



# Standard Terminology Relating to Automatic Identification Hard Copy Printing Systems<sup>1</sup>

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## 1. Scope

1.1 The definitions in this terminology are those that relate directly or indirectly to business imaging hard copy printing used in automatic data-capture systems and the measurement of the quality thereof.

## 2. Referenced Documents

### 2.1 ANSI Standard:

ANSI X3.182 Guideline for Bar Code Print Quality

## 3. Terminology

### 3.1 Definitions:

*2D matrix symbols*—see **matrix symbols**.

*2D stacked symbols*—see **multi-row symbols**.

**2D (two-dimensional) symbol**, *n*—a machine-readable symbol that must be examined both vertically and horizontally to read the entire message. Two-dimensional symbols may be of two types: matrix symbols and multi-row symbols.

**achieved width**, *n*—the calculated bar or other element width based on measurements.

**AIAG**, *n*—an abbreviation for the Automotive Industry Action Group; a standards body composed of representatives from the U.S. automobile industry responsible for the development of a common automotive industry standard relating to symbol technologies and Electronic Data Interchange (EDI).

**AIM**, *n*—an acronym for the Automatic Identification Manufacturers; a trade association of automatic identification suppliers.

**angle of incidence**, *n*—the angle between an incident ray and the normal to a surface at the point of contact. When

referring to a scanner reading a printed symbol, the angle between the light source scanner beam and the symbol position.

**aspect ratio**, *n*—*in a bar code symbol*, the ratio of bar height to symbol length.

**autodiscrimination**, *n*—the ability of a symbol reader to automatically recognize and decode multiple symbologies.

**bar**, *n*—one of two types of elements comprising a bar code symbol. An element of a bar code symbol whose reflectance is less than the Global Threshold.

**bar code**, *n*—an array of parallel rectangular marks and spaces in a predetermined pattern.

**bar code density**, *n*—the number of characters that can be represented in a lineal inch. (See **symbol density**).

**bar code label**, *n*—an adhesive-backed carrier bearing printed bar code information suitable for affixing to an apparatus, equipment, or container surface.

*bar code reader*—see **bar code scanner**.

**bar code scanner**, *n*—a device used to identify and decode a bar code symbol.

**bar code symbol**, *n*—an array of rectangular bars and spaces, arranged in a predetermined pattern, following specific rules that represent elements of data referred to as characters.

DISCUSSION—Typical bar code symbols contain a leading quiet zone, start character, data characters, check characters (if any), stop character and a trailing quiet zone. Examples are: UPC code, Code 11, Code 39, Code 128, 2 of 5 code and Codabar.

**bar height**, *n*—the dimension of a symbol element perpendicular to its width.

**bar reflectance** ( $R_b$ ), *n*—the smallest reflectance value in a bar.

**bar width**, *n*—the thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same bar.

**bar width ratio**, *n*—*in symbologies having two widths*, the ratio of the widest to the narrowest width within the bar code symbol. (See also **wide to narrow ratio**.)

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- bar width reduction**, *n*—a diminution of the nominal bar width dimension on film masters or printing plates to compensate for systematic errors in some printing processes.
- base side**, *adj*—when referring to a film master, the nonimage bearing side (See also the reverse, **emulsion side**.)
- bearer bars**, *n*—solid lines that are located at the perimeter of some bar code symbols whose purpose is to reduce partial, incorrect scans and support the printing plate. Bearer bars do not contain information.
- bi-directional**, *adj*—in reference to bar codes, symbologies that may be decoded whether scanned in one direction or the reverse direction.
- charge coupled device**, CCD, *n*—an array (linear or matrix) of transductive elements wherein packets of electrons are set in each element as a result of the quantity of light received during an exposure interval, and where these packets are recovered from the array in the form of a pulse height-modulated electric signal.
- characters**, *n*—in bar code symbols, the smallest group of elements that represent one or more numbers, letters, punctuation marks or other information.
- character set**, *n*—those characters available for encodation in a particular automatic identification technology.
- check character**, *n*—a calculated character included within a symbol whose value is used to perform a mathematical check of the accuracy of the decoded data.
- clear area**, *n*—a space containing no dark marks, which precedes the start character of a symbol and which follows the stop character. Also, the region of a document reserved for OCR characters and the required unmarked space around these characters. (See also **quiet zone**.)
- code density**, *n*—the number of characters that can appear per unit of length, usually expressed as characters per inch (cpi).
- code medium**, *n*—the material used to construct a machine-readable code; such materials may be retroreflective, luminescent, magnetic, opaque, transponder or conductive.
- code set**, *n*—the specific assignment of data characters to symbol characters.
- code word**, *n*—in reference to bar codes, an arrangement of bars and spaces used to communicate one or more data characters.
- concatenation**, *n*—the linking or chaining together of either separate items of data in a bar code symbol, or of the data contained in two or more separate bar code symbols (also referred to as “message append”).
- compliance indicator**, *n*—a specified string of three characters indicating that the message which follows conforms to the requirements of a particular standard.
- contact scanner**, *n*—a bar code reader that requires physical contact between the code medium and the scanner.
- continuous bar code**, *n*—a bar code symbology where all spaces within the symbol are parts of characters and no inter-character spaces are present.
- contrast**, *n*—the difference in reflectance between dark bars and light spaces of a bar code symbol.
- data element**, *n*—a single, atomic piece of data that cannot be subdivided and still retain any meaning.
- data identifier**, DI, *n*—a specified character, or string of characters, that define the intended use of the data elements that follow.
- decoder**, *n*—as part of the two-dimensional symbol and linear bar code reading systems, the electronic package that receives the signals from the scanner, executes the algorithm to interpret the signals into meaningful data, and acts as the interface to other devices.
- delta code**, *n*—in encoding information in a one-dimensional medium, intervals that are subdivided into modules that are assigned values of “1” or “0” where “1s” are bars and “0s” are spaces. Examples are UPC, Code 128, Code 93 and Code 49.
- density**, *n*—in printed symbologies, the number of data characters that can be contained in a given unit of measure. Linear bar code density is expressed in characters per inch (CPI) and two-dimensional symbol density is expressed in characters per square inch (CPSI).
- depth of field**, *n*—in bar code reading, the difference between the minimum and maximum distance from the aperture of the reader to the symbol throughout which the bar code can be accurately interpreted.
- diagnostic verifier**, *n*—a device that automatically evaluates the quality of a film master or a printed code by comparing the observed information to a standard for the printed symbol.
- diffuse reflection**, *n*—the component of reflected light that emanates uniformly in all directions from the reflecting surface.
- dirt**, *n*—when referenced for scanning purposes, the presence of non-reflective foreign particles embedded in a substrate.
- discrete bar code**, *n*—a bar code symbol in which the intercharacter space is not part of the code and is allowed to vary dimensionally within wider tolerances than those specified for bars and spaces. An example would be Code 39.
- EAN International**, *n*—abbreviation for the (European) International Article Numbering Association.
- EAN symbology**, *n*—symbologies specified by the International Article Numbering Association, EAN International.
- edge contrast**, EC, *n*—the difference between the space reflectance ( $R_s$ ) and the adjoining bar reflectance ( $R_b$ ) as calculated by the equation:  $EC = R_s - R_b$ .
- edge-to-edge symbologies**, *n*—a bar code scheme that can be decoded using edge-to-similar-edge measurements, such as from the start of one bar to the start of another or from the end of one bar to the end of another. Examples are Code 93, Code 128, Code 49 and Code 16K.
- Electronic Industries Association**, EIA, *n*—an abbreviation for a standards organization in the United States specializing in the electrical and functional characteristics of interface equipment.
- electronic data interchange**, EDI, *n*—the communication of data between business trading partners accomplished in a standard format and syntax.
- element**, *n*—in coded symbologies, a single bar or space in linear or stacked configurations or a single cell in matrix (2-D) configurations.

**element edge, *n***—the location where the scan reflectance profile intersects the midpoint between the space reflectance ( $R_s$ ) and bar reflectance ( $R_b$ ) of adjoining elements.

**element width, *n***—the thickness of an element measured from the leading edge of an element to the trailing edge of the same element. (See **X dimension**.)

**emulsion side, *n***—the image-bearing side of a film master. (See also the opposite **base side**.)

**erasure correction, *n***—a use of error correction characters to correct data errors that have unknown locations.

DISCUSSION—Only one error correction character is required to correct each erasure.

**error correction, *n***—use of error correction characters to locate and correct data errors that have unknown locations.

DISCUSSION—Two error correction characters are required to correct each error (one to locate the error and the second to correct the character's data).

**error correction characters, *n***—special symbol characters that are calculated mathematically from other symbol characters for the purpose of error correction, error detection or erasure correction.

**error detection, *n***—use of error correction characters to determine that the number of errors in the symbol exceeds the error correction capacity.

DISCUSSION—Error detection prevents the symbol from being decoded as erroneous data.

**error correction level, *n***—an indicator of the number of error correction characters in a symbol.

**field of view, *n***—the lineal dimension defining the length of a bar code that can be read in one scan, particularly significant in moving beam and array technologies.

**filler character, *n***—a character inserted to extend an item of data to achieve a desired length. (See also **pad character**.)

**film master, *n***—a master negative or positive film transparency of a specific bar code symbol from which a printing plate is made.

**finder patterns, *n***—a unique pattern, containing no data, that is specific to each symbology, whose purpose is to locate the symbol within the reader's field of view.

**fixed beam scanner, *n***—either a visible light or laser scanner reading in a set plane.

**fixed mount reader, *n***—a bar code reader that is mounted in a stationary fashion to intersect the plane of a bar code symbol passing before the reader. Often employed in conveyor and transport systems.

**flux, *n***—the combining of photons of light energy to create radiant power.

DISCUSSION—Luminous flux or visible light energy, ranges from 390 to 770 nm. Radiant flux encompasses all light energy in the optical spectrum—ultraviolet, visible, and infrared wavelengths.

**global threshold, *GT, n***—the reflectance level that discriminates bars from spaces in a scan reflectance profile.

DISCUSSION—The global threshold is established through the middle of a profile at a constant reflectance value. The reflectance value is

determined by dividing the symbol contrast (SC) by 2 and adding the minimum reflectance,  $R_{min}$  according to the equation:

$$GT = R_{min} + (SC/2) \quad (1)$$

**haloing, *n***—a shadow effect around the entire printed segment or around the leading edge of a printed segment caused by excessive pressure between the printing plate and the printed surface.

**hand-held scanner, *n***—a scanner held and operated by a human, thus enabling the scanner to be brought to the symbol.

**highlighting lines, *n***—*in label printing*, horizontal, thick, divider lines placed above and below the package identification building block.

**horizontal bar code, *n***—a bar code symbol presented in such a manner that its overall length dimension is parallel to the horizon; also called, **picket fence**.

**human-readable interpretation, *n***—the letters, digits or other characters associated with specific symbol characters and printed along with the linear bar code or two-dimensional symbol.

**image processing, *n***—techniques for filtering, storing and retrieving images, and for processing pictorial information by computer.

**incident irradiation, *n***—the amount of flux per unit area that is normal (perpendicular) to a surface or detector.

DISCUSSION—If the flux is not normal (not perpendicular), then the component of the angular flux is the incidence. In radiometric terms, incidence is called radiant incidence or irradiance. Irradiance ( $E_e$ ) is measured in watts per square metre using the formula  $E_e = W/m^2$ .

**ink fill-in, *n***—expansion of a mark beyond specified tolerances.

**inspection band, *n***—an area of the bar code symbol where measurements are taken spanning from 10 to 90 % of the average bar height.

**intensity, *n***—the amount of radiant or luminous flux per unit solid angle that diverges from a light source.

**intercharacter space, *n***—the space between the last bar of one character and the first bar of the next that separates two adjacent characters. Also called intercharacter gap.

**label, *n***—a piece of paper, cloth, polymer, metal, or other material affixed to something and indicating its contents, destination, or other information.

*ladder code*—See **vertical bar code**.

**laser marking, *n***—etching of data by lasers that directly mark a surface such as metal, wood, and fiberboard.

**laser scanner, *n***—an optical bar code reading device using a low energy laser light beam as its source of illumination.

**light pen, *n***—*in a bar code system*, a handheld scanning wand that is used as a contact bar code reader where the operator traverses the reader across the bar code symbol.

**light source, *n***—*for symbology readers*, light energy can be emitted in straight lines from a point source or from several points as an extended source.

DISCUSSION—Light sources for bar code reading equipment are typically infrared (900 nm peak), visible red (630 to 720 nm), and incandescent (400 to 900 nm).