State of Ohio IT Standard

Standard Number: ITS-SYS-01	Title: **Bar Code Standards for Automated Systems used by State of Ohio Government Agencies to Inventory Tangible Personal Property**
Effective Date: September 1, 2013	**Issued By:** Stuart R. Davis, Assistant Director/State CIO Office of Information Technology Ohio Department of Administrative Services
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1.0 Purpose

The purpose of this standard is to ensure the consistent use of bar code technology as it relates to the inventory of state of Ohio assets.

2.0 Scope

Pursuant to Ohio IT Policy ITP-A.1, "Authority of the State Chief Information Officer to Establish Policy Regarding the Acquisition and Use of Computer and Telecommunications Products and Services," this state IT standard is applicable to every organized body, office, or agency established by the laws of the state for the exercise of any function of state government except for those specifically exempted.

3.0 Background

The use of bar code technology can be a cost-effective means of obtaining fast and accurate inventories so long as uniform standards are in place to insure compatibility and label uniformity across the state. In the fall of 1989, a joint committee from the Department of Administrative Services and the Office of the Auditor of State was established to address concerns of incompatible and inauditable inventory systems employing bar code technology as applied to asset tag numbers. Inventory systems of concern included Administrative Services' Asset Management System (OAKS AM) and

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the asset management systems used by some agencies in-house. The committee researched bar coding technology to determine an effective and feasible solution.

Under the auspices of Ohio Revised Code 125.16, the Office of Asset Management Services within the General Services Division of the Department of Administrative Services provides a comprehensive statewide inventory program to agencies to assist them with fulfilling statutory requirements for identifying, maintaining, reporting and certifying inventories consisting of their state owned assets. Asset Management Services provides the use of OAKS AM to agencies to assist them with their asset inventory obligations, and provides the subject matter expertise for this state IT standard as well as sponsoring its ongoing maintenance.

4.0   Standard

All systems using bar code technology to inventory tangible personal property of the state of Ohio shall be compliant with the following minimum standards. Additional recommendations are also provided where appropriate and their use is encouraged. Certain options are also provided with their use at the discretion of each agency.

4.1   Information Encoded

4.1.1   Minimum Standard. Information to be encoded in both the bar code and the associated human readable representation shall be the full asset tag number of the item. This asset tag number shall be unique to that asset. No duplicate asset tag numbers may exist for multiple items, unless they are similar items and are identified as a lot within the asset tag number suffix or identified in the inventory system using the appropriate quantity unit of measure code. The amount of a lot shall be identified in the quantity field of the asset record in the inventory system.

For users of OAKS AM, the asset tag number shall consist of ten characters. The tag number shall consist of either of the following formats:

First Example: ETX0000100

Where:

E = This character identifies the asset classification. In this example, it is tangible personal property, which includes but is not limited to equipment, furniture, furnishings, machinery and non-licensed vehicles.

TX = These two characters identify the agency or a major reporting unit of the agency. In this example, it represents the Ohio Department of Taxation. The two characters relate to OAKS AM agency/reporting unit code, known in OAKS AM hierarchy of level codes as Levels 1 & 2.

00001 = These five characters identify a sequential number that is specific to an asset. The range of sequential numbers would be from 00001 to 99999.

00 = These two characters represent the suffix. The actual suffix of "00" is used for the original asset and then incremented by one for each TPP attachment/component added to the original asset. The suffix is also used to identify building components for new building construction,

improvements and renovations. The optional characters "LT" may be used for the suffix for items inventoried as a lot.
Second Example: ETAX000100

Where:

E = This character identifies the asset classification. In this example, it is tangible personal property, which includes but is not limited to equipment, furniture, furnishings, machinery and non-licensed vehicles.

TAX = These three characters identify the agency or a major reporting unit of the agency. In this example, it represents the Ohio Department of Taxation. The three characters relate to OAKS AM agency/reporting unit code, known in OAKS AM hierarchy of level codes as Levels 1 & 2.

0001 = These four characters identify a sequential number that is specific to an asset. The range of sequential numbers would be from 0001 to 9999.

00 = These two characters represent the suffix. The actual suffix of "00" is used for the original asset and then incremented by one for each TPP attachment/component added to the original asset. The suffix is also used to identify building components for new building construction, as well as building improvements and renovations. The optional characters "LT" may be used for the suffix for items inventoried as a lot.

4.1.2   <u>Recommended</u>. None.

4.1.3   <u>Options</u>. It is optional that the asset tag number be supplemented with an eleventh character, called a check digit. The check digit is not part of the OAKS AM tag compliant number, in other words it is not key-entered or imported by a scanner into OAKS AM. The check digit is only used by a scanner terminal to minimize incorrect data entry when scanning the bar code.

The actual check digit is determined by using a formula that is appropriate for the bar code *symbology* being encoded. For example, if the symbology Code 39 is being used, then the check digit would be determined by using the Modulo 43 formula and table. (Refer to Attachment 1)

4.2   <u>Symbology</u>

4.2.1   <u>Minimum Standard</u>. Information shall be encoded in one of the following alpha/numeric symbologies:

4.2.1.1   Code 39

4.2.1.2   Code 128

4.2.1.3   Multi-row or Matrix Code (e.g. PDF-417, Code 16K, Code 49)

4.2.2   <u>Recommended</u>. It is recommended that this information be encoded in the symbology Code 39, meeting the specifications as outlined in the ANSI Print Quality Specification Guidelines.

4.2.3   <u>Options</u>. None.

4.3   <u>Bar Code Quality</u>

4.3.1   <u>Minimum Standard</u>. The bar code shall be scannable by the scanning equipment chosen for use by the agency. Scanning devices may include bar code wands, laser/laser diode scanners, and CCD scanners.

4.3.2   <u>Recommended</u>. It is recommended that bar code print quality meet the specifications of the ANSI Print Quality Guidelines using either the "traditional" method or the "new" method.

4.3.3   <u>Options</u>. Under the ANSI Print Quality Guidelines, the minimum ratio is 2.2:1. A ratio of 2:1 is acceptable if reliable scannability is maintained.

4.4   <u>Human Readable</u>

4.4.1   <u>Minimum Standard</u>. The human readable representation shall incorporate all of the information contained in the bar code representation, including the check digit if used and excluding the start/stop characters.

4.4.2   <u>Recommended</u>. It is recommended that the human readable representation be in 10-pitch OCR font, or an easily readable font, which is a minimum of 3/32" in height.

4.4.3   <u>Options</u>. None.

4.5   <u>Other Information to be Included on the Label</u>

4.5.1   <u>Minimum Standard</u>. The agency name, or a recognizable abbreviation, shall be included in the label above the bar code in a font and size that is easily read.

4.5.2   <u>Recommended</u>. It is recommended that the full agency name be printed above the bar code.

4.5.3   <u>Options</u>. Optional information includes asset description (e.g. equipment type and color) and year of acquisition of the asset.

4.6   <u>Durability of Image/Print</u>

4.6.1   <u>Minimum Standard</u>. Image and print quality shall be smear/smudge resistant under environmental conditions as established by the agency. It shall be of a sufficient quality so as not degrade over time, or as a result of exposure to changes in temperature or lighting conditions.

4.6.2   <u>Recommended</u>. It is recommended that the printing technology be either photocomposed or thermal transfer, using a fully compatible substrate/ribbon combination. The application of a mylar laminate or UV

coating is desirable if the image demonstrates smear or smudge when exposed to moisture or friction.

4.6.3   Options. Dot matrix, ink jet or laser printing may be used for on-site printing if all minimum standards of this standard are met. The application of a mylar laminate is highly recommended with dot matrix, ink jet or laser printing due to their poor performance in resisting damage by moisture or friction.

4.7   Durability/Security of Label Material

4.7.1   Minimum Standard. Labels shall be printed on a stock which is durable under environmental conditions established by the agency, and which will show if any attempt has been made to change the tag number or remove it from the asset. Labels shall be of a type that if a label comes off an asset, the label shall be unusable.

4.7.2   Recommended. It is recommended that the label material is of a destructible vinyl or "Void" type synthetic material.

4.7.3   Options. Paper label material can be used if it meets the durability requirements when covered with a separate mylar cover, and if security slits are incorporated in this mylar cover. Metal tags are suitable if, upon removal, they are so deformed as to be unusable.

4.8   Adhesion

4.8.1   Minimum Standard. Label adhesive shall be as permanent as possible when applied to a variety of surfaces such as glass, wood, Formica, plastic, and metal, under the environmental conditions as established by the agency.

4.8.2   Recommended. While pressure sensitive adhesives can be used, it is recommended that agencies consider supplemental adhesion with an epoxy-, solvent-activated, or strengthening adhesive such as Superglue.

4.8.3   Options. Agencies have the option of permanently etching the asset number into the asset to supplement the bar code label. This facilitates ease of identification in the event of label replacement.

4.9   Size/Color/Placement

4.9.1   Minimum Standard. The label shall be of a size, color, and placement location that is as inconspicuous as possible in daily use of the asset.

4.9.2   Recommended. It is recommended that the color of the label be consistent with the asset to which it is being applied. For example, white labels can be used for computer equipment and light-colored office furniture. Woodgrain labels can be used for dark furniture and equipment. It is also desired that agencies establish location guidelines that facilitate consistent placement.

4.9.3   Options. Agencies have the option of placing two bar codes on each asset--one in a spot which is fairly accessible for scanning purposes, and one which is fairly inaccessible to serve as a back up.

4.10   Equipment/Label/Media Selection

4.10.1   Minimum Standard. Agencies shall ensure that labels, equipment and media conform to the specifications provided in this standard and their specific agency requirements.

4.10.2   Recommended. It is recommended that any state agency purchasing preprinted bar code labels or bar code generation equipment and media have the vendor certify that the preprinted labels or the equipment and media to be used to produce bar code labels meet the minimum/recommended standards in this standard.

Additionally, samples of printed bar code labels can be sent to Asset Management Services prior to purchase. Such samples will be reviewed for bar code quality and label construction appropriateness. The reviewer will respond to the requesting agency within 21 working days of sample submittal.

Any state agency purchasing preprinted labels or label generation equipment and media are encouraged to conduct their own tests to validate the appropriateness of the items being purchased. This includes, but is not limited to, testing the labels under a variety of environmental conditions, and verification to ANSI standards with a bar code verifier. Agencies establish location guidelines that facilitate consistent placement.

4.10.3   Options. None.

5.0   References

5.1   Ohio IT Policy ITP-A.1, "Authority of the State Chief Information Officer to Establish Policy Regarding the Acquisition and Use of Computer and Telecommunications Products and Services," defines the authority of the state CIO to establish State of Ohio IT standards as they relate to the acquisition and use of information technology by state agencies, including, but not limited to, hardware, software, technology services and security.

5.2   Section 125.16 of the Ohio Revised Code requires that state agencies maintain and annually certify their updated inventory activities of tangible personal property and real property in accordance with guidelines and procedures established by the Department of Administrative Services. This statute permits Administrative Services to establish uniform methods of identifying state property.

5.3   Section 126.21 of the Ohio Revised Code requires that state agencies report their capital ("fixed") asset financial activity to the Office of Budget and Management each fiscal year.

5.4   A glossary of terms found in this standard is located in Section 8.0 – Definitions. The first occurrence of a defined term is in ***bold italics***.

6.0 Related Resources

Document Name
State of Ohio Asset Management Policies and Procedures Web site at: http://das.ohio.gov/Divisions/GeneralServices/AssetManagementServices.aspx

7.0 Revision History

Date	Description of Change
07/01/1996	Original Policy.
07/02/2001	This Policy revises and replaces OPP-003 issued July 1, 1996.
12/15/2006	This Standard revises and replaces ITP-E.3 issued July 2, 2001.
09/01/2013	This Standard replaces FAMS with OAKS AM
09/01/2016	Scheduled standards review

8.0 Definitions

8.1 <u>Symbology</u>. A barcode symbology defines the technical details of a particular type of barcode: the width of the bars, character set, method of encoding, checksum specifications, etc.

9.0 Inquiries

For information regarding the state of Ohio's Asset Management Services, please contact:

       Asset Management Services
       General Services Administration Division
       Ohio Department of Administrative Services
       4200 Surface Road
       Columbus, Ohio 43228-1395

       Telephone: 614.752.0076
       Email: Fred.Zabonik@das.ohio.gov

For information regarding this or any state IT standard, please contact:

       State IT Standards Manager
       Enterprise IT Architecture & Policy
       Office of Information Technology
       Ohio Department of Administrative Services
       30 E. Broad Street, 39th Floor
       Columbus, Ohio 43215

       Telephone: 614.466.6930
       Email: DAS.State.IT.Standards.Manager@das.ohio.gov

       State of Ohio IT Standards can be found online at:
       http://das.ohio.gov/Divisions/InformationTechnology/StateofOhioITStandards.aspx

10.0   Attachments

10.1   <u>Attachment 1:</u> *Modulo 43 Check Digit*. This attachment provides a Modulo 43 Check Digit Form that will assist in calculating the appropriate check digit for asset tag numbers.

Attachment 1
Modulo 43 Check Digit

General Instructions.

Upon receiving bar coded labels from a vendor, check a sample of the labels for correct Modulo 43 check digits. The following table of Modulo 43 characters is used with the symbology Code 39. Use this formula and table that follow to calculate the Modulo 43 check digit for your asset tag numbers:

Formula.

1. Refer to the table to determine the character value for each data character in the asset tag number.

2. Sum all of the character values.

3. Divide the sum from step (2) by 43. The check digit is the character corresponding to the value of the remainder.

4. Compare the check character from the table to the check character printed on the bar code label.

Table.

CODE 39 CHARACTER VALUES FOR CHECK DIGIT COMPUTATION

Character	Character Value	Character	Character Value
0	0	M	22
1	1	N	23
2	2	O	24
3	3	P	25
4	4	Q	26
5	5	R	27
6	6	S	28
7	7	T	29
8	8	U	30
9	9	V	31
A	10	W	32
B	11	X	33
C	12	Y	34
D	13	Z	35
E	14	-	36
F	15	.	37
G	16	space	38
H	17	$	39
I	18	/	40
J	19	+	41
K	20	%	42
L	21		

Examples.

For example, consider the asset tag number "ETX0567800". The sum of the character values would be 14 + 29 + 33 + 0 + 5 + 6 + 7 + 8 + 0 + 0 = 102. After dividing 102 by 43, the quotient is 2 and the remainder is 16. The character whose value is 16 is the check digit, which is "**G**". Therefore ETX0567800G would be the asset tag number with the check digit.

Another example, consider the asset number "EFA0000100". The sum of the character values would be 14 + 15 + 10 + 0 + 0 + 0 + 0 + 1 + 0 + 0 = 40. The sum of 40 is smaller than 43, therefore 40 is considered the remainder. The character whose value is 40 is "**/**". Therefore EFA0000100/ would the asset tag number with the check digit.