Considerations for Barcodes

Application (substrate)
Depending on the substrate, ink system and bar code art orientation, bar codes may require extra bar width reduction or "cutback". This is done to compensate for "bar growth" due to ink gaining and spreading on certain applications.

Symbology (type of bar code)
There are several different types of symbologies used in the marketplace. The pages within this module contain the most common used types of codes that are applied in the label and packaging industry.

Encodation
These are the "numbers" used for the bar code. They will be encoded into the bars and spaces and there will also be "human readable" figures below the bar code.

Magnification
It is not recommended to place UPC-A, UPC-E and EAN into designs at magnifications less than 70%. Whenever possible, a full 100% code size should be used. (See Fig. 1 for 70% Mag. UPC).

Color
The best color choice for any bar code is a black code on a white background. This will produce a highly readable code for the scanner due to the contrast of the code against the background. Other Pantone colors can be used for bar codes, but must meet minimum reflectance values. Considerations must also be taken for items printing on foil and transparent substrates (these will need to be backed with white ink).

Truncation
Codes that are placed without any "truncation" or without any "cropping" to the bar code height will provide the best scan quality. Code "truncation" may be necessary within designs that have space limitations. If possible, truncation of more than 50% of the bar height should be avoided. (See Fig. 2 for bar code with truncation).

Quiet Zone
Bar codes need a "quiet zone" or "clearance" from side-to-side to ensure the scanner does not mis-read (or not scan at all) due to other artwork that may be in close proximity to the code. In most cases, the quiet zone should be .125" or 9 times the width of the narrowest bar on either side of the code.

(See Fig. 3 for Quiet Zone).
Shown below are some examples of bar code color choices and combinations that WILL scan.

**THE IDEAL COLOR FOR A BAR CODE IS A BLACK CODE AGAINST A WHITE BACKGROUND.**

Pantone colors that fall in tolerance with reflectance values can be used for bar code colors.

Bar codes can be printed over a colored background, provided that there is great contrast between the colors. Colors should be chosen carefully in these situations.

Shown below are some examples of bar code color choices and combinations that will NOT scan.

Avoid using red for bar codes.

These 3 examples are poor color choices, due to lack of contrast with the background.

Avoid using a white or "reversed" code.

This code shown below would not scan due to lack of contrast from background color.

This code shown below would not scan due to lack of contrast from background color.
MISC. INFO. / UPC / EAN

BARS AND SPACES
Shown are a UPC and a STANDARD 2 of 5. The UPC can contain information in both the width of the bars and the width of the spaces. The STANDARD 2 of 5 can only encode information in the width of the bars—all its' spaces are a fixed width. Print quality is critical in either case. For example, too much impression at press or lack of contrast due to poor color choices for the bar code can result in a code that will not scan.

START AND STOP PATTERNS
Each type of symbology has a distinct arrangement of bars and spaces which are used at the beginning and end of the code. These provide reading instructions, as well as scanning direction. Typically, the start pattern is at the “beginning” or left side of the code, and the stop pattern is at the end of the right side of the code.

BEARERS
Certain customers may want “bearers” surrounding a bar code. There should be an option in the bar code application to apply these. Follow supplied layouts to use in deciding the size of the bearers.

UPC A
Most commonly used with consumer products in U.S.A.

UPC E
Compressed version of UPC A (eliminates “extra” zeroes). Generally used on very small packaging.

EAN-13
Based on the UPC standard, implemented in Europe. EAN codes are designed for international consumer product use.

EAN 8
EAN 8 is an EAN equivalent of the UPC E code (compressed version). Generally used on very small packaging for international use.

ALL VALUES PLUGGED INTO CODES ARE “MOCK” NUMBERS
UPC and EAN codes also may include an additional supplemental code to the right of the main bar code. They are 2 or 5 digits and are typically used to encode additional information for newspapers, books or other periodicals.

Both UPC and EAN codes are bidirectional and can encode numeric information only.
Interleaved 2 of 5 codes are used primarily in the warehouse industry and also in photofinishing and for airline ticketing and baggage handling. Called “2 of 5” because 2 characters are encoded in each set of 5 bars.

**INTERLEAVED 2 OF 5 SCS (1-2-5-5-1)**

A Bookland code is an EAN-13 code with a number system of “978” that is used exclusively for books. Bookland codes may have a supplemental code (as shown).

**INTERLEAVED 2 OF 5 SCS (1-2-4-4-2-1)**

Standard 2 of 5 codes (see page 3) can only encode information in the width of the bars.

To avoid the possibility of a 2 of 5 code being “short read”, a check digit and length check is usually used.

**INTERLEAVED 2 OF 5 SCS (1-2-4-6-1)**

**INTERLEAVED 2 OF 5 SCS (3-5-5-1)**

**INTERLEAVED 2 OF 5 SCS (1-6-6-1)**
CODE 128 has the ability to encode the standard ASCII symbols, digits, and uppercase letters, and control codes.

CODE 128B has the ability to encode the standard ASCII symbols, digits, and uppercase and lowercase letters.

CODE 128C is a numeric only code, and compresses two numeric digits into each character, providing better code density.

Coupon codes are made up of a UPC with a 128 extension. Shown are all 5 formats.

UCC/EAN 128 is a numeric only code, and compresses two numeric digits into each character, providing better code density.
CODE 39 / CODABAR / PHARMACODE

*ALL VALUES PLUGGED INTO CODES ARE “MOCK” NUMBERS

CODE 39

0123456789TEST

Code 39 is a variable length code. It is self-checking. Some applications may require an extremely high level of accuracy and may call for a check digit “modulo 43 checksum”.

CODABAR

012345+

Codabar had a 16 character set (0 thru 9 and - $ : / . + )
Also needs to contain start/stop characters of (a,b,c,d).

CODABAR symbology is used in bloodbanks, photolabs, and Fedex airbills.

PHARMACODE

012345

Used in the pharmaceutical industry as a packing control system.

Code 39 or “3 of 9” (first alphanumeric symbology developed) is still widely used in non-retail environments.

Code 39 is the standard code used in the U.S. Dept. of Defense

Used in the pharmaceutical industry as a packing control system.