



Bar Code & Label Layout Specification



CHECK DIGIT CALCULATION ALGORITHMS

FEDEx GROUND CODE 128 BAR CODE("96"BAR CODE)

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.

Bar Code Data 9 6 1 1 0 2 0 9 8 7 6 5 4 3 1 2 3 4 5 6 7 C

| | | | |
|---------|---|--------------------------------|------------------|
| 96 | = | UCC/EAN Application Identifier | (not included) |
| 11 | = | SCNC | (not included) |
| 020 | = | Class of Service | (not included) |
| 9876543 | = | FedEx Ground Shipper ID | INCLUDED |
| 1234567 | = | PACKAGE NUMBER | INCLUDED |
| C | = | Check Digit | To be calculated |

Tracking Number

SHIPPER ID

PACKAGE NO.

| | | | | | | | | | | | | | | | |
|---------------------|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|
| DATA | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | C |
| Position (Odd/Even) | O | E | O | E | O | E | O | E | O | E | O | E | O | E | O |
| Digit Position | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

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