

BAR CODE SCANNING IMPLEMENTATION – Considerations

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When implementing AIDC (Automatic Identification and Data Collection) systems that utilize bar code scanning it is important to consider not only the “printing/marking” of the symbol but also the “scanner” systems that will be used to read the bar code symbol.

For the purpose of this discussion paper, **printing/marking** means the creation of the bar code symbol and its application on the item being identified. This can be via source printing on an item’s packaging or printing on a label that is post-applied to the item. Similarly for use in this document, **scanner** means any bar code reading device such as a traditional linear scanner or a camera-based imager as well as different form factors including hand held, fixed mount, wireless, etc. **Scanning** means the process to acquire, decode, and output the data found within the bar code symbol.

Overall, the specific final AIDC “use case” and its needs... how the bar code symbols and their reading devices will be operationally and physically used... is of ultimate concern and must be taken into account when determining printing/marking processes and selecting scanning equipment. Consideration of the concepts & details noted below for these two inter-dependent areas will help ensure a successful data collection system:

Printing / Marking	Topic	Consideration
<i>Data Carrier</i>	Use Case Assessment	<p>Are there regional or global standards that cover the use case?</p> <p>Are there other trading partner requirements that would affect the data carrier and orienting/marking?</p> <p>What space is available on the packing for the data carrier (bar code symbol) and its Human Readable Interpretation (HRI)?</p> <p>Can the data carrier be printed directly on the package (pre-print or in-line during packaging) or is a label (print & apply) more practical?</p> <p>Is Direct Part Marking a requirement?</p> <p>What “life cycle” or “life expectancy is needed for the data carrier (at what point(s) in the “life cycle” of the overall process will the data carrier need to be readable)</p>
	Data Carrier	<p>Are there regional or global standards that cover the user case and are to be followed that indicate the data carrier (bar code symbology) choice(s)?</p> <p>If not has an appropriate data carrier been chosen based upon the use case?</p> <p>Is the size of the symbol elements and the symbol itself specified in the standard for the user case?</p> <p>If not are those chosen appropriate for the use case based upon available space?</p>
	Data Format & Quantity (Encoding & Integrity)	<p>Can pre- or post-use data format verification tests be performed to GS1 standards (does it meet the GS1 Rules for data element use)?</p> <p>Ensure that the decoded data, the right information for intended use.</p> <p>Ensure that the information decoded by the scanner was what was expected.</p>
	Data Carrier Application	<p>What is the recommended placement of the symbol and/or label carrying the symbol?</p> <p>How is the data carrier being applied (pre-print source mark, print & apply label, DPM, etc.)?</p> <p>Is there chance of “overwrap” obscuring the bar code symbol?</p>
	Verification	<p>Are there regional or global standards or regulation requirements that cover bar code data carrier quality verification?</p> <p>Can a pre or post-use ISO/IEC based print quality verification test be performed?</p> <p>Where, when & by whom can the verification be done?</p> <p>What is the aim or required minimum overall print quality grade?</p> <p>Can a pre or post-use visual or <u>non</u>-ISO/IEC inspection of the optical aspects be made?</p> <p>What observations can be manually visually made (e.g., ink/ribbon application quality, evenness, distortion, etc.)?</p> <p>Is the use case prone to physical label or symbol damage?</p>

Printing / Marking	Topic	Consideration
		Ensure that the elements/modules are not too small or too large for the scanner environment.
		Ensure any standards for bar code symbol are followed.
		Ensure that the bar code symbol overall size is not too small or too large for the scanner environment.
		Ensure that any standards for bar code symbol are followed.
		Ensure there is nothing obstructing the bar code symbol.
Scanning	Topic	Question
<i>Scanner</i>	Use Case Assessment	<p>Are there regional or global standards that cover the use case?</p> <p>Are there other trading partner requirements that would affect the scanning?</p> <p>Will the scanner need to read 2D/Matrix as well as 1D/Linear bar code symbols?</p> <p>Will the scanner be used in a single limited are and/or location, directly connected to a computer... or is portable, remote or untethered use needed?</p> <p>Does the scanner need to be able to read and store symbol decodes in a batch "untethered" mode for later download?</p> <p>If batch mode, how much data must the unit be able to store in-between downloads / syncing?</p> <p>If batch mode if required does the scanner need a display or keypad?</p> <p>If untethered what operational (battery life) between charges is needed?</p> <p>Does the scanner need additional computing capabilities (i.e. as a portable data terminal)?</p> <p>Will the scanner be subjected to a harsh environment (moisture, heat, dust, cleaning solutions, etc.)?</p> <p>What range of symbol sizes will the scanner have to read and at what distances, angles, etc.?</p> <p>Are there user related size constraints such as if a hand held scanner the size of the handle / grip, the weight of the device?</p> <p>Is local versus remote support required?</p> <p>Is training a consideration (e.g., proper scanner configuration / connection / use, which symbol to scan, what visually found issues to look for, etc.)?</p> <p>Any other known use considerations?</p>
	Scanner Selection	<p>Any scanner selected should meet the use case needs.</p> <p>If not all can be met, which needs may be sacrificed or worked around?</p> <p>Ensure that the features and capabilities of the scanner match the use environment (e.g., is it designed to read two-dimensional, DataMatrix symbols, is it designed to read very small symbols, etc.)?</p> <p>Ensure the optical specifications match the range of element and symbol sizes as either indicated by the appropriate standard or as the result of the symbol size selection based upon use case?</p> <p>The scanner optical capabilities must be matched to the use case and bar code symbols.</p> <p>Do the interface & communication specifications match the use case needs (corded vs. cordless, wireless protocols, USB, RS-232, etc.)?</p> <p>Are the scanners field configurable for the use case?</p> <p>Are the scanners field upgradable?</p> <p>What factory versus user selectable configuration options are available?</p> <p>What are the scanner maintenance requirements?</p>

Considering the above areas of note can lead to questions and at times a seemingly overwhelming mix of information. However there is help readily available. Training and assistance can come from "solution providers" such as AIDC consultants, AIDC VAR's (Value Added Resellers), bar code print quality verifier manufacturers and organizations such as GS1 and the GS1 Member Organizations. In fact one of the prime responsibilities and services of a GS1 Member Organization is to provide customer service in the form of education and technical support.