code is not possible on a commercial line item, then list lot codes, in human readable, 1D and 2D, oldest first, using a repeatable section.
 - 2. Minimum requirement: When one lot code is not possible on a commercial line item, put the word "MIXED" or "MULTI" in the field or leave the field completely blank. Indicate on the packing slip that multiple lot codes are present and specify what lot codes are in the shipment
 - c. Country of Origin
 - 1. Preferred method: When one country of origin is not possible on a commercial line item, then list the country of origin codes, in human readable, 1D and 2D, largest quantity first, using a repeatable section.
 - 2. Minimum requirement: When one country of origin is not possible on a commercial line item, put the word "MIXED" or "MULTI" in the field or leave the field completely blank. Indicate on the packing slip that multiple country of origins are present and specify what country of origins are in the shipment.

F. Data Element Syntax for 2D Symbols

The encoding shall be as described in ISO/IEC 15434, using "Format 06", using Data Identifiers. The first seven characters shall be "[)> $^{R}_{S}06^{G}_{S}$ ". For Data Identifier messages the last 2 characters, " $^{R}_{S}E_{O_{T}}$ ", are fixed (Format Trailer) for this application. When data elements are combined within a two dimensional symbol, the " $^{G}_{S}$ " (ASCII/ISO 646 Decimal "29", Hex "1D") character and the appropriate Data Identifier shall be used to identify each of the combined fields.

Data Format example/concatenation of 2D codes

[)>^R_s06^G_s 11K0033317 ^G_s 123456789,LM393DR,2500,14, ^R_s^Eo_T

Barcode Content	Meaning
	Header (DM ECC200 using
	data identifiers and group
$[) > {}^{R}{}_{S} 06 {}^{G}{}_{S}$	separator)
11K0033317	Sample Package ID
G S	Group Separator
123456789,LM393DR,2500,14,	String of custom records
R E S OT	Trailer (End of Text)

VII. Placement Examples

- A. Single PO and line item, single box shipment.
 - 1. Label B1 with total quantity attached to the carton itself.
 - 2. Information from Chart B1 barcoded directly on packing slip, or Label B1 accompanying packing slip with total line item quantity.



- 3. Single PO and line item, multiple box shipment. Packing slip must be attached to Box 1 of the individual line item on all multi box shipments.
 - Label B1 with individual carton quantity attached to each carton.
 - Information from Chart B1 barcoded directly on packing slip, or Label B1 accompanying packing slip with total line item quantity



4. Multiple purchase order and/or multiple line shipment.

NOTE: Only one purchase order line item is preferred per packing slip page. Packing slip must be attached to Box 1 of each individual line item or purchase order on all mixed load shipments.

- Label D1 Mixed Load attached to shipping carton.
- Information from Chart B1 barcoded on packing slip, or Label B1 accompanying packing slip with total line item quantity. One P/S for each line item is preferred.
- Cartons inside of a mixed load shipment may be labeled with either Label A1 (Product Package) or B1 (with carton quantity) dependant on the package type.

No from the first state of the f	
MIXED LOAD	
PACKAGE COUNT: WEIGHT: 1 of 2 53 UT	

- 5. Product Package or Unit Pack Labeling
 - Label A1 attached to product package itself with the exact quantity in the product package.



Companies Contributing to this Specification

Arrow Avnet Digi-Key Freescale Future KEMET Murata Newark Phoenix Contact Sager Electronics TE Connectivity TI TTI Vishay





PACKING LIST

PEACHTREE CITY, GA 302692047 (770)487-5200

SOLD TO: DISTRIBUTION CUSTOMER

1234 STREET AVE.

60069

CITY

ΙL

.

[DATE SHIPPED
	09/02/15
P	ACKING LIST NO.
	PI03100451

123-456-7890

SHIP TO:

CITY ΙL

DISTRIBUTION CUSTOMER

60069

1234 STREET AVE.

CUSTOMER PO:



CUSTOMER I	PURCHASE ORDER NO.	CUSTOMER PART NO./ITEM DESCRIPTION QUANTITY SHIPP				
1755037 P/O Line: 0373		C0603X7R1E152K030BA 30,000 C0603X7R1E152KT00NN MULTILAYER CERAMIC CAPACITORS Country Origin: JAPAN				
1 x 30,000	-	Sup.code: TCU	ЭК			
	THESE PARTS ARE CERT	TIFIED TO BE COMPLIANT WI	TH 100% OF TDK SPECIFICATIO	NS		
SHIP VIA	INLAND FREIGHT	TOTAL WEIGHT	TOTAL PACKAGES	TOTAL QUANTITY		
Truck	2 COLLECT		1	30,000		

TDK Corporation of America	PACKING SLIP				
SHIP FROM: TDK Components USA 611 Highway 74 South Peachtree City, GA 30269	SHIP TO: DISTRIBUTION (1234 STREET A\ CITY, IL 6006	CUSTOMER /ENUE 69			
(P) CUSTOMER PART: C0603X7R1	E 152K030BA	(K) CUST PO: 1755037 (4K) CUST. PO LINE: 0373	(4L) COO: JP (6D) SHIP DATE: 150918	(11K) PACKING SLIP: PI03100451 (Q) QUANTITY: 30000	

Ship From: TDK Components USA 611 Highway 74 South Peachtree City GA 30269	Ship To: DISTRIBUTION CUSTOMER 1234 STREET AVENUE CITY, IL 60069
(K) Cust PO: 1755037	(4K) Cust. PO Line: 0373
(P) Customer Part No: CO603X	7R1E152K030BA
(1P) Manufacturer Part: C0603	X7R1E152KT00NN
(11K) Packing List: PI031004	51
(Q) Quantity: 30000	(4L) COO: JP
	BOX LABEL
	Carton: 1/1
(6D) Ship Date: 20150918	ROHS = YES
COUNTRY OF ORIGIN: JAPAN	P103100451091815L6

N.