

UPC Barcodes



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1 PURPOSE

The aim of this document is to give customers a better understanding of what UPC codes are and how they can be seamlessly integrated in to CIMS.

The information contained in this advice paper will explain what a UPC code is and the necessary steps required to ensure that all the different applications within the system can read the barcode where required.

2 UPC BARCODES

2.1. What is a UPC Barcode?

UPC (Universal Product Code) barcodes originated from the United States in 1974 and was originally a barcode structure reserved for the USA and Canada. It is a symbology designed for tracking trade items in much the same way as EAN (European Article Number) barcodes are used in Europe.

The main UPC barcode is an 11 digit barcode (no alpha characters) with a check digit on the end.

There are various forms of UPC, which can be seen below:

- UPC-A: This is the most common form of UPC code and consists of 11 digits with a check digit at the end – 12 in total
- UPC-E: This was designed for use on smaller packages and is only 6 digits long. When read, the barcode is expanded out to a full UPC-A format.
- UPC-B, UPC-C & UPC-D: These are all variations of the UPC-A format and are expected to be phased out by 2010.

2.2. UPC v EAN: What is the difference?

The EAN and UPC codes are essentially the same. Both styles of barcode should be readable on a particular system.

The main differences between the two are:

- EAN barcode consists of 12 digits plus a check digit
- UPC barcode consists of 11 digits plus a check digit

EAN is a superset of UPC. In order for UPC codes to be readable throughout Europe a zero has been added to the front of the barcode, which means it is 12 digits long with a check digit. This zero makes no material difference to the way the barcode is scanned.

With EAN needing to cover the whole of Europe, 1 character at the front would not be enough. Therefore an extra digit was introduced to give greater flexibility. For example, EAN barcodes issued in the UK will start with 50 and in France it will be between 30 and 37.

2.3. Check Digit Calculation

In both cases, the calculation of the check digit is the same and works in the following way:

1. Starting from the right, take the first digit and every alternate digit thereafter, add them together and multiply the answer by three.
2. Starting from the right, take the second digit and every alternate digit thereafter and add them together.
3. Add the two results together and round the answer up to the nearest 10.
4. The rounding value is the check digit.

Example 1

The barcode is 501822424111

Step 1: $(1+1+2+2+8+0) \times 3 = 42$

Step 2: $1+4+4+2+1+5 = 17$

Step 3: $42+17 = 59$; 1 is needed to round up to the nearest 10, which is 60

Step 4: Check digit = 1

Example 2

The barcode is 564562234111

Step 1: $(1+1+3+2+5+6) \times 3 = 54$

Step 2: $1+4+2+6+4+5 = 22$

Step 3: $54+22 = 76$; 4 is needed to round up to the nearest 10, which is 80

Step 4: Check digit = 4

3 BARCODES IN CIMS

3.1. Valid Barcode Formats

CIMS is designed to be able to use various different formats of barcodes throughout the system. These include:

- Product SKU Barcodes
- Pack Barcodes
- Carton Barcodes
- Bin Barcodes
- Pallet Barcodes

Across these different areas CIMS supports EAN8, EAN13, UPC-A, Code128, ITF-14, I2/5

3.2. Product Barcodes

When entering products in CIMS, users can either allow the system to create a barcode for a product or a predefined barcode can be entered manually.

For automatic creation the system will generate either:

- An EAN code – from a predefined range on the system
- A 'Prologic' code which is EAN format (12 digits plus a check digit) and is held on the system starting at 100000000001

For manual entry of a barcode the system will accept:

- EAN13
- EAN8
- UPC-A
- I2/5

3.3. UPC Product Barcodes

UPC barcodes must be entered in to CIMS in a specific way to ensure that the barcode can be scanned throughout the system.

As mentioned in section 2.2, the human readable UPC code is 11+1 digits long. However in CIMS the barcode field is 12 characters long with a separate space for the check digit.

In spite of the fact that the human readable barcode is on 12 digits long, the symbology includes a leading zero. This ensures that UPC and EAN are supported by scanners worldwide.

The barcode below is a UPC barcode:



In this case the main barcode is **07567816412** and the check digit is **5**.

However the scannable barcode is actually **007567816412 5**

This is depicted by the fact that there are two pairs of narrow lines together representing the two zeros.



It is clear from the UPC code, even if it starts with a number other than zero that the pair of narrow lines at the start depicts that there is a preceding zero in the barcode, even if the human readable part doesn't show it.

Therefore, if you have been supplied UPC codes which need to be added into CIMS, you **must** enter the extra 'invisible' zero in the barcode field.

This will ensure that the check digit always goes into the check digit field. In CIMS the barcode above will be:

Barcode	
007567816412	5