This document outlines the FedEx Ground bar code specifications and provides descriptions of all key components effective January 2004. The following topics are included:

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<th>Changes</th>
<th>Author</th>
<th>Effective Date</th>
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<tbody>
<tr>
<td></td>
<td>Initial document</td>
<td>Frank Patterson</td>
<td></td>
</tr>
<tr>
<td>3/01/00</td>
<td>Adds support for plain paper labels</td>
<td>Amy Anderson</td>
<td>03/01/00</td>
</tr>
<tr>
<td>1/05/01</td>
<td>R3jck Home Delivery icon change. Add software version number to label. Remove I2of5 information</td>
<td>Joe Kuhn</td>
<td>01/05/01</td>
</tr>
<tr>
<td>FY02.A</td>
<td>Clarify laser and inkjet printing requirements COD label printing added to overall specification from previous separate document. Enhance PDF417 use for Home Delivery Extend description of system type on shipping label Code 128 subset clarification for Zip bar codes</td>
<td>Joe Kuhn, Amy Anderson</td>
<td>12/01/01</td>
</tr>
<tr>
<td>FY 03</td>
<td>Page 11 Clarify the physical size of the FedEx Ground UCC/EAN 128 based on width and print type</td>
<td>Amy Black</td>
<td>12/1/02</td>
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<tr>
<td></td>
<td>Page 17 Added Element &amp; sub-element separator chart</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Page 18 Updated the Ground and Home Delivery General 2D Data Format - 01 envelope to Common Label format</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Page 19 Updated the Ground and Home Delivery General 2D Data Format - 03 envelope to Common Label format</td>
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</tr>
<tr>
<td>Page</td>
<td>Change Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Page 19</td>
<td>Added Store Number field to the 03 envelope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Page 19</td>
<td>Date Certain &amp; Home Delivery labels must contain the recipients phone number in the 2D bar code and on the label</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Page 19</td>
<td>Return manager: Change the L11 segment containing the full tracking number of the bar code to the original outbound package number to link it to the return package number.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Page 20</td>
<td>3rd Party Billing 03 Envelope L11 required segment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Page 44</td>
<td>Added the Current Shipper Print Evaluation Process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Page 46</td>
<td>Added the FedEx Ground/Home Delivery CSP Evaluation Process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Page 48</td>
<td>Added the Impact of Bar Code Quality Issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Page 49</td>
<td>Added FedEx Ground COD/ECOD Thermal &amp; Plain Paper Label Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY 04</td>
<td>Minor text changes to the document No label specification update</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SPECIFICATIONS

FedEx Ground “96” Code 128

The primary bar code used as part of the FedEx Ground bar code strategy is a Code 128 bar code designed to conform to the Latest ANSI and UCC\(^1\) standards for transportation industry bar codes. It is referred to as the “96” bar code because it always begins with a “96”.

**GENERAL**

*Code 128* is a variable length, high-density alphanumeric symbology. Three different character subsets can be used within a Code 128 bar code to more efficiently encode the data. FedEx Ground requires subset C for the “96” sortation bar code. Zip bar codes may use subset B if alpha information is encoded.

<table>
<thead>
<tr>
<th>Subset</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subset A</td>
<td>The first sub-set encodes all uppercase and ASCII control characters</td>
</tr>
<tr>
<td>Subset B</td>
<td>The second sub-set encodes all upper and lower case characters.</td>
</tr>
<tr>
<td>Subset C</td>
<td>The third sub-set encodes numeric digit pairs 00 through 99.</td>
</tr>
</tbody>
</table>

Each subset has its own advantages. For example if no alpha data is to be encoded the data density within the code can be effectively doubled by using sub-set C. Code 128 has 106 different bar and space patterns. Each pattern can have different meanings depending upon which subset is used.

---

\(^1\) ANSI = American National Standards Institute; UCC = Uniform Code Council. The primary organizations responsible for establishing industry standards.
The character in the above example can be interpreted as an “SOH” character (ASCII 64) in subset A, “a” in subset B, or the number 65 in subset C.

Code 128 also has the capability to encode four special function codes (FNC1 - FNC4). FedEx Ground uses only FNC1.

Their uses are as follows:

<table>
<thead>
<tr>
<th>Function Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNC1</td>
<td>Reserved for EAN² applications</td>
</tr>
<tr>
<td>FNC2</td>
<td>Used to instruct the bar code reader to concatenate the message in the bar code with the message in the next code.</td>
</tr>
<tr>
<td>FNC3</td>
<td>Used to instruct the bar code reader to perform a <strong>RESET</strong>. When FNC3 is encoded anywhere within a symbol any data within the symbol is discarded</td>
</tr>
<tr>
<td>FNC4</td>
<td>Remains available for use in closed system applications</td>
</tr>
</tbody>
</table>

Special start characters tell the reader which of the character sets is initially being used and three special shift characters permit changing character sets within a bar code symbol.

Code 128 also employs an internal check digit for data security. This internal check digit is calculated by the bar code printing application. Each bar code reader also reads and re-calculates this check digit as part of the decode process. The internal check digit is separate from any human readable check digit that may be employed for manual data entry accuracy, and does not become part of the data stream. For this reason code 128 is referred to as a **self-checking** code.

The **UCC/EAN Code 128** symbology is a variation of the original Code 128, and was designed primarily for use in product identification applications. The EAN/UCC 128 specification uses the same code set as Code 128, except that it does not support FNC2 - FNC4. FNC1 is used as part of the start code in the symbol. The FedEx Ground “96” bar code is a UCC/EAN Code 128 symbol.

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² EAN = European Article Numbering Association.
**DATA CONTENT:**

The data content of the FedEx Ground “96” UCC/EAN Code 128 bar code is as specified below:

<table>
<thead>
<tr>
<th>Character(s)</th>
<th>Use</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Start Character</td>
<td>Indicates start of bar code and sets character sub set to “C”.</td>
</tr>
<tr>
<td>2</td>
<td>FNC1</td>
<td>“Function 1” character identifies symbology as “UCC/EAN - 128”</td>
</tr>
<tr>
<td>3-4</td>
<td>Application Identifier</td>
<td>Two-digit number that identifies the bar code as a shipping label.</td>
</tr>
<tr>
<td>5-6</td>
<td>SCNC</td>
<td>Two digit “Serial Container Numeric Code” - “11,12,13” identifies the carrier as “FedEx Ground”.</td>
</tr>
<tr>
<td>7-9</td>
<td>Class of Service</td>
<td>Three-digit number used to identify the FedEx Ground class of service.</td>
</tr>
<tr>
<td>10-16</td>
<td>FedEx Ground Shipper ID</td>
<td>Seven-digit unique shipper identification number.</td>
</tr>
<tr>
<td>17-23</td>
<td>Package Number</td>
<td>Seven-digit package serial number.</td>
</tr>
<tr>
<td>24</td>
<td>Check Digit</td>
<td>One digit, mod-10 data field check digit.</td>
</tr>
<tr>
<td>25</td>
<td>Check Digit</td>
<td>Symbology Check Digit</td>
</tr>
<tr>
<td>26</td>
<td>Stop Character</td>
<td>Stop character - delineates the end of the bar code.</td>
</tr>
</tbody>
</table>

**Totals:**

26 Total Characters,

22 User defined Characters

**Note:** Start and Stop characters, FNC1 and Symbology Check Digit are not user definable. They should be automatically created by the bar code printing application.
The layout of the human readable text and graphics required with the FedEx Ground “96” bar code is as shown below.

Below is an example of how the FedEx Ground “96” bar code may be used in a custom, shipper-created label application. Specific label layouts will be reviewed and approved by the Bar Code Analysts at FedEx Ground.

As indicated below, the meter number, printer type, printer number (if more than one printer operates on a system), software name and version number must be shown along the bottom edge of the label. (The meter number is assigned by FedEx for company supplied shipping systems and may not be available for externally supplied systems.) Printer type shall be configurable for a given system type and the software name and version number must be sufficient to easily identify the product producing the label. Recommend the use of six-point text.

Refer to Appendix F for a complete list of class of service codes, Icons, application Identifiers and descriptive text labels.
PHYSICAL PROPERTIES:
The specified physical properties of the FedEx Ground “96” Code 128 bar code have been developed to ensure accurate readability with all bar code scanning systems in use now and in the foreseeable future. The individual components of the specification were determined as follows:

Bar / Space Width - Determined by the scanner type, depth of field and presentation speed.

X-Dimension – The width of the minimum narrow element (bar or space) is a dimensional parameter, which can be used to calculate the symbol’s actual width.

Bar / Space Tolerance - This is the amount the bars and/or spaces can vary from symbol to symbol without changing the overall print quality grade or significantly altering the size of the symbol. The tolerance is roughly equivalent to 20% of the X-dimension.

Horizontal Label Registration Tolerance – How much the different colors of ink used to print the bar code label can be out of alignment with one another. This is primarily related to multi-color offset printing.

Width - The overall width of the bar code is a result of the X-dimension and wide to narrow ratio. The width usually cannot be set independently.

Height - The overall height of the bar code was established to ensure that bar codes were not so small that they could pass between two scanners without being read. Maximum height is not significant3, as increased height only improves scan capability.

Quiet Zone - The specified Quiet Zone is a requirement taken from the Code 128 symbology specification and is equivalent to 10 times the maximum X-dimension. A 0.1-inch quiet zone shall also be applied above and below the symbol.

Human Readable Text - The human readable text is required by FedEx Ground and is used to enable an operator to manually enter the data encoded in the bar code in case of a scanner failure or label damage. Extra human readable information is also included to enable the operator to determine the class of service, any secondary service4, and origin zip code5.

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3 Up to the overall maximum allowable height.
4 COD, AutoPOD, etc.
5 Useful if the package needs to be returned to the shipper.
The important physical properties evaluated on the FedEx Ground “96” Code 128 bar code are:

**Bar Size**

X-Dimension (Narrow Bar Width)

- Minimum: 0.017"
- Maximum: 0.019"

**Horizontal Label Registration Tolerance:** ± 0.10"

**Overall Bar Code Size:**

- **THERMAL**
  - Minimum height for three standard size x dimensions of thermally printed bar codes
  - 17 mil X-dimension = 1.40" height
  - 18 mil X-dimension = 1.40" height
  - 19 mil X-dimension = 1.40" height

- **PLAIN PAPER or LASER**
  - 17 mil X-dimension = 1.50" height
  - 18 mil X-dimension = 1.50" height
  - 19 mil X-dimension = 1.50" height

**Quiet Zones:**

- 10.0 times the X-Dimension on each side (0.20")
- 0.1" On top and bottom

**Label Stock:**

- Use only white label stock. (Near infrared for direct thermal printing)

The Application Identifier, SCNC Code, and Class of Service Code should be placed below the bar code as shown.
The use of graphical icons to indicate the primary mode of transport has been discontinued.
Please refer to Appendix F for a complete list of mandatory text icons and respective class of service codes.
**Print Quality:**

The print quality specifications were developed to ensure all scanners could read the bar codes. The major print quality criteria are:

**Print Contrast Signal (PCS)** - The Print Contrast Signal values were established to ensure the bar codes would be readable at the conveyor speeds used on the FedEx Ground automated package sorters. The scanners cannot consistently read bar codes with low PCS values on the sorters, although they may read well with a hand scanner. High quality white label stock along with high quality print is required to achieve the specified PCS. (Thermal labels should be of a Near Infra Red type to support scanners operating in the 630nm to 670nm range. Labels should also exhibit stable print characteristics through exposure to varying heat and temperature conditions.)

**Decode Margin** - Decode margin is a graded measure of decodability; or how close a given scan comes to a reference decode failure. Lower margins indicate an increased susceptibility to decoding failure due to scanning errors.

**Average Bar Error** - The average bar growth in the symbol relative to its X-dimension.

**Reflectance** - Given in two parts, reflectance is a measure of the reflected laser light from the bars (dark) and spaces (light).

**Defects** - This is a graded measure of the maximum element reflectance non-uniformity due to any noise within the element due to voids, spots, or fuzzy edges.

### Print Contrast Signal

- **Minimum Print Contrast:** 90%
- **Desirable Contrast Range:** 95 - 100%
- **Symbol Contrast (min.):** 65%
- **Decode Margin (min.):** “A” grade
- **Average Bar Error (max.):** ±0.10X
- **Defects (max.):** 15%
- **Reflectance**
  - **Light:** ≥80%
  - **Dark:** ≤15%

The overall print quality must be ANSI grade “A”.
PDF-417 Two-Dimensional Symbol

An innovation introduced by FedEx Ground is the PDF-417 Two Dimensional Symbol. Use of the PDF-417 enables FedEx Ground customers to encode large amounts of data into the symbol, which will travel with the package. It is referred to as the 2D bar code.

General

**PDF-417** is a high-density two-dimensional alphanumeric bar code symbology that essentially consists of a series of stacked linear bar codes. The symbology is capable of encoding the entire 255-character ASCII data set. PDF stands for "**Portable Data File**" and the symbology can encode up to 2725 characters in a single symbol, however this is reduced by the error correction level and the application. FedEx Ground has set a limit of 350 characters. The complete PDF-417 specification provides many encoding options including data compression options, error detection and correction options, and variable size and aspect ratios.

The PDF-417 symbology was originally published by Symbol Technologies, Inc. to fill the need for higher density bar codes, and has since been released into public domain.

PDF-417 symbols consist of an array of code words.

Code words are small bar and space patterns similar to those on a standard linear bar code. The code words are grouped and stacked on one another in a specific order to produce a complete PDF symbol. An individual PDF-417 symbol consists of at least 3 rows of up to 30 code words and may contain up to 90 code words per symbol with a maximum of 928 code words per symbol. Each row contains a beginning and ending indicator to identify its location within the symbol.
The code words in a PDF-417 symbol are generated using one of the following three data compression modes. This allows more than one character to be encoded into a single code word.

1. **Extended Alphanumeric Compaction** (EXC) mode. This mode supports encoding all printable ASCII characters and can compress approximately 2 characters per code word.

2. **Binary / ASCII Plus** mode. Binary mode supports encoding the entire ASCII character set and can compress approximately 1.2 characters per code word.

3. **Numeric Compaction** mode can encode only the numeric characters 0 through 9. Numeric mode can compress approximately 3 characters per code word.

One or more modes can be used within a symbol by using special shift and latch characters to switch between modes within the symbol. Because different data compression modes can be used in different combinations, it is possible for symbols produced from the same data to appear very different. **PDF symbol printed for FedEx Ground must be 10 columns wide.**

If the symbol contains more than 300 characters, 11 columns should be used and the resultant symbol should have a rectangular, not square, shape.

PDF-417 also includes nine different levels of data security and error detection / correction. Each successively higher level offers increased data security, but adds additional overhead.

Each PDF symbol has two code words for error detection. These function similarly to check digits in standard linear bar codes. Error correction compensates for label defects and mis-decodes. There are essentially two types of errors that can occur in a bar code symbol:

1. **Erasures** - Missing or deleted code words.
2. **Mis-Deodes** - Errors that cause the reader to interpret a particular code word incorrectly.

The nine available error correction or security levels are numbered 0 through 8. Each higher security level allows for a higher number of erasures and mis-decodes to be recovered from. Note that since it takes 2 code words to recover from a mis-decode(one code word to detect the error; one to correct it) a given security level can support
half the number of mis-decodes that it can un-decoded or missing code words.

Error detection and correction is encoded into additional code words. A PDF-417 symbol can contain a maximum of 928 total code words for data and error correction combined. The additional code words associated with the error correction are referred to as overhead since they take up space within the symbol, yet they are not user-defined data.

The relationship between security level, error correction capacity and the amount of overhead (expressed in number of code words) required for each security level is outlined below:

<table>
<thead>
<tr>
<th>Security Level</th>
<th>Max. Number of Erasures</th>
<th>Max. Number of Misdecodes</th>
<th>Added Overhead (Code Words)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td>5</td>
<td>62</td>
<td>31</td>
<td>64</td>
</tr>
<tr>
<td>6</td>
<td>126</td>
<td>63</td>
<td>128</td>
</tr>
<tr>
<td>7</td>
<td>254</td>
<td>127</td>
<td>256</td>
</tr>
<tr>
<td>8</td>
<td>510</td>
<td>255</td>
<td>512</td>
</tr>
</tbody>
</table>

**FedEx Ground requires the use of security level 5 in PDF417 bar codes.**
DATA CONTENT:
The use of the PDF-417 in conjunction with the FedEx Ground label is intended to be consistent with the procedures and practices described in draft ANSI MH10.8.3; “Two Dimensional Symbols for Use with Unit Loads and Transport Packages”. The following information is a summary of these procedures and is not meant to replace or supersede the ANSI standard. It is intended as a guide for use with the FedEx Ground PDF-417 symbol. Note: Since this is written in a FedEx Ground context, some descriptions and notations are different than those in the ANSI MH10.8.3 standards document.

The data content of the FedEx Ground PDF-417 symbol is grouped into three categories:
- Mandatory transportation data.
- Optional transportation data.
- Trading Partner data.

Because PDF-417 is a 2 dimensional stacked symbology, it is not possible to illustrate the data content as with the FedEx Ground “96”Code 128 symbol.

The ANSI MH10.8.3 standard provides a clear, yet flexible structure and method for representing data. This structure is similar to the structure used by EDI.

Each symbol consists of
- A MESSAGE HEADER
  - A FORMAT HEADER
  - Formatted data
  - A FORMAT TRAILER
- A MESSAGE TRAILER

A format header and formatted data followed by a format trailer is called a FORMAT ENVELOPE. More than one format envelope may be used within a single symbol.

The mandatory and optional data fields require a minimum of 40 characters (including message overhead). Depending on the amount of data encoded in the mandatory and optional data fields, the PDF-417 symbol can contain between 151 and 310 additional characters of trading partner data and additional message overhead.

NOTE: The total number of characters in the symbol, including message overhead cannot exceed 350 characters. If the symbol contains more than 300 characters, 11 columns should be used and the resultant symbol should have a rectangular, not square, shape.
ELEMENT AND SUB-ELEMENT SEPARATORS

The ANSI MH10.8.3 standard defines the characters used as format, field, element and sub-element separators. The final character of a message is also defined. These characters are non-printing ASCII characters and must be present in the data string and encoded in the symbol. Failure to enter all formatting and separator characters will result in unusable data.

<table>
<thead>
<tr>
<th>Subset</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS</td>
<td>Decimal 28, Hex 1C</td>
</tr>
<tr>
<td>GS</td>
<td>Decimal 29, Hex 1D</td>
</tr>
<tr>
<td>RS</td>
<td>Decimal 30, Hex 1E</td>
</tr>
<tr>
<td>US</td>
<td>Decimal 31, Hex 1F</td>
</tr>
<tr>
<td>EOT</td>
<td>Decimal 04, Hex 04</td>
</tr>
</tbody>
</table>

## Ground and Home Delivery General 2D Data Format – 01 Envelope

<table>
<thead>
<tr>
<th>Description</th>
<th>Required</th>
<th>Added Overhead (Code Words)</th>
<th>Data Format</th>
<th>Maximum Data Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Header $^R_S$</td>
<td>M</td>
<td>4</td>
<td>$[ ) &gt; ^R_S$</td>
<td></td>
</tr>
<tr>
<td>Format Envelope Header (Carrier Data 01)</td>
<td>M</td>
<td>5</td>
<td>01 $^G_S$vv$^9$</td>
<td></td>
</tr>
<tr>
<td>Recipient Postal Code $^G_S$</td>
<td>M</td>
<td>1</td>
<td>(an, 5 or 6) $^G_S$</td>
<td>6</td>
</tr>
<tr>
<td>Recipient Country Code $^G_S$</td>
<td>M</td>
<td>1</td>
<td>(n, 3) $^G_S$</td>
<td>3</td>
</tr>
<tr>
<td>Class of Service (assigned by carrier) $^G_S$</td>
<td>M</td>
<td>1</td>
<td>(an, 1-3) $^G_S$</td>
<td>3</td>
</tr>
<tr>
<td>Tracking Number (assigned by carrier) $^G_S$</td>
<td>M</td>
<td>1</td>
<td>(an, 1-20) $^G_S$</td>
<td>20$^{10}$</td>
</tr>
<tr>
<td>Origin Carrier SCAC $^G_S$</td>
<td>M</td>
<td>1</td>
<td>(an, 2-4) $^G_S$</td>
<td>4</td>
</tr>
<tr>
<td>Pickup Location (carrier assigned shipper ID) $^G_S$</td>
<td>C$^{11}$</td>
<td>1</td>
<td>(an, 1-7) $^G_S$</td>
<td>7</td>
</tr>
<tr>
<td>Julian Pickup Date $^G_S$</td>
<td>O</td>
<td>1</td>
<td>(n, 3) $^G_S$</td>
<td>3</td>
</tr>
<tr>
<td>Shipment ID Number (assigned by shipper) $^G_S$</td>
<td>O</td>
<td>1</td>
<td>(an, 1-30) $^G_S$</td>
<td>30</td>
</tr>
<tr>
<td>Container n of total of x $^G_S$</td>
<td>O</td>
<td>1</td>
<td>(n, 1-4/n,1-4) $^G_S$</td>
<td>9</td>
</tr>
<tr>
<td>Weight in pounds (decimal is a character) $^G_S$</td>
<td>M</td>
<td>1</td>
<td>$(r^{12} 1-8)$ $^G_S$</td>
<td>8</td>
</tr>
<tr>
<td>Cross Match Postal Code to State (Y or N) $^G_S$</td>
<td>M</td>
<td>1</td>
<td>(a, 1) $^G_S$</td>
<td>1</td>
</tr>
<tr>
<td>Recipient Street Address Line 1 (Primary Street Address) $^G_S$</td>
<td>M</td>
<td>1</td>
<td>(an, 1-30) $^G_S$</td>
<td>30</td>
</tr>
<tr>
<td>Recipient City $^G_S$</td>
<td>M</td>
<td>1</td>
<td>(an, 1-30) $^G_S$</td>
<td>30</td>
</tr>
<tr>
<td>Recipient State/Province</td>
<td>M</td>
<td>1</td>
<td>(an, 2) $^G_S$</td>
<td></td>
</tr>
<tr>
<td>Format Separator $^R_S$</td>
<td>M</td>
<td>1</td>
<td>$^R_S$</td>
<td>2</td>
</tr>
<tr>
<td>Message Trailer $^E_O_T$</td>
<td>E</td>
<td>1</td>
<td>$^E_O_T$</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Limit postal codes in the 01 section to five-digit numeric or six characters alpha. (The plus 4 must not be part of the zip code in the 2D bar code)

---

6 $^R_S$ = Record Separator, $^G_S$ = Group Separator, $^E_O_T$ = END OF TRANSMISSION
7 Data element is either Mandatory(M), Optional(O), or Conditional(C)
8 $^a = alpha, n = numeric$
9 vv represents the two-digit version assigned by ANSI MH10.8.3. vv=96
10 FedEx Ground Tracking ID uses 15 digits; SSCC-18 uses 20 digits
11 Required if the SSCC-18 is used as the tracking number; not required if the FedEx Ground UCC/EAN 128 bar code is the tracking number
12 $r = radix floating decimal (for example, 145.05)$
## GROUND & HOME DELIVERY GENERAL 2D DATA FORMAT – 03 ENVELOPE

<table>
<thead>
<tr>
<th>Description</th>
<th>Required</th>
<th>Added Overhead Code Words</th>
<th>Data Format</th>
<th>Maximum Data Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format Envelope Header</td>
<td></td>
<td>11</td>
<td>03₀³ˢ₀ᵘˢ₀ᵥᵥᵥᵥᵥ</td>
<td></td>
</tr>
<tr>
<td>Recipient Company Name</td>
<td>M</td>
<td>6</td>
<td>N₁₀¹ˢᵗ₀ˢ⁽an, 1-30⁾₀ˢ</td>
<td>30</td>
</tr>
<tr>
<td>Recipient Additional Company Name</td>
<td>O</td>
<td>4</td>
<td>N₂₀²ˢ⁽an, 1-30⁾₀ˢ</td>
<td>30</td>
</tr>
<tr>
<td>Recipient Address Line 2 &amp; 3</td>
<td>O</td>
<td>5</td>
<td>N₃₀³ˢ⁽an, 1-30⁾₀ˢ⁽an, 1-30⁾₀ˢ</td>
<td>60</td>
</tr>
<tr>
<td>Recipient City, State, Postal Code, and Country Code</td>
<td>M</td>
<td>7</td>
<td>N₄₀²ˢ⁽an, 1-20⁾₀ˢ⁽an, 5 or 6 or 9⁾₀ˢ⁽n, 3⁾₀ˢ</td>
<td>34</td>
</tr>
<tr>
<td>Store Number</td>
<td>O</td>
<td>7</td>
<td>N₉₀²ˢ₀ᵗ₀ˢ⁽an, 1-10⁾₀ˢ</td>
<td>10</td>
</tr>
<tr>
<td>Recipient Contact Name and Phone Number</td>
<td>M</td>
<td>12</td>
<td>G₆₁₀²ˢ₀ᵈᶜ₀ˢ⁽an, 1-30⁾₀ˢ₀ᵈⁿ₀ˢ⁽n, 11 or 12⁾₀ˢ</td>
<td>40</td>
</tr>
</tbody>
</table>
| Date for Date Certain Delivery                       |          | 8                         | N₄₀¹ᵗ₀ⁿₑ₀ˢᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚᵧₚ� | 14 Required only when using Date Certain services
15 YYYY = Year, MM = Month, DD = Day
16 This is the full tracking number of the bar code to the original outbound package number to link it to the return package number.
17 CR-Customer Reference Number, IN-Invoice Number, PO- Purchase Order Number, SI-Shipment ID Number(shipper’s identifying number for shipment)
18 If the 7 digit FedEx Ground shipper number is to be billed use the billing qualifier 11 or if the 9 digit FedEx account number is to be billed then use the billing qualifier 12.

### NOTE: The recipient phone number is required to be present in the 2D bar code as well as in the human readable for Home Delivery and Date Certain Services

## RETURN MANAGER - ADDITIONAL DATA FIELDS REQUIRED IN THE 2D - 03 ENVELOPE

<table>
<thead>
<tr>
<th>Description</th>
<th>Required</th>
<th>Added Overhead Code Words</th>
<th>Data Format</th>
<th>Data Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format Envelope Header</td>
<td></td>
<td>11</td>
<td>03₀³ˢ₀ᵘˢ₀ᵥᵥᵥᵥᵥ</td>
<td></td>
</tr>
<tr>
<td>FedEx Ground full 22 digit original tracking number</td>
<td>O</td>
<td>8</td>
<td>L₁₁₀₅⁽n, 22⁾₀₅₀₈₀₅ˢ</td>
<td>22</td>
</tr>
<tr>
<td>Customer Reference Number (CR, IN, PO, &amp; SI)¹⁷₁³</td>
<td>O</td>
<td>8</td>
<td>L₁₁₀₅⁽an, 1-30⁾₀₅₀.CR₀₅ˢ</td>
<td>30</td>
</tr>
<tr>
<td>FedEx Ground Shipper number to be billed</td>
<td>M</td>
<td>8</td>
<td>L₁₁₀₅⁽n, 7 or 9⁾₀₅⁽11 or 12⁾₀₅ˢ</td>
<td>97</td>
</tr>
</tbody>
</table>

¹³ ANSI X12 version number VVVVVV=004010
¹⁴ Required only when using Date Certain services
¹⁵ YYYY = Year, MM = Month, DD = Day
¹⁶ This is the full tracking number of the bar code to the original outbound package number to link it to the return package number.
¹⁷ CR-Customer Reference Number, IN-Invoice Number, PO- Purchase Order Number, SI-Shipment ID Number(shipper’s identifying number for shipment)
¹⁸ If the 7 digit FedEx Ground shipper number is to be billed use the billing qualifier 11 or if the 9 digit FedEx account number is to be billed then use the billing qualifier 12.
The example above shows the additional 03 data that is required for Return Manager. The L11 segments may contain the FedEx Ground original outbound bar code number (22 digits) with a 08 qualifier in the first segment and the customer reference number with a CR qualifier in the second segment. SSCC-18 and twelve-digit I 2 of 5 bar codes shall not be used. Alternately the CR may be replaced with an IN, PO, or SI for invoice number, purchase order number, or shipment identifier respectively. However, only one reference field can be provided at a time. If the shipper does not require reference information, the field is not required to be present. An additional L11 segment must be supplied. This segment can contain either a seven digit Ground shipper number or a nine-digit account number. A qualifier of 11 is used with a Ground shipper number and a qualifier of 12 is used with a nine-digit account number as shown in the following examples:

Please note that service codes 836 and 842 are restricted to home return destinations and must also contain the additional 03 information for Home Delivery.

### 3rd Party Billing - Additional Data Fields Required in the 2D - 03 Envelope

<table>
<thead>
<tr>
<th>Description</th>
<th>Required</th>
<th>Added Overhead (Code Words)</th>
<th>Data Format</th>
<th>Data Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format Envelope Header</td>
<td>G</td>
<td>11</td>
<td>03GGSU VVVVV</td>
<td></td>
</tr>
<tr>
<td>FedEx Ground Shipper number to be billed</td>
<td>M</td>
<td>8</td>
<td>L11GS (n, 7 or 9) GS (11 or 12) f5</td>
<td>9</td>
</tr>
</tbody>
</table>

19 If the 7 digit FedEx Ground shipper number is to be billed use the billing qualifier 11 or if the 9 digit FedEx account number is to be billed then use the billing qualifier 12
MESSAGE HEADER

The message Header must be the first data characters in the symbol. For the FedEx Ground PDF-417 “2D” symbol the message header must be presented as [>]RS.

Where: [>] is the compliance indicator used to identify the symbol as conforming to the ANSI MH10.8.3 standard.

TRANSPORTATION (CARRIER) DATA FORMAT

The data format header for the transportation data field must immediately follow the message header and be presented as 01GSyy.

Where: 01 indicates the data follows the transportation (carrier) format.

GS is the non-printing ASCII group separator character (decimal 29, hex 1D).

yy indicates the last two digits of the year of publication of the ANSI MH10.8.3 standard being used. The current standard was published in 1996. The value for this field is therefore “96”.

There are mandatory and optional transportation data fields. Separators must delimit all fields even blank ones. No separator is used following the last field. The group separator (GS) is not used following the last field in which data is entered. Instead, a record separator immediately follows the last field (RS) character to indicate the end of the carrier data format message envelop.

MESSAGE TRAILER

The message trailer consists of a single non-printable ASCII end of transmission EOT character (decimal 04, hex 04). This character must not be used elsewhere in the symbol.

TRADING PARTNER DATA (03 AND 05 SECTIONS)

Trading Partner data can be any information that is agreed upon by trading partners (for example, purchase order number, recipient name, ANSI X12 204 data). The ANSI MH10.8.1M-2000 standard provides a wide range of options for representing data. FedEx Ground will recognize either data with UCC/EAN application identifiers (AIs) or data with ANSI x12 segment structure.

The mandatory data and optional transportation (carrier) data must be the first data format in the FedEx Ground PDF-417 symbol.

Trading partner data may follow the carrier data. If used, X12 segment 03 data should precede 05 data using UCC/EAN application identifiers.
**TRADING PARTNER DATA FORMAT**

By definition, the trading partner data may be in any format mutually agreed upon between trading partners. The ANSI MH10.8.3 standard provides a wide variety of formatting options that follow rules similar to those used in the carrier data format outlined above. Only UCC/EAN application identifier and ANSI X12 segment formats should be used within the FedEx Ground PDF-417 2D symbol.

Format Using ANSI X12 Segment Structure (03 Section):

Data may also be presented using ANSI X12 data segment syntax. Format Envelope Header: **03FSGSUSvvvrr**.

Where:  
- **03** indicates data is formatted following X12 segment syntax.  
- **FS** is the non-printing ASCII Field Separator character (decimal 28, hex 1C). The field separator is used to separate segments.  
- **GS** is the non-printing ASCII Group Separator character (decimal 29, hex 1D). The field separator is.  
- **US** is the non-printing ASCII Unit Separator character (decimal 31, hex 1F). The field separator is used to separate sub-elements.  
- **vvvrr** is the version and release number of the X12 document being used.

Format Using UCC/EAN Application Identifiers (05 Section):

---

20 For additional information on X12 data segment syntax, refer to the ANSI MH10.8.1M-200 standard
Format Envelope Header: **05GS**.

Where:  
- **05** indicates that data is formatted with UCC/EAN application identifiers.
- **GS** is the non-printing ASCII field separator character (decimal 29, hex 1D). This character is used between data fields.

**DATA LINKING**

Because the FedEx Ground PDF-417 symbol is not intended to be a stand-alone symbol, specific fields in the symbol are used to link it with the FedEx Ground “96” bar code or the UCC/EAN SSCC-18 bar code. Either of these symbols can be used for high-speed automated sortation.

When used in conjunction with the UCC/EAN SSCC-18 bar code, the SSCC-18 Vendor ID and Container ID must be encoded in the appropriate fields within the PDF-417 symbol.

In order for FedEx Ground systems to accept the proper bar code combinations, it is important to provide some indication of which symbols are present on the package. **DIFFERENT STANDARD CARRIER NUMERIC CODES** (SCNC) and **STANDARD CARRIER ALPHANUMERIC CODES** (SCAC) have been assigned to indicate if more than one symbol is required; and if so, which ones. The standard carrier codes to be used for each possible bar code combination are listed below.

<table>
<thead>
<tr>
<th>Primary Symbol</th>
<th>SCNC</th>
<th>Secondary Symbol</th>
<th>SCAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FedEx GROUND “96” Code 128</td>
<td>11</td>
<td>None</td>
<td>N/A</td>
</tr>
<tr>
<td>FedEx GROUND “96” Code 128</td>
<td>13</td>
<td>UCC/EAN-128 SSCC-18</td>
<td>N/A</td>
</tr>
<tr>
<td>FedEx Ground “96” Code 128</td>
<td>12</td>
<td>FedEx GROUND PDF-417 “2D”</td>
<td>RPSB</td>
</tr>
<tr>
<td>UCC/EAN-128 SSCC-18</td>
<td>N/A</td>
<td>FedEx GROUND PDF-417 “2D”</td>
<td>RPSC</td>
</tr>
</tbody>
</table>

Note the SCNC is used in the FedEx Ground “96” bar code. The SCAC is used in the PDF-417 “2D” symbol. Neither the SCAC nor SCNC is used in the UCC/EAN SSCC-18 bar code.
**ADDITIONAL TEXT & ICONS**

When the PDF-417 “2D” symbol is used with the UCC/EAN SSCC-18, the appropriate FedEx shipper ID must be placed as illustrated in the example below. Please note that the truck and plane icons were previously discontinued along with the air service codes.

The graphical icons are no longer supported. Refer to Appendix F for a complete revised list of the text, text icons and class of service codes. Appendix F is maintained as a separate document.

**PHYSICAL PROPERTIES:**

The specified physical properties of the FedEx Ground PDF-417 “2D” symbol have been developed to ensure accurate readability by the handheld scan guns in use now and with other bar code scanning systems that may be introduced in the future.

The individual components of the specification were determined as follows:

**Module Height / Width** – Determined by the scanner type, the specified module size was selected to ensure adequate scanner performance with raster laser type scanners.

**X-Dimension** – The width of the minimum narrow element (bar or space) is a dimensional parameter, which can be used to calculate the symbol’s actual width.

**Number of Columns** – Selected to provide a symbol with a rectangular shape overall. Rectangular symbols read better than square symbols with a raster laser scanner.

**Aspect Ratio** – A specific overall aspect ratio is not specified. The aspect ratio can vary widely from symbol to symbol depending on content. The aspect ratio selected should be as low as possible to result in a rectangular symbol.
Width – The overall width of the symbol is a result of the X and Y-dimensions, number of columns and aspect ratio. The width usually cannot be set independently.

Height – The overall height of the symbol is also a result of the X and Y-dimensions, number of columns and aspect ratio. The height usually cannot be set independently. If all other factors are held constant, the height of the symbol will vary with the data content.

Quiet Zone – The specified Quiet Zone is a requirement taken from the PDF-417 symbology specification and is equivalent to 20 times the X-dimension. A 0.1-inch quiet zone shall also be applied above and below the symbol.

Error Correction – The error correction level was chosen as a good compromise between data security and symbol size (and overhead).

The important physical properties evaluated on the FedEx Ground PDF-417 “2D” symbol are:

Module Size
X-Dimension (Module Width)
Minimum: N/A
Nominal: 0.010”
Maximum: N/A
Y-Dimension (Module Height)
Minimum: N/A
Nominal: 0.050”
Maximum: N/A

Error Correction: Level 5

Overall Bar Code Size:
Nominal Width: 2.40”

Quiet Zones: 0.04” (1mm) min.
0.1” On top and bottom

Label Stock: Use only white label stock.
(Near Infrared for direct thermal printing)
PRINT QUALITY:
The print quality specifications were developed to ensure all scanners could read the bar codes. The major print quality criteria are:

Print Contrast Signal (PCS) – The Print Contrast Signal values were established to ensure the bar codes would be readable at the conveyor speeds used on the FedEx Ground automated package sorters. The scanners cannot consistently read bar codes with low PCS values on the sorters, although they may read well with a hand scanner. High quality white label stock along with high quality print is required to achieve the specified PCS. (Thermal labels should be of a Near Infra Red type to support scanners operating in the 630nm to 670nm range. Labels should also exhibit stable print characteristics through exposure to varying heat and temperature conditions.)

ANSI X3.182 Grade – This is a graded measure of conformance to ANSI standard for PDF-417 print quality.

AIM Uniform Symbology Specification Grade – This is a graded measure of conformance to AIM\(^2\) standard for bar code print quality.

Minimum Unused Error Correction – Given as a percentage, this is a measure of

<table>
<thead>
<tr>
<th>Print Contrast Signal</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Print Contrast</td>
<td></td>
</tr>
<tr>
<td>Desirable Contrast Range</td>
<td>95 – 100%</td>
</tr>
<tr>
<td>Symbol Contrast (min.)</td>
<td>65%</td>
</tr>
<tr>
<td>ANSI X3.182 Grade</td>
<td>“A” grade</td>
</tr>
<tr>
<td>AIM Uniform Symbology</td>
<td>“A” grade</td>
</tr>
<tr>
<td>Specification Grade</td>
<td></td>
</tr>
<tr>
<td>Minimum Unused Error Correction</td>
<td>62%</td>
</tr>
</tbody>
</table>

The overall print quality must be ANSI grade “A”.
Refer to Appendix F for a complete list of the text, icons and class of service codes

\(^2\) AIM = Automatic Identification Manufacturers Association
UCC/EAN Code 128 “SSCC-18”

In an effort to provide shippers with a more convenient way of tracking their packages, FedEx Ground incorporated support for the SSCC-18 bar code into their bar code strategy.

GENERAL

The SSCC-18 is an industry standard linear bar code for container marking in the commercial, industrial, and retail sectors as determined by the Uniform Code Council (UCC). The SSCC-18 is used to identify a shipping container for both the shipper and recipient. FedEx Ground supports the use of the SSCC-18 as package identification for all systems. When properly used in conjunction with the FedEx Ground PDF-417 “2D” symbol or the “96” Code 128 bar code, the number encoded SSCC-18 becomes the package tracking identification number. The FedEx Ground PDF-417 “2D” symbol or the “96” Code 128 bar code are required to be used with the SSCC-18 to provide the transportation information not included in the SSCC-18.

Since FedEx Ground has integrated full support for the SSCC-18 into all systems, shippers will only have to maintain one reference number for their packages. That means a shipper that currently has a shipping system designed around the SSCC-18 need not modify that system for a FedEx Ground bar code.

NOTE: The SSCC-18 must always be used with a FedEx Ground bar code.

The SSCC-18 is a twenty-digit UCC/EAN Code 128 bar code. Because the application identifiers allow these codes to be identified automatically, FedEx Ground restrictions on the presence of other bar codes can be relaxed. Shippers can now have complete flexibility as to how many symbols appear on the package.

---

22 e.g. “Class of Service” code and FedEx GROUND Shipper Identification Number.
23 As long as all of the symbols conform to UCC/EAN or coordinate standards.
DATA CONTENT

The data content of the SSCC-18 bar code is illustrated below.

![SSCC-18 data structure](image)

<table>
<thead>
<tr>
<th>Position</th>
<th>18</th>
<th>17</th>
<th>16</th>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character</td>
<td>PT</td>
<td>M1</td>
<td>M2</td>
<td>M3</td>
<td>M4</td>
<td>M5</td>
<td>M6</td>
<td>M7</td>
<td>S1</td>
<td>S2</td>
<td>S3</td>
<td>S4</td>
<td>S5</td>
<td>S6</td>
<td>S7</td>
<td>S8</td>
<td>S9</td>
<td>C</td>
</tr>
</tbody>
</table>

Any 18 digit number where:

PT is a Packaging Type assigned by a particular M2-M7 using the following logic:

- 0 Indicates the shipping container is a case or a carton.
- 1 Indicates the shipping container is a pallet (larger than a case).
- 2 Indicates the shipping container is a container larger than a pallet.
- 3 Indicates the shipping container is undefined.
- 4 Indicates the shipping container is for internally defined intra-company use.
- 5-9 Reserved for future use.

M1-M7 is a unique number assigned by the company holding a particular M2-M7 to identify any one entity (for example, product, container, pallet) from another entity for 12 months or the life of the entity, whichever is longer.

C is a modulo 10 check character.

(This information is an excerpt from the UCC specification. Please refer to the current UCC specification for the most recent information on the proper use of the SSCC-18 bar code. Contact information is provided in the Reference section of this document.)
**PHYSICAL PROPERTIES:**

![Diagram of barcode structure]

**Bar Size**
- X-Dimension (Narrow Bar Width)
  - Minimum: 0.017”
  - Maximum: 0.020”

**Bar / Space Tolerance:**
- 0.20X
- ± 0.10”

**Overall Bar Code Size:**
- **THERMAL**
  - 17 mil X-dimension = 1.40” height
  - 18 mil X-dimension = 1.40” height
  - 19 mil X-dimension = 1.40” height

- **PLAIN PAPER or LASER**
  - 17 mil X-dimension = 1.50” height
  - 18 mil X-dimension = 1.50” height
  - 19 mil X-dimension = 1.50” height

**Quiet Zones:**
- 10.0X On each side (0.25”)
- 0.1” On top and bottom

**Label Stock:**
- Use only white label stock. (Near Infrared for direct thermal printing)
**Print Quality:**

The print quality specifications were developed to ensure all scanners could read the bar codes. The major print quality criteria are:

**Print Contrast Signal (PCS)** – The Print Contrast Signal values were established to ensure the bar codes would be readable at the conveyor speeds used on the FedEx Ground automated package sorters. The scanners cannot consistently read bar codes with low PCS values on the sorters, although they may read well with a hand scanner. High quality white label stock along with high quality print is required to achieve the specified PCS. (Thermal labels should be of a Near Infra Red type to support scanners operating in the 630nm to 670nm range. Labels should also exhibit stable print characteristics through exposure to varying heat and temperature conditions.)

**Decode Margin** – Decode margin is a graded measure of decodability; or how close a given scan comes to a reference decode failure. Lower margins indicate an increased susceptibility to decoding failure due to scanning errors.

**Average Bar Error** – The average bar growth in the symbol relative to its X-dimension.

**Reflectance** – Given in two parts, reflectance is a measure of the reflected laser light from the bars (dark) and spaces (light).

**Defects** – This is a graded measure of the maximum element reflectance non-uniformity due to any noise within the element due to voids, spots, or fuzzy edges.

**Print Contrast Signal**

- Minimum Print Contrast: 90%
- Desirable Contrast Range: 95 – 100%

**Symbol Contrast (min.):** 65%

**Decode Margin (min.):** “A” grade

**Average Bar Error (max.):** ±0.10X

**Defects (max.):** 15%

**Reflectance**

- Light: ≥80%
- Dark: ≤15%

The overall print quality must be ANSI grade “A”.
**FedEx Home Delivery Bar Code Labeling Requirements**

The **FedEx Home Delivery Bar Codes** follow the same format as the FedEx Ground128 (96) bar code specifications except for the “H” that is located near the ship to address and the logo will change to FedEx Home Delivery.

Refer to Appendix F for a complete list of the text, icons and class of service codes.

A large bold printed “H” must be printed using block font with a minimum font point size of 44 surrounded by a box. Ideally, the “H” should be located immediately to the left of the Ship To address. The “H” should have a minimum height of ¾ " and a minimum width of ¼". If it is not possible to print the “H” immediately to the left of the Ship To address, it may be placed elsewhere, but must be within 1" of the Ship To address. See the examples below.

Note: The icon for the Home Delivery service codes is now “HOME” and the FedEx Ground logo is replaced with “FedEx Home Delivery” as shown above.
**PLAIN PAPER LABEL BAR CODE**

The Plain Paper Label bar code follows a similar format as the FedEx Ground 128 bar code specifications except for the physical properties of the bar code. Plain paper bar codes are larger to increase readability through tape and plastic.

The layout of the human readable text and graphics required with the FedEx Ground Plain Paper “96” bar code is as shown below. See Appendices G and H.

1. Appendix G1- Basic Plain Paper Format – Portrait
2. Appendix G2- Basic Plain Paper Format – Landscape
3. Appendix G3- Basic Plain Paper Format EPDI – Portrait
4. Appendix G4- Basic Plain Paper Format EPDI – Landscape
5. Appendix H1- FedEx Home Delivery Plain Paper Format EPDI – Portrait
6. Appendix H2- FedEx Home Delivery Plain Paper Format EPDI – Landscape

This is the layout for bar codes produced by FedEx Ground for the Plain Paper product. Below are two examples of how the FedEx Ground Plain Paper “96” bar code may be created from our label application.

Refer to Appendix F for a complete list of class of service codes, Icons, application Identifiers and descriptive text labels.
**PHYSICAL PROPERTIES:**
The specified physical properties of the FedEx Ground Plain Paper “96” Code 128 bar code have been developed to ensure accurate readability with all bar code scanning systems in use now and in the foreseeable future. The individual components of the specification were determined as follows:

**Bar / Space Width** – Determined by the scanner type, depth of field and presentation speed.

**X-Dimension** – The width of the minimum narrow element (bar or space) is a dimensional parameter, which can be used to calculate the symbol’s actual width.

**Bar / Space Tolerance** – This is the amount the bars and/or spaces can vary from symbol to symbol without changing the overall print quality grade or significantly altering the size of the symbol. The tolerance is roughly equivalent to 20% of the X-dimension.

**Width** – The overall width of the bar code is a result of the X-dimension and wide to narrow ratio. The width usually cannot be set independently.

**Height** – The overall height of the bar code was established to ensure that bar codes were not so small that they could pass between two scanners without being read. Maximum height is not significant, as increased height only improves scan capability.

**Quiet Zone** – The specified Quiet Zone is a requirement taken from the Code 128 symbology specification and is equivalent to 10 times the maximum X-dimension.

**Human Readable Text** – The human readable text is required by FedEx Ground and is used to enable an operator to manually enter the data encoded in the bar code in case of a scanner failure or label damage. Extra human readable information is also included to enable the operator to determine the class of service, any secondary service, and origin zip code.

The important physical properties evaluated on the FedEx Ground “96” Code 128 bar code are:

---

24 Up to the overall maximum allowable height.
25 COD, AutoPOD, etc.
26 Useful if the package needs to be returned to the shipper.
### Bar Size

**X-Dimension (Narrow Bar Width)**
- **Minimum:** 0.017"
- **Maximum:** 0.020"

**Horizontal Label Registration Tolerance:** ± 0.10"

**Overall Bar Code Size:**
- **Minimum (WxH):** 3.25" X 1.50"
- **Maximum (WxH):** 3.34" X 1.50" (Additional height permitted)

**Paper Size (WxH):**
- **Minimum:** 8.50" X 11.00"
- **Maximum:** 8.50" x 11.00"

**Quiet Zones:**
- 10.0X On each side (0.25")
- 0.1" On top and bottom

**Label Stock:** Use only white label stock. (Near Infrared for direct thermal printing)

---

The **Application Identifier**, **SCNC Code**, and **Class of Service Code** should be placed below the bar code as shown.

Refer to **Appendix F** for a complete list of the text, abbreviations and class of service codes.
**Print Quality:**

The print quality specifications were developed to ensure all scanners could read the bar codes. The major print quality criteria are:

**Print Contrast Signal (PCS)** – The Print Contrast Signal values were established to ensure the bar codes would be readable at the conveyor speeds used on the FedEx Ground automated package sorters. The scanners cannot consistently read bar codes with low PCS values on the sorters, although they may read well with a hand scanner. High quality white label stock along with high quality print is required to achieve the specified PCS. Only pure white paper is permissible.

**Decode Margin** – Decode margin is a graded measure of decodability; or how close a given scan comes to a reference decode failure. Lower margins indicate an increased susceptibility to decoding failure due to scanning errors.

**Average Bar Error** – The average bar growth in the symbol relative to its X-dimension.

**Reflectance** – Given in two parts, reflectance is a measure of the reflected laser light from the bars (dark) and spaces (light).

**Defects** – This is a graded measure of the maximum element reflectance non-uniformity due to any noise within the element due to voids, spots, or fuzzy edges.

**Print Contrast Signal**
- Minimum Print Contrast: 90%
- Desirable Contrast Range: 95 – 100%

**Symbol Contrast (min.):** 65%

**Decode Margin (min.):** “A” grade

**Average Bar Error (max.):** ±0.10X

**Defects (max.):** 15%

**Reflectance**
- Light: ≥80%
- Dark: ≤15%

In addition, the overall print quality grade must be “A”.
SHIPPING REQUIREMENTS:
The shipping requirements were developed to ensure all scanners could read the bar codes. The major shipping requirements are:

Plain Paper – High grade pure white paper. No colors permitted.
Laser Printer – Laser printers are preferred over ink jet. Ensure proper fusion of the toner to prevent flaking
Ink jet Paper – Ink jet paper is required with an ink jet printer.
Attaching Label to Package – Plain paper labels should be attached to the package with either clear matte packaging tape or with a FedEx Domestic Pouch. The tape/pouch securely fastens the label to the package and avoids smudging and the collection of dirt on the bar code.
Tape – Any tape covering the bar codes must have a clear matte finish and be free of wrinkles. Tinted tapes are not permitted.
FedEx Domestic Pouch – The latest version of the domestic pouch is made with an improved plastic to permit better readability of bar codes. (Domestic pouch order number: 2041732172 REV 10/00)

LABEL SIZE AND ORIENTATION
Size – 8 ½ by 11 inches
Orientation – See Diagram below
CHECK DIGIT CALCULATION ALGORITHMS


Check digits are included in the human readable interpretation of the FedEx Ground code 128 bar code to prevent manual data entry errors. These check digits should not be confused with the internal code 128 symbology check digit. The symbology check digit is a required part of the code 128 symbol structure and is not counted as part of the user defined data encoded in the symbol. This check character is necessary for the bar code reader to ensure correct decode performance. And is usually calculated by the bar code printing application.

The FedEx Ground Code 128 bar code employs a weighted modulo 10 check digit for the user defined data. The algorithm used for calculating the FedEx Ground “96” Code 128 symbol’s data field check digit is the same basic algorithm used for the UCC/EAN Code 128 “00” bar code. For the sake of clarity, separate examples of the calculation are illustrated below for both the FedEx Ground “96” bar code and the SSCC-18 bar code.

For complete details on the UCC/EAN code 128 SSCC-18 check digit, contact the Uniform Code Council.

The basic check digit calculation is as follows:

- Digit positions are labeled from right to left.
- Digit 1 is the check character.
- For the FedEx Ground “96” bar code, digits 2 through 8 are the package ID number; digits 9 through 15 are the shipper ID. Digits 16 through 22 are not used in the FedEx Ground “96” check digit calculation.
- For the SSCC-18 bar code, digits 11 through 17 are the shipper ID number, digits 2 through 10 are the container serial number, and digit 18 is the container type. Digits 19 & 20 are not used in the check digit calculation.

Step 1. Starting from position 2, add up the values of the even numbered positions.

Step 2. Multiply the results of step Step 1. By three.

Step 3. Starting from position 3, add up the values of the odd numbered positions. Remember – position 1 is the check digit you are trying to calculate.

Step 4. Add the result of step Step 2. To the result of step Step 3.

Step 5. Determine the smallest number which when added to the number from Step 4. Results in a multiple of 10. This is the check digit.
The calculation process is illustrated in the example below.

**Example:**

Determine the data to be included in the check digit calculation.

<table>
<thead>
<tr>
<th>Bar Code Data</th>
<th>9 6 1 1 0 2 0</th>
<th>9 8 7 6 5 4 3 1 2 3 4 5 6 7 C</th>
</tr>
</thead>
<tbody>
<tr>
<td>96</td>
<td>UCC/EAN Application Identifier (not included)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>SCNC (not included)</td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>Class of Service (not included)</td>
<td></td>
</tr>
<tr>
<td>9876543</td>
<td>RPS SHIPPER ID INCLUDED</td>
<td></td>
</tr>
<tr>
<td>1234567</td>
<td>PACKAGE NUMBER INCLUDED</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Check Digit To be calculated</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FedEx Ground Shipper ID</th>
<th>TRACKING NUMBER</th>
<th>SHIPPER ID</th>
<th>PACKAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar Code Data</td>
<td>9 8 7 6 5 4 3</td>
<td>1 2 3 4 5 6 7 C</td>
<td></td>
</tr>
<tr>
<td>Position (Odd/Even)</td>
<td>O E O E O E O E O E O E O E O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit Position</td>
<td>15 14 13 12 11 10 9 8 7 6 5 4 3 2 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Starting with position 2, add the data digits in the even numbered positions.
   \[7 + 5 + 3 + 1 + 4 + 6 + 8 = 34\]

2. Multiply the results by three.
   \[34 \times 3 = 102\]

3. Starting with position 3, sum the odd numbered digits...
   \[6 + 4 + 2 + 3 + 5 + 7 + 9 = 36\]

4. Add the two sums together...
   \[36 + 102 = 138\]

5. Now subtract this sum from the next highest multiple of ten...
   \[140 - 138 = 2\]

The difference is the check digit.
The check digit in this case = 2.

The complete data string then is:

9611020 9876543 12345672
UCC/EAN SSCC-18 Bar Code

The calculation process for the “00” bar code is illustrated in the example below.

Given the following bar code...

(00) 0 0012345 000000002 ?

follow these steps to calculate the check digit.

1. With the SSCC-18 bar code, the last two (left most) digits are not included in the calculation.
   The number used for the calculation is:
   00012345000000002

2. As with the FedEx Ground “96” bar code, start with position 2 and add the data digits in the even numbered positions.
   0 + 0 + 2 + 4 + 0 + 0 + 0 + 0 + 2 = 8

3. Multiply the results by three.
   8 × 3 = 24

4. Starting with position 3, sum the odd numbered digits...
   0 + 1 + 3 + 5 + 0 + 0 + 0 + 0 = 9

5. Add the two sums together...
   24 + 9 = 33

6. Now subtract this sum from the next highest multiple of ten...
   40 – 33 = 7

The difference is the check digit.
   The check digit in this case = 7.

The complete data string then is:

0 00123450000000027
BAR CODED ZIP CODES

GENERAL

In order to speed the SWAK (Scan, Weigh And Key) process and reduce data entry errors, FedEx Ground developed the ability to accept the destination ZIP code encoded in a separate linear bar code. Accepts destination ZIP codes in three formats. Currently, this capability is only applicable at SWAK.

FedEx Ground accepts destination zip codes in three formats:

1. **FIVE DIGIT** – Plain Five digit number, no data identifiers or control characters.
2. **VICS** – Five-digit destination ZIP code with three-character alphanumeric data identifier.
3. **FACT** – Five-digit destination ZIP code with three-digit numeric data identifier.

The specifications for FedEx Ground bar coded destination ZIP codes is as listed below. At this time all destination ZIP codes must be five digits in length numeric or six characters alpha. FedEx Ground cannot accept three, nine or eleven digit ZIP codes. Also, Canadian postal codes can only be accepted in bar coded format at Canadian origin facilities.27

DATA CONTENT

**FIVE DIGIT**

<table>
<thead>
<tr>
<th>12345</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbology:</td>
</tr>
<tr>
<td>Total number of digits encoded:</td>
</tr>
<tr>
<td>Human Readable Text</td>
</tr>
</tbody>
</table>

**VICS**

**(52L) 12345**

| Symbology: | Code 39 |
|---|
| Number of characters encoded: | 8 |
| Human Readable Text | 24 Point |

---

27 The ability to scan Canadian Postal codes was incorporated into all Canadian SWAK systems in early 1998.
FACT

(420) 12345

Symbology: UCC/EAN

128

Total number of digits encoded:

8

Human Readable Text 24 Point

(To encode Canadian alpha postal codes, use subset B for Code 128.)

Note: All Code 128 bar codes used for sortation (“96” & “00”) shall use subset C.
**Physical Properties**

The specified physical properties of the zip code bar codes have been developed to be consistent with the physical properties of the other FedEx Ground bar codes that may be present on the same label.

The individual components of the specification were determined as follows:

**Bar / Space Width** – Determined by the scanner type, depth of field and presentation speed.

**X-Dimension** – The width of the minimum narrow element (bar or space) is a dimensional parameter, which can be used to calculate the symbol’s actual width.

**Bar / Space Tolerance** – This is the amount the bars and/or spaces can vary from symbol to symbol without changing the overall print quality grade or significantly altering the size of the symbol. The tolerance is roughly equivalent to 20% of the X-dimension.

**Wide to Narrow Ratio** – Dictated by the depth of field of the overhead scanners. Since the bar coded zip codes are currently read only with hand held scanners at SWAK, the specified wide to narrow ratio is merely set to be the same as that of the other FedEx Ground bar code(s) present on the label.

**Width** – The overall width of the bar code is a result of the X-dimension and wide to narrow ratio. The width usually cannot be set independently.

**Height** – The overall height of the bar code was established to ensure that bar codes would fit conveniently on the label.

**Quiet Zone** – The specified Quiet Zone is a requirement taken from the Code 128 and Code 39 symbology specifications and is equivalent to 10 times the maximum X-dimension.

**Human Readable Text** – The human readable text is required by FedEx Ground and is used to enable an operator to manually enter the data encoded in the bar code in case of a scanner failure or label damage.

The important physical properties evaluated on the FedEx Ground destination zip codes are:

- **Bar Size**  
  **X-Dimension (Narrow Bar Width)**  
  Minimum: 0.010"  
  Maximum: 0.020"

- **Bar Code Height:**  
  Minimum 0.50"  

- **Quiet Zone:**  
  10.0X
**Print Quality:**

The print quality specification was developed to ensure the bar coded destination zip codes were physically consistent with all other FedEx Ground bar codes.

The major print quality criteria are:

**Print Contrast Signal (PCS)** – The Print Contrast Signal values were established to ensure the bar codes would be readable at the conveyor speeds used on the FedEx Ground automated package sorters. Since the bar coded zip codes are read only at SWAK with handheld scan devices, the PCS values specified only Bar codes with low PCS values cannot be consistently read by the scanners on the sorters, although they may read well with a SWAK or STAR scanner. High quality white label stock along with high quality print is required too achieve the specified PCS.

**Decode Margin** – Decode margin is a graded measure of decodability; or how close a given scan comes to a reference decode failure. Lower margins indicate an increased susceptibility to decoding failure due to scanning errors.

**Average Bar Error** – The average bar growth in the symbol relative to its X-dimension.

**Reflectance** – Given in two parts, reflectance is a measure of the reflected laser light from the bars (dark) and spaces (light).

**Defects** – This is a graded measure of the maximum element reflectance non-uniformity due to any noise within the element due to voids, spots, or fuzzy edges.

### Print Contrast Signal
- Minimum Print Contrast: 90%
- Desirable Contrast Range: 95 – 100%
- Symbol Contrast (min.): 65%
- Decode Margin (min.): “A” grade

### Average Bar Error (max.)
- ±0.10X

### Defects (max.)
- 15%

### Reflectance
- Light: ≥80%
- Dark: ≤15%

In addition, the overall print quality grade must be ANSI grade “A”.

**BAR CODE EVALUATION PROCESS**

**OVERVIEW**

Each shipper or vendor printing a FedEx Ground bar code must have the bar code approved before they can be used on any package. This approval process is necessary to ensure the shipper gets proper service and each package can be handled correctly.

**CURRENT SHIPPER PRINTED EVALUATION PROCESS**

The current process through which FedEx Ground bar codes are approved is as follows:

1. Shipper notifies their Account Executive that they want to print their own FedEx Ground bar code labels.
3. Shipper designs preliminary bar code layout and sends, faxes or emails a copy to groundlabel@fedex.com. Bar code analysis fax number is 412-859-2490. Required is one single piece and multi-piece shipment for each service code.
4. Bar code Analysis will make modifications to the shippers layout an faxes or email recommended changes within 24-48 hours. A mocked up bar code example may accompany the email or fax to help the shipper see what changes need to be made.
5. Adjustments are usually software related at this point, moving text fields and defining the layout of the labels. This process may take several rounds before being completed. Depending on the shipper’s ability to make the changes, this process may take several days.
6. When Bar Code Analysis can find no other items that need to be adjusted based on a fax or email, it is requested of the shipper to send actual sample labels to:
   FedEx Ground
   1000 FedEx Drive
   Moon Township, PA 15108
   Attn: Bar Code Analysis
7. Shipper must submit 5 labels from each printer that will be used to produce labels for FedEx Ground. The tracking numbers should increment so that the bar codes are not all duplicates. Five samples of each service the shipper intends on using also need to be included in the samples
8. The label will be analyzed in 24–48 hours of receipt and an email stating the changes will be sent. The process of receiving labels and sending results may take several attempts depending on the shippers ability to make the requested adjustments. This process could last a few days to several weeks or months

9. Shippers may need to order new label stock, input requests for programming and/or order parts for printers before the labels will be
10. Once the labels meet all of the specifications, an email will be sent stating that the labels are approved for use in the FedEx Ground system. Accompanying this email will be a recommended package number to start the labels printing so there will not be a duplication problem.

FedEx Ground Bar Code Evaluation Process – Approval Cycle

1. Shipper notification to Account Executive wants to print own bar codes

2. Account Executive supplies shipper with bar code specifications.

3. Shipper designs preliminary bar code layout and sends, faxes or emails a copy to bar code analysis fax number is 412.859.2490. Required is one single piece and multi-piece shipment for each service code.

4. Bar Code Analysis will make modifications to the shipper’s layout and faxes or emails recommended changes within 24-48 hours. A mocked up bar code example may accompany the email or fax to help shipper see what changes need to be made.

5. Adjustments are usually software related at this point, moving text fields, and defining the layout of the labels. This process may take several rounds before being completed. Depending on the shippers ability to make changes, this process may take several days to several weeks.

6. When Bar Code Analysis can find no other items that need to be adjusted based on fax or email, it is requested of the shipper to send actual sample labels to FedEx Ground 1000FedEx Drive Moon Township, PA 15108 Attn: Bar Code Analysis
IMPACT OF BAR CODE QUALITY ON SORTATION

Overview
FedEx Ground relies on the latest technology in bar codes to sort and track packages, unlike any other small package transportation company. Packages are sorted at automated hubs at speeds in excess of 550 feet per minute. At these speeds, it is important that the bar code meet the FedEx Ground specifications so the overhead scanners can read the bar code. If the bar code cannot be read, the package is routed to the relabel area. A duplicate of the original bar code is applied to the package to ensure the package will sort properly. The package is then re-circulated through the hub sortation system.

Benefits of Quality Bar Codes
- Ensures the best possible guaranteed service
- Provides real time information regarding the status of shipments
- Ensures data capture is accurate and complete
- Minimizes handling of packages which in turn reduces claims
- Improved shipment integrity
- Ensures accurate billing

Why Relabels Occur
If a package is not labeled properly, it will potentially need to be relabeled. There are three major contributing factors that cause packages to be relabeled: bar code placement, damaged bar code and poor quality bar code.

Bar code Placement
Bar codes should never be placed in the following places:
- Under straps
- Over an edge/corner/seam
- Placed on the small end

Damaged Bar Code
If a label is damaged because it is ripped, torn, wrinkled, wet or soiled, the package will have to be re-labeled.

Poor Quality Bar Code
The quality of a FedEx Ground bar code plays a significant role. If the quality of the bar code is poor, it cannot be read by the sortation scanners and will need to be relabeled. The following are typical bar code quality problems:
- Print head problems or Split Bars
- Faded or Voids in the Print
- Incorrect data content
- Quiet zone too small
- Smudged bar code
- Toner fusion problem
- Wrinkle in the print
- Duplicate package numbers
- Print contrast too low (It must be 90% or higher.)

Plastic Covering Bar Code
- Under tape
- Under plastic

Keys to Success
- Ensure that the front line parcel processing operator understands the importance of maintaining bar code quality
- Be proactive in solving bar code quality issues
- Work with FedEx Ground for help in resolving of bar code quality issues
- Establish preventative maintenance programs on labeling system
APPENDIX C - C.O.D./E.C.O.D. THERMAL & PLAIN PAPER
LABEL REQUIREMENTS

The FedEx Ground thermal and plain paper labels for C.O.D. and Electronic C.O.D. follow the same format as the FedEx Ground 128 bar code specifications. In addition to printing the shipping label and meeting the requirements as stated in the “FedEx Ground Bar Code & Label Layout Specification,” customers who plan to produce the FedEx Ground C.O.D./E.C.O.D. labels must also incorporate the following:

Two duplicate C.O.D./E.C.O.D. labels will print following the FedEx Ground shipping label. **The C.O.D./E.C.O.D. labels will not be affixed to the package, but placed inside a pouch provided by FedEx Ground (OP-013POUCH). The pouch will then be adhered to the outer packaging.** The FedEx Ground PDF-417 symbol will stand alone on labels two and three. Information to be included in the stand-alone PDF-417 (2D) bar code on the two subsequent C.O.D./E.C.O.D. labels should duplicate the information included in the PDF-417 imprinted on the tracking label. The C.O.D. amount to be collected will also be printed on labels two and three. The doc tab on the bottom of the label will serve as a return address label for regular C.O.D. shipments and will serve as a reminder to not mail, but deposit funds for Electronic C.O.D. shipments.

See the examples listed below:

**Sample:** C.O.D. regular

**Sample:** Electronic C.O.D. – Guaranteed Funds

*Labels are not shown in actual size.*
Electronic C.O.D. Thermal Label Format

- **16 POINT BOLD TEXT**
  - Deposit Check
  - DO NOT MAIL

- **14 POINT BOLD TEXT**
  - Recipient: Customer Inc.
  - Attn: Valued Customer
  - Address Line 1
  - Address Line 2
  - Memphis, TN 38115

- **12 POINT TEXT**
  - Original Tracking ID: 9612439012345612345671
  - Reference # 012345678901234567890123456789
  - C.O.D. Amount: $500.00

- **24 POINT BOLD TEXT**
  - GUARANTEED FUNDS!
  - FedEx Ground
  - TR v2.0 2443 12/00

- **16 POINT TEXT**
  - Deposit Check - DO NOT MAIL

- **12 POINT TEXT**
  - **24 POINT BOLD TEXT**

---

Note: Label not shown to actual size. Layout is to fit on a 4" x 6" label stock with additional dock tab.

Track ID is the original FedEx Ground bar code number. ("96" or "00")
Reference # is limited to thirty (30) characters.
**C.O.D. THERMAL LABEL FORMAT**

**Mail Check To:**
Good Customer
1000 FedEx Drive
Suite 1
Pittsburgh, PA 15108

**Recipient:**
Customer Inc.
Attn: Valued Customer
Address Line 1
Address Line 2
Memphis, TN 38115

Original Tracking ID: 9612409012345612345671
Reference # 012345678901234567890123456789
C.O.D. Amount: $500.00

**CURRENCY ONLY!**

FedEx
Ground
TR v2.0 2443 12/00

Good Customer
1000 FedEx Drive
Suite 1
Pittsburgh, PA 15108

Note: Label not shown to size. Layout is to fit on a 4" x 6" label stock with additional dock tab.

Track ID is the original FedEx Ground bar code number. ("96" or "00")
Reference # is limited to thirty (30) characters

**NOTE:** If the doc tab is not present then the return address at the bottom of the labels needs to shift up so that the full address appears on the label. The address will be able to be cut off and used as an address label for the envelope to mail the C.O.D check back to the shipper.
Note: Label not shown to size. Layout is to fit on a half sheet of white paper. (51/2" x 81/2")
Track ID is the original FedEx Ground bar code number. ("96" or "00")
Reference # is limited to thirty (30) characters
ELECTRONIC C.O.D. PLAIN PAPER LABEL FORMAT

Please fold this document in half and place both C.O.D. tags behind the original shipping label in the waybill pouch affixed to the outside shipping container. **WARNING:** Use only the printed original label for shipping. Using a photocopy of the label for shipping purposes is fraudulent and can result in additional billing charges, along with the cancellation of your metric account number.

**Deposit Check**

DO NOT MAIL

**Electronic C.O.D.**

GUARANTEED FUNDS!

C.O.D. Amount: $500.00 USD

Original Tracking ID: 96124390123, 4612345671

Reference # 01234567890123456789

FedEx Ground

Note: Label not shown to size. Layout is to fit on a half sheet of white paper. (51/2” x 81/2”)

Track ID is the original FedEx Ground bar code number. (“96” or “00”)

Reference # is limited to thirty (30) characters

Refer to the PDF-417 specification in this guide.
APPENDIX F – ACTIVE SERVICE CODE LIST

Please refer to the latest external Appendix F document for the most recent information on service codes and associated text fields.
http://grd.fedex.com/online/mcode/mcode.htm

Select View Appendix F – this document will need downloaded to your computer prior to viewing.
APPENDIX G – FedEx Ground Plain Paper Formats

APPENDIX G1- Basic Plain Paper Format – Portrait

Note: Label not shown to actual size

BASIC PLAIN PAPER FORMAT

- Quiet Zone – White space before and after the bars of all of the bar codes must be .20 inches wide

- 12 Point Bold Text
- 10 Point Text
- 4 Lines at 30 Characters Each

- 24 Point Bold Text
- 12 Point Text for “Ship To Code (420)”

- 10 Mil X Dimension
  - 0.50 Inches Tall

- 10 Mil X Dimension
  - 35 Character Field

- 12 Point Text for Ship Date/Weight/Dept. #/Invoice #/Reference #/AND PO # Fields
- Invoice #
- Reference #
- PO #

- 24 Point Bold Text
  - See Appendix F

- GND Prepaid

- 18 Point Text for the Service Code/Text 2 & Text 3
- See Appendix F
APPENDIX G2- BASIC PLAIN PAPER FORMAT – LANDSCAPE

Note: Label not shown to actual size

BASIC PLAIN PAPER FORMAT

- QUIET ZONE – WHITE SPACE BEFORE AND AFTER THE BARS OF ALL OF THE BAR CODES MUST BE 6.20 INCHES WIDE AND ABOVE AND BELOW THE BARS MUST BE A TENTH OF AN INCH

- 12 POINT TEXT FOR "SHIP TO CODE (420)"
- 12 POINT BOLD TEXT
- 10 POINT TEXT
  - 4 LINES AT 30 CHARACTERS EACH
- 14 POINT BOLD TEXT
  - 5 LINES AT 30 CHARACTERS EACH
- 10 POINT TEXT FOR COUNTRY AND PHONE NUMBER
- 10 MIL X DIMENSION
- 50 MIL Y DIMENSION
  - UP TO 350 CHARACTERS
- WEIGHT – ONLY ONE DECIMAL POINT
- 10 MIL X DIMENSION
  - 0.50 INCHES TALL
  - 35 CHARACTER FIELD

- SHIP FROM: Goodtree Industries
  - 118 Whisper St
  - Pittsburgh, PA 15225

- SHIP TO:
  - CUSTOMER INC.
  - ATTN: VALUED CUSTOMER
  - 2936 CUSTOMER AVE
  - DAYTON, OH 45459
  - Country: United States
  - Phone: (412) 555-5555

- 24 POINT BOLD TEXT
  - SEE APPENDIX F
- 10 MIL X DIMENSION
  - 0.50 INCHES TALL
- 19 MIL X DIMENSION
  - (+1/4)
  - 1.50 INCHES TALL
- 12 POINT TEXT
- 24 POINT BOLD TEXT
- 9 POINT TEXT
- DEPT # 10 CHARACTER FIELD
- 12 POINT TEXT FOR SHIP DATE, WEIGHT/DEPT, INV#VOICE, REFERENCE # AND PO # FIELDS
- INVOICE #/REFERENCE # AND PO # 35 CHARACTER FIELD
- 12 POINT TEXT

- GND Prepaid
- FedEx
- 019
- (9612019) 049319033301817

- Ship Date: 02/08/2000
- Weight: 24.5 lbs
- Dept. # 1234567890
- Invoice # 12345678901234567890123456789
- Reference # 12345678901234567890123456789
- PO # 12345678901234567890123456789

- Order # ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890

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APPENDIX G3 - BASIC PLAIN PAPER FORMAT EPDI - PORTRAIT

Note: Label not shown to actual size

BASIC PLAIN PAPER FORMAT EPDI

- Quiet zone - white space before and after the bars of all of the bar codes must be 0.20 inches wide

1. 12 point bold text
2. 10 point text
3. 4 lines at 30 characters each
4. 24 point bold text
5. 12 point text for "ship to code (420)"
6. 10 mil x dimension
   0.50 inches tall
7. 10 mil x dimension
   0.50 inches tall
   35 character field
8. 12 point text for ship date/weight/dept/
   #/invoice/#/reference/#/and
   po #: fields
9. 24 point bold text
10. see appendix f
11. text 1 field
12. 18 point text
13. see appendix f
14. 8 point text
15. in reverse print
directly below human
readable service information
across the whole label
16. 18 point text for the
service code/text 2 &
text 3
17. see appendix f
18. 14 point bold text
19. 5 lines at 30 characters each
20. 10 point text for country and
   phone number
21. 10 mil x dimension
22. 50 mil y dimension
23. up to 350 characters
24. 12 point text
25. dept # 10
   character field
26. weight - only one
decimal point
27. 19 mil x dimension
   (+1/-0)
   1.50 inches tall
28. 12 point text
29. 24 point bold text
   for "fedex"
30. 9 point text for
   "ground"
APPENDIX G4- BASIC PLAIN PAPER FORMAT EPDI – LANDSCAPE

Note: Label not shown to actual size

BASIC PLAIN PAPER FORMAT EPDI

- 12 POINT TEXT FOR "SHIP TO CODE (420)"
- 12 POINT BOLD TEXT
- 10 POINT TEXT
  - 4 LINES AT 30 CHARACTERS EACH
- 14 POINT BOLD TEXT
  - 2 LINES AT 30 CHARACTERS EACH
- 10 POINT TEXT FOR COUNTRY AND PHONE NUMBER
- 10 MIL X DIMENSION
  - 50 MIL Y DIMENSION
  - UP TO 256 CHARACTERS
- QUIET ZONE – WHITE SPACE BEFORE AND AFTER THE BARS OF ALL OF THE BAR CODES MUST BE 0.20 INCHES WIDE AND ABOVE AND BELOW THE BARS MUST BE A TENTH OF AN INCH
- 24 POINT BOLD TEXT
- 24 POINT BOLD TEXT
- 24 POINT BOLD TEXT
- 24 POINT BOLD TEXT
- 24 POINT BOLD TEXT
- 24 POINT BOLD TEXT
- 24 POINT BOLD TEXT
- 18 POINT BOLD TEXT
- WEIGHT – ONLY ONE DECIMAL POINT
- 10 MIL X DIMENSION
  - 0.50 INCHES TALL
- 35 CHARACTER FIELD
- 10 MIL X DIMENSION
  - 1.50 INCHES TALL
- 12 POINT TEXT
- 12 POINT TEXT
- 9 POINT TEXT
- DEPT # - 10 CHARACTER FIELD
- 12 POINT TEXT FOR SHIP DATE/WEIGHT/DEPT #/INVOICE #/REFERENCE #/PO #
- INVOICE #/REFERENCE # AND PO # - 35 CHARACTER FIELD
- 12 POINT TEXT

SHIP FROM:
Goodship Industries
1138 Shipper St.
Pittsburgh, PA 15208

SHIP TO:
CUSTOMER INC.
ATTN: VALUED CUSTOMER
2906 CUSTOMER AVE
DAYTON, OH 45459

Country: United States
Phone: (412) 500-0000

GND Prepaid

FedEx

Ship Date: 02/06/2000
Weight: 24.5 lbs
Dept. # 1234567890
Invoice #: 123456789023456789123456789123456789
Reference #: 123456789023456789123456789123456789
PO #: 123456789023456789123456789123456789

Order #: ABCDEFGHJ234567891234567893456789

Page 56 of 59
APPENDIX H – FedEx Home Delivery Plain Paper Formats

APPENDIX H1 – FedEx Home Delivery Plain Paper Format EPDI – Portrait

Note: Label not shown to actual size

HOME DELIVERY PLAIN PAPER FORMAT EPDI

- Quiet Zone – white space before and after the bars of all of the bar codes must be 0.30 inches wide

- 12 point bold text

- 10 point text
  - 4 lines at 30 characters each

- 72 point text surrounded by a box

- 24 point bold text

- 12 point text for “Ship to Code (420)”

- 10 mil X dimension
  - 0.50 inches tall

- 10 mil X dimension
  - 0.50 inches tall
  - 35 character field

- 12 point text for ship date/weight/
  - Dept. #/Invoice #/Reference #/and
  - PO #/Field

- Invoice #
  - 123456789123456789123456789

- Reference #
  - 1234567891234667891234566789

- PO #
  - 123456789123456789123456789

- 24 point bold text
  - See Appendix F

- 9 point text
  - In reverse print directly below human readable service information
  - Across the whole label

- 10 point text for the service code
  - Text 2 &
  - See Appendix F

SHIP FROM:
Douglaspper Industries
1136 Slipper St.
Pittsburgh, PA 15208

SHIP TO:
CUSTOMER INC.
ATTN: VALUE CUSTOMER
2906 CUSTOMER AVE
DAYTON, OH 45459

Country: United States
Phone#: (412) 555-5555

Order #: ABCDEFGHI123456789123456789123456789

Ship Date: 02/08/2000
Weight: 24.5 lbs
Dept. #: 123456789

Invoice #
123456789123456789123456789

Reference #
123456789123456789123456789

PO #
123456789123456789123456789

(9612854) 0453185 33301017

HOME
804
FedEx
Home Delivery
APPENDIX H1 – FedEx Home Delivery Plain Paper Format EPDI – Landscape

Note: Label not shown to actual size

HOME DELIVERY PLAIN PAPER FORMAT EPDI

- 12 POINT TEXT FOR “SHIP TO CODE (420)”
- 12 POINT BOLD TEXT
- 10 POINT TEXT
- 4 LINES AT 30 CHARACTERS EACH
- 14 POINT BOLD TEXT
- 5 LINES AT 30 CHARACTERS EACH
- 10 POINT TEXT FOR COUNTRY AND PHONE NUMBER
- 72 POINT TEXT SURROUNDED BY A BOX
- 10 MIL X DIMENSION
- 50 MIL Y DIMENSION
- UP TO 350 CHARACTERS
- 12 POINT TEXT FOR SHIP DATE/WEIGHT/DEPT.#INVOICE/#REFERENCE/#AND PO/# FIELDS
- INVOICE/#REFERENCE # AND PO/# 35 CHARACTER FIELD
- 12 POINT TEXT
- 10 MIL X DIMENSION
- 1.50 INCHES TALL
- 24 POINT BOLD TEXT
- WEIGHT – ONLY ONE DECIMAL POINT
- 10 MIL X DIMENSION
- 0.50 INCHES TALL
- 35 CHARACTER FIELD
- 24 POINT BOLD TEXT
- 18 POINT BOLD TEXT
- QUIET ZONE – WHITE SPACE BEFORE AND AFTER THE BARS OF ALL OF THE BAR CODES MUST BE 0.20 INCHES WIDE AND ABOVE AND BELOW THE BARS MUST BE A TENTH OF AN INCH
APPENDIX P – REFERENCES & ACKNOWLEDGEMENTS

REFERENCES & ACKNOWLEDGMENTS

REFERENCES:

Additional Information can be obtained from:

The American National Standards Institute (ANSI)
11 west 42nd Street
13th Floor
New York, NY 10036
1 (212) 642-4900
Fax: 1 (212) 398-0023

AIM USA
634 Alpha Drive
Pittsburgh, PA 15238
1 (412) 963-8588
Fax: 1 (412) 963-8753
BB: 1 (412) 963-9047
Internet: ADC @ aim.com

Uniform Code Council (UCC)
8163 Old Yankee Road
Suite J
Dayton, OH 45459
1 (513) 435-3870
Fax: 1 (513) 435-4749

ACKNOWLEDGMENTS:

Information from the following sources was used in the creation of this specification.

“The Bar Code Book”
Palmer, R.
Helmers Publishing.

“B-Coder User’s Guide”
author unknown
T.A.L Enterprises 1993

“SWAK-IV Technical Manual”
Hatcher, D; Donadlson, G.; Sponable, R.; et al.
QNX003.321
Mettler Toledo, Inc. 1997