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ARTICLE NUMBER ASSOCIATION (UK) LIMITED

Retail Article Numbering and Symbol Marking

Operating Manual



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Revised Edition: May 1980

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ARTICLE NUMBER ASSOCIATION (UK) LIMITED

6 Catherine Street, London WC2B 5JJ

Replaces two separate manuals.

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and

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1.0 INTRODUCTION

This Manual describes the ANA (UK) system for article numbering and for machine readable bar-codes, as well as various similar associated systems.

The aim of the Manual is to provide all necessary information to all those who may be interested in the system, or involved in its implementation from whatever point of view; in particular

- retailers requiring to know what coding options are available, and what types of data capture equipment are appropriate
- product manufacturers requiring to know how their articles should be coded, and the implications for packaging
- suppliers of equipment and services requiring to know the technical standards involved.

Previous editions of this Manual were issued in two parts:

Part 1: Retail Article Numbering and Symbol Marking
First Issued January 1978
Second Edition February 1979

Part 2: Short Version Symbols for Source Marking
Issued July 1978

The present edition has been re-written so as to incorporate both parts into one volume, for greater convenience. At the same time points of clarification and updating have been included.

New EAN recommended standards for variable weight items and for Add-on codes have been added. The section on Preferred locations for symbols on packs, which was advisory and not mandatory, has now been omitted from the Manual, and is being published separately as a set of "Guidelines".

No changes have been made to any basic principles or to any material values in the specifications, but for the avoidance of any confusion in future, the present edition should now be regarded as the authoritative text. Copies of this edition are being supplied to all previous holders of earlier editions, which should accordingly be withdrawn from use.

1.1 Point of Sale and Communications

The ANA system as described in this Manual applies to retail articles only. It provides for the unique numbering of retail articles of sale, and for the representation of these numbers on articles in machine-readable bar code form; in order that articles can be uniquely identified by machine-scanning at the point of sale.

These unique numbers can also be used as a means of identifying retail articles for the purposes of communications, especially in electronic data exchanges between buyers and suppliers. The ANA Council is currently supporting the development of a standard language for such exchanges, which will be the subject of a separate publication, and which will refer to the use of the ANA numbering system for this purpose.

It should be noted, however, that no rulings have as yet been adopted for the standard numbering or bar coding of transit outer packs containing some quantity of a retail article. The present Manual deals only with the numbering and bar coding of retail units of sale, and not with outer packs - except insofar as the outer pack may itself occasionally be sold as a retail unit.

Efforts are continuing to achieve international agreement on standards both for the numbering of outer containers and for a suitable type of bar code for this type of packing. The Council of ANA (UK) expects to be able to issue a further publication on this subject in due course.

1.2 Operating Principles

The principle of the ANA system is that articles are marked with a machine-readable bar code which is scanned at the point of sale and decoded into a unique article number. The article is thus identified in a computer look-up file, and its description and price transmitted back to the point of sale for display and printing on a till receipt. The check-out process is thereby expedited and made more accurate. Accurate sales data can also be recorded, for use in all other store management systems.

For economic operation of the system, it is necessary for a very large proportion of articles to be printed with the bar code symbol at source by the manufacturer. The source marked bar code and the article number must therefore be standard, and uniform to all retailers. The participation of product manufacturers is sought only on this basis.

There is also provision in the system for articles which have not been bar coded at source to be coded and identified within the store itself. In this way the totality of articles in a store can be dealt with through a single system of check-out terminals equipped with scanners and keyboards.

The ANA system is designed to apply to all consumer articles which have high volume sales in mass-merchandise, self-selection outlets. A high proportion of these articles will be in the traditional grocery category, but the system can accommodate any variety of merchandise sold in supermarkets and similar stores.

1.3 European Compatibility

The ANA system has been established within the framework of the European Article Numbering System which at the present time comprises 13 member countries in Europe. The EAN system is also available to member countries outside Europe: to date Japan and Australia have become members. All member countries undertake to operate their national numbering systems within the EAN rules in such a way that consumer articles numbered and symbol marked in any one country shall be uniquely identified in all the other countries and scannable on the same type of equipment. Users of the ANA system therefore benefit from mutual compatibility of systems throughout Europe, and increasingly elsewhere. Retailers can scan merchandise source marked in other EAN member countries without relabelling. Manufacturers can use ANA source marking for merchandise exported to other EAN member countries.

1.4 Relationship with UPC

The European Article Numbering system was itself developed from the Uniform Product Code system (UPC) in the United States, with which it has one-way compatibility at the present time. Articles bar-coded under the UPC system can be scanned and identified without ambiguity on equipment designed for the ANA system. Articles bar-coded under the ANA system (and other EAN systems) cannot however be scanned on the majority of the equipment currently installed in U.S. retail outlets. Manufacturers exporting to the USA must therefore for the time being continue to bar code under the UPC system any articles intended for retail scanning in the USA. It should be said however that only a minor up-grading to US equipment is necessary to permit the scanning of EAN codes, and there is reason to hope that modifications will be made retrospectively and that full compatibility will be achieved in due course.

1.5 Legal Basis and Acknowledgements

The Specification which follows is necessarily extremely detailed, and in some sections highly technical, as it must be to provide precise standards to those who will be involved in implementing the system at a technical level. This technical detail may not encourage easy understanding by those whose interest is only in the general principles, but it is hoped that the Section headings will simplify selection of relevant passages.

Every effort has been made to ensure that the Specification is correct, but no representation or warranty, express or implied, to that effect is made, and the Council of ANA (UK) Ltd. hereby expressly disclaims liability for errors in this Specification. In addition no warranty or representation is made that this Specification will not require modification due to developments in technology.

The bar-code symbology described in this Specification was first adopted by the Uniform Product Code Council in the USA. The work of this Council in pioneering the system, in agreeing performance standards with the scanning equipment industry and in publishing the results in the public domain, is most gratefully acknowledged by the Council of ANA (UK) Ltd. The essentials of this system were in turn adopted by the European Article Numbering Association and are now republished by ANA (UK) Ltd. as a voluntary standard for national and international use.

1.6 Guidelines for Implementation

The ANA system is a voluntary one for co-operation between manufacturers and distributors. The basis on which such co-operation should rest has been defined in the Memorandum of Agreement of the European Article Numbering Association, to which ANA (UK) Ltd. is a signatory, and is reprinted here for the guidance of all users of the ANA system.

"The following recommendations should be taken into account by National Numbering Organisations in order to settle any problems which may arise between manufacturers and distributors in this connection.

- "Source symbol marking" must only be progressively introduced within the scope of a programme which allows for manufacturers' normal packaging renewal rate (and for the fact that a substantial number of traders must be equipped with automatic mark scanning cash registers).

- As a result, "source symbol marking" - whenever locally feasible - shall lead to the elimination of demands from distributors for price marking by manufacturers.
 - All concerned in the manufacture, distribution and retailing of mass consumption articles, shall be able to avail themselves of the basic data collected by the automatic cash registers, at cost price. Such data acquisition shall be effected in accordance with terms and conditions which shall guarantee freedom of action and business confidentiality to each partner.
 - Finally, "source symbol marking" must not involve for manufacturers any individual obligation to acquire checking equipment in order to ascertain the correctness of the symbol. A simple check at the time of the establishment of the master films, and compliance with the general rules concerning symbol printing shall release them from any liability in regard to symbol utilisation by distributors.
 - Moreover, it is the wish of all concerned that the numbering system established for symbolisation purposes may also be used in a communication system".
-

All enquiries for membership of the Article Number Association (UK) Ltd, for the issue of numbers, and for any further information, should be addressed to:-

Article Number Association (UK) Ltd
6 Catherine Street
London WC2B 5JJ

Telephone 01-836 2460 Telex 299388

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2.0 SOURCE NUMBERING OF ARTICLES IN THE UK

For articles which are to be bar coded at source by their manufacturers or packers, the ANA system provides two different systems of unique numbering.

- The Standard Long Number
- The Standard Short Number

The Short Number permits the use of a short form of bar code, and its availability is limited for use only on particularly small packages or labels. Both systems are described below.

2.1 The Standard Long Number

The ANA (UK) Standard Long Number for articles numbered at source has a field length of 13 all-numeric digits, made up of:

- 2 digits Prefix. These digits always have the value 50, which uniquely identifies the ANA (UK) series of numbers.
- 5 digits Manufacturer Number
- 5 digits Item Reference Number
- 1 digit Check Digit calculated to a standard algorithm detailed in Sect.2.1.1 below

Thus:

Prefix	Mfr. No.	Item Ref.	Check
50	M M M M M	I I I I I	C

2.1.1 Check digit Calculation

The Check digit is calculated by modulo-10 algorithm from all the other digits in the number through the following steps:

- Step 1: Starting with the digit on the right of the number, (excluding the check digit) sum all the alternate digit values, reading from right to left.
- Step 2: Multiply the result of Step 1 by 3.
- Step 3: Sum all the remaining digit values.

A separate manufacturer number will be required by each independent business unit, defined as one which controls and markets its own range of articles: whether or not it is a legally constituted company or an operating division

of a larger company. Such a business unit may use more than one manufacturer number, if it finds this necessary, but this should not be done without good reason, as it may prove confusing.

The manufacturer number as issued by ANA (UK) is purely an identification number and has no other significance.

2.1.3 The Item Reference Number

A business unit possessing a manufacturer number allocates an item reference number to its own individual articles entirely at its own discretion and without further reference to ANA (UK). The item reference may have any value as long as it comprises and does not exceed 5 digits all-numeric. If desired, a business unit may use existing internal code numbers or assign an internal code or classification meaning to the item reference. Such significance will not however be recognised within the ANA system.

Warning: The Item reference by definition applies to the retail unit of sale. Many companies use internal code numbers which define the standard case quantity of an article. A case quantity code number must on no account be re-used as an item reference for the retail unit, or confusion will eventually result.

The business unit which possesses the manufacturer number is responsible for ensuring that item reference numbers are allocated uniquely to individual articles, without risk of ambiguity. (See Sect.2.6 for the definition of articles requiring separate numbering).

The item reference uniquely identifies the article within its manufacturer (or marketer); the manufacturer is uniquely identified within the ANA system; and the ANA Prefix confers uniqueness against the remainder of the EAN and UPC systems.

2.2 The Standard Short Number

The ANA (UK) standard short number for articles numbered at source consists of 8 all-numeric digits, made up of:

2 digits <u>Prefix</u>	These digits always have the value 50, which uniquely identifies this series as ANA (UK) numbers.
------------------------	---

5 digits <u>Short Identifier Number</u>	
---	--

1 digit <u>Check Digit</u>	calculated to a standard algorithm detailed in Sect.2.2.1 below.
----------------------------	--

When placed in juxtaposition to full length ANA numbers, that is to say, when entered to a 13-digit field, the standard short number must always be right justified; or, alternatively, considered as having five implied initial zeros in the left hand positions. Thus:

Implied Zeros	Prefix	Short Identifier	Check
0 0 0 0 0	5 0	X X X X X	C

2.2.1 Check Digit Calculation

The check digit is calculated in the same way as for full length numbers, by Modulo-10 algorithm from all the other digits in the number through the following steps:

Step 1: Starting with the digit on the right of the number, (excluding the check digit) sum all the alternate digit values, reading from right to left.

Step 2: Multiply the result of step 1 by 3.

Step 3: Sum all the remaining digit values.

Step 4: Add the result of step 2 to the result of step 3.

Step 5: The Modulo-10 check digit is the smallest number which when added to the result of step 4 produces a multiple of 10.

Note: The check digit calculation must be performed on the 7 significant digits of the short number in their right justified positions. Any fill-in zeros must be on the left, and not in any intermediate position between the significant digits.

For example, to calculate the check digit for ANA short number 50-12345-C:

	(00000)	5	0	1	2	3	4	5	C	
Step 1:-		5	+	1	+	3	+	5		= 14
Step 2:-									x3	= 42
Step 3:-			0	+	2	+	4			= <u>6</u>
Step 4:-									Add step 2 + step 3	= 48
Step 5:-									C	= <u>2</u>
										50
										==

The complete number is therefore (00000) 50-12345-2.

2.1.2.2 The short Identifier Number

The 3 digits forming the short identifier number can, for the purposes of source marking of retail articles in the UK, be generated in two different ways:-

- Partially by the product manufacturer, as a sub-set of his full length numbers
- By direct assignment to individual articles by the Council of ANA (UK) Ltd.

These two methods are described below.

2.3 Manufacturer-Derived Short Numbers

Members of ANA-(UK) who undertake the numbering of their articles at source are issued with a "Manufacturer Number" as described in Section 2.1.2. The facility to form their own short numbers for source marking is available only to those members whose manufacturer number commences with a minimum of two zeros. Thus:

00MMM

2.3.1 Allocation of Item Reference Numbers

The method of allocating 5 digit item reference numbers to articles is described in Section 2.1.3. Members who require a short coding facility and who have obtained a manufacturer number commencing with a minimum of two zeros should reserve item reference numbers in the series

00001 to 00099

for articles requiring a short bar code.

2.3.2 Formation of Short Numbers

The Short Number to form the series for a short bar code is then compiled as follows:

Prefix 50
Manufacturer number in the form 00MMM
Item reference number in the series 00001
to 00099

Thus:

50 - 00MMM - 00001
to
00099

The first two zeros in the manufacturer number, and the first three zeros in the item reference, are then omitted.
Thus:

50 - MMM - 01
to
99

The check digit is then calculated over the seven digits remaining (not at the previous stage.) Thus:

50 - MMM - 01 - C
to
99

It is of vital importance to note that the zeros which are omitted in this way from manufacturer number and from item reference are never replaced in their original positions, either by the scanning process, or in any other communications. This is therefore not a "zero-suppression" system, as exists in the UPC system (see Section 4.4). The arrangements described above are purely a formula for uniquely generating a series of short numbers, which will thereafter be treated as right-justified in the form:

(00000) 50 - MMM - 01 - C
to
99

The article number formed in this way must always be quoted as 8 digits, right justified. It must on no account be quoted with the zeros restored to the mid-positions in manufacturer number and item reference. The check digit would then no longer be valid, nor would a scanner be able to derive such a number from the short bar code.

2.3.3 Correlation with Long Numbers

When item-reference numbers in the series

00001 to 00099

have been reserved for items requiring short codes, it follows that only item reference numbers in the series

00100 to 99999

should be used for items with long codes. Such items will then have full length numbers in the form

50 - 00MMM - 00100 - C
to
99999

This number must always be quoted in full, with no zeros omitted, either from the bar code itself or when the number is used in communications.

The objective of the system so far described is that product manufacturers may operate a single sequence of item references internally, without risk of ambiguity between large and small items. The internal decision rules for a product manufacturer are therefore:

- Small Items: reference numbered from 01 to 99. ANA number formed by omitting two leading zeros from manufacturer number.
- Large Items: reference numbered from 00100 upwards. ANA number formed by adding manufacturer number in full.

A product manufacturer can therefore identify all his products internally using the item reference on its own without having to include his own manufacturer number, and without risk of duplication.

This facility applies only where fewer than 99 short codes are required. For cases where a manufacturer requires more than this number of short codes, see Section 2.5.5.

2.3.4 Limited Issue of Manufacturer Numbers

For the time being, and subject to subsequent decision by the ANA Council, the only manufacturer numbers to be issued of the form 00MMM will be those in the series

00101 to 00599

Values from 00600 to 00999 will not be issued.

2.4 Directly Assigned Short Numbers

Product manufacturers requiring a short number for a small article, but not having the facility to derive it from their own manufacturer number, as in Section 2.3, may apply to the Council of ANA (UK) for the direct assignment of a standard short number to the article in question. This number will be of the general form:

(00000) 50 - XXXXX - C

It will not be structured internally into Manufacturer/Item, and will not correspond in any way to the other manufacturer and item numbers used by that manufacturer. It will uniquely identify the item, and will have no other significance.

2.4.1 Limited Issue of Directly Assigned Short Numbers

For the time being, and subject to subsequent decision by the ANA Council, directly assigned short numbers will be issued only in the series

50 - 60001 - C
to
50 - 99999 - C

As stated in Section 2.4, manufacturer numbers in the series 00600 to 00999 are not currently being issued. Therefore there will be no risk of directly assigned numbers being duplicated by manufacturers using the derivation system.

Directly assigned numbers will be issued by the Council starting from the top down. Shortenable manufacturer numbers will be issued from the bottom up. The Council will review the allocation rules as numbers issued from the two systems approach one another.

2.4.2 Purpose of Directly Assigned Short Numbers

The objective of the direct assignment system is so that the Council may retain an indefinite capacity to provide short numbers and codes for small articles genuinely requiring them, into the foreseeable future. Nearly 40,000 short numbers will be available for this purpose. As articles become obsolete, their numbers can be re-used after 36 months (see Section 2.7). Capacity to provide short codes where required should therefore continue to be available indefinitely.

Product manufacturers should however note that, since there will be no correspondence between their standard full length numbers and any directly assigned short numbers, neither can safely be abbreviated internally. There is no guarantee that the final digits in each series may not coincide. Both should therefore be quoted in full at all times.

2.5 Rules for Use of Short Numbers

The total availability of short numbers for source marking is limited, and their use must be restricted to articles whose design of pack or label genuinely and reasonably precludes the printing of a standard full-length bar code. The following rules and guidelines have been adopted by the ANA Council to define what is considered to be reasonable use of a short code, and to govern the issue of short version numbers to product manufacturers.

2.5.1 Other Options to be Explored

Before deciding to use a short version code, the manufacturer should consider - usually jointly with his printer - all available options for using a full-length code. These may include:-

- (a) Whether the label can reasonably be redesigned.
(The term label is used to denote the total printed design surface, whether or not affixed separately.)

If by a redesign, the size of standard symbol which the printer recommends can be included, then this should be given priority.

- (b) Whether the label can reasonably be increased in size, especially where the existing one is small in comparison with the area of the pack.

- (c) Whether the form of the label or packaging can conveniently be changed, eg by the use of an additional label.

In considering an increase in size or change in the form of the label, the revised design should enable the printers' recommended size of standard symbol to be included.

- (d) Whether the symbol can be reduced in size, ie printed at a lower magnification.

The rules governing magnification factors for bar code symbols are given in Section 6.3.1.

When considering small packages, the size of the symbol must not be reduced below that established from extensive printability gauge studies. Also, reference should be made to Appendix 10 of this Manual. The bar width tolerances sharply decrease below a magnification factor of 90% and, hence, symbols below this level should only be printed if printability gauge results are extensive, reproducible and fully representative of the process, machine and design to be produced.

A reduction in symbol size can, therefore, be considered as an alternative to a short code only provided the size selected is known to be acceptable to the printer. Excessive reduction in size may result in a significant reduction in scanning efficiency.

2.5.2 Pack Size Constraint

The use of a short version code would be considered unreasonable if the standard symbol, in the size required as a result of printability gauge studies, would not exceed 12.5% of the area of the label or appropriate pack face.

2.5.3 Issue of Shortenable Manufacturer Numbers

A manufacturer number commencing with two or more zeros, suitable for the derivation of short numbers, will be issued only to a member who satisfies the Council that he will be source marking 10 or more articles requiring short codes as defined above. The member will then have the facility to apply up to 99 short codes to his articles without further reference to the Council. The member will, however, be expected to apply these short codes only to articles genuinely requiring them in accordance with the Council's criteria for short codes.

2.5.4 Issue of Directly Assigned Numbers

A member who foresees no need for 10 or more short codes, or who cannot satisfy the Council of this, or who is not concerned to have a related sequence for long and short codes, will be issued with a manufacturer number commencing with fewer than two zeros, from which short numbers cannot be derived. For any of his articles requiring short codes then or in the future, the member should apply to the Council for directly assigned short numbers. These will be issued singly or in blocks in respect of specific articles meeting the Council's criteria.

2.5.5 Issue of Additional Short Numbers

A member requiring more than 99 short codes must satisfy the Council that the first 99 have been or will be utilised only for articles meeting the Council's criteria. Further facilities will be given as in Sections 2.5.3 or 2.5.4 depending on whether more or fewer than 10 supplementary codes are required.

2.5.6 In-Store Short Numbers

The foregoing sections are concerned solely with the use of short numbers for the coding of articles at source by their manufacturers or marketers. Other ways in which short numbers and codes are available for use in-store are described in Section 4.0.

2.6 Articles Requiring Separate Numbers

A separate unique ANA number whether in long or short form is required for every different retail unit of sale; and for every variant of an item, whenever this variation is in any way apparent and significant to the trade or retail customer.

Thus separate unique numbers are required for:

- each different variety of item: by product type and also by flavour, colour, perfume etc.
- each different retail pack size of an item.
- each different multiple pack of an item, where it is intended, or there is a possibility, that the multiple pack will be sold as a unit at retail. Thus a banded pack of two bars of soap must have a separate ANA number to distinguish it from the single bar of soap sold individually. Occasionally, the transit outer container itself may be sold at retail as a unit eg, in discount operations. For such situations, the outer container should be allocated a separate ANA number.
- each promotional variant of an item:
 - . where a price difference is specified on the pack
 - . where it is necessary to distinguish the stock keeping units separately
- each new modification to the item, as with product relaunch, improved formula, redesigned pack etc., when the change makes a distinction necessary between old stock and new. A separate number is not necessary when the modification is purely minor and does not affect continuity between the old version and the new.

A separate number is not necessary solely because of a price change, whether temporary or permanent, to an unchanged item.

Manufacturers (or marketers) who undertake the source numbering of items assume responsibility for ensuring that the foregoing rules are respected and that all retail sales variants are numbered uniquely. They are also responsible for notifying their trade customers of the numbers which have been allocated to each retail sales variant.

2.7 Obsolete Items

Numbers allocated to items which have become obsolete must not be re-used for another item until 36 months have elapsed from the date the original item was last supplied by the manufacturer (or marketer). This applies equally to numbers used for promotional variants.

3.0 ASSOCIATED SOURCE NUMBERING SYSTEMS

The ANA (UK) source numbering system is only one sub-set within the overall European Article Numbering System (EAN). The EAN system is in turn unambiguous with the UPC and other numbering systems in the USA. All of these numbering systems are designed to be represented by the same type of machine readable bar-code (described in Sect. 5.0 seq.).

The present Section describes these numbering systems in detail, in order to demonstrate how mutual exclusiveness is achieved, and for the guidance of retail users of scanning systems who may encounter these numbering systems on merchandise source numbered outside the UK.

The systems are also summarised in Appendix 1. It will be seen that all of them are mutually exclusive when entered in a 13-digit field, right justified. Retailers using a 13-digit field for item files and look up tables, as required by the ANA system, will be able to enter article numbers from any other of these co-ordinated systems to the same files without ambiguity. Items numbered under these other systems do not have to be re-numbered when distributed in the UK.

3.1 European Article Numbering - Full Length Version (EAN-13)

The EAN-13 standard number for articles numbered at source is the general form of which the ANA (UK) number is one particular version. This general form is 13 all-numeric digits, made up of:

2 digits Prefix denoting the National Numbering Authority administering the remainder of the number

10 digits National Article Number
 Structure as determined by the National Numbering Authority

1 digit Check Digit calculated by the standard algorithm described in Sect. 2.1.1

Thus :

Prefix	National Article No.	Check
P ₁ P ₂	X X X X X X X X X X	C

Prefix values are issued to National Numbering Authorities in Europe by the EAN Council. A list of currently assigned prefix values is given in Appendix 2. Other values are held in reserve, or are excluded from use by the requirements of other numbering systems, as explained later.

The requirements of other countries adopting Article Numbering in future will be co-ordinated within these unused Prefix values. It may in future be necessary to assign the first three digits as a Prefix to any one country, leaving only nine digits for the National Article Number.

Note that the Prefix value of an EAN number does not necessarily denote the actual country of origin of the merchandise. It merely shows the Numbering Authority under which the item has been numbered. Marketing companies may at times find it convenient to number items under National Authorities other than in the country of origin.

The National Article Number is structured entirely at the discretion of the National Numbering Authority, and there are no obligatory rules within the EAN system for the form this structure should take. Most if not all European countries in fact follow the same system as ANA (UK) in issuing manufacturer numbers, to be followed by the manufacturer's own item reference. But the number of digits used for manufacturer versus item varies as between countries. It is therefore not possible to identify the manufacturer from the same field positions in all EAN source numbers.

3.2 European Article Numbering - Short Version (EAN-8)

The EAN system provides for a second, entirely independent series of numbers of 8 digit length, in addition to the full length 13 digit series. This short number is intended to be represented by a special, short version bar code symbol (See Sect. 5.6). This number system is used for source marking by certain EAN member countries, including ANA (UK) as described in Section 2.2. The rules for the derivation and allocation of short numbers are, however, different as between countries, and it is therefore not possible to identify the manufacturer from the same field positions in all cases.

The EAN-8 number consists of:

2 digits Prefix denoting the National Numbering Authority administering the remainder of the number.

5 digits National Short Article Number
Structure as determined by the National
Numbering Authority.

1 digit Check Digit calculated according to the
standard algorithm in Sect. 2.2.

When entered in a 13 digit field, this 8 digit number must always be right justified; or, alternatively, considered as having five implied initial zeros in the left hand positions. Thus:

Prefix	Nat. No.	Check
(00000) P ₁ P ₂	X X X X X	C

It will be seen that in a 13 digit field this series of numbers must always be unique against EAN-13 numbers, and also against UPC numbers, to be described below.

The Prefix values in the EAN-8 system are issued to National Numbering Authorities in Europe by the EAN Council in the same way as for the EAN-13 series; and the same prefix digit values are used for each Authority for both the long and the short numbers. Note however that since Prefixes occur in different field positions in the two series of numbers, use of the same digit values does not make the two series coincide.

3.3 USA Uniform Product Code (UPC)

The UPC code numbering system used in the USA and in Canada was the original system, with which the EAN system has been made retrospectively unambiguous. UPC codes were originally conceived as consisting of 10 digits, plus a single prefix digit on the left and a single check digit on the right, total 12 digits. For purposes of compatibility in EAN 13 digit fields, UPC codes should be considered as being right justified or as having an additional implied initial (left hand) digit of value zero.

Thus:

Prefix	Code Number	Check
(0) P	X X X X X X X X X X	C

The values of Prefix P which have been assigned to source numbering in UPC are:

- 0 - denoting code numbers in the "Grocery" series.
- 3 - denoting National Drug Code and National Health Related Items Code. These have variable internal structures.

The Grocery code numbers have an internal structure of 5 digits manufacturer number plus 5 digits item number. The following blocks of numbers are however not used in the 5 digit series of manufacturer numbers:

- a) numbers commencing with more than two consecutive zeros i.e. numbers from 00000 to 00099
- b) numbers in the block from 01000 to 07999 (See Sect. 4.4).

UPC Grocery numbers therefore take the form:

Prefix	Manufacturer	Item	Check
(0) 0	M M M M M	I I I I I	C

From a) above, the first two digits of the manufacturer number may be zero; but not the first three. Therefore no UPC number in a 13 digit field commences with more than 4 zeros. This feature is used to ensure compatibility with both EAN-13 and EAN-8 numbers. No EAN number, either long or short, in a 13-digit field, commences with zero, unless with 5 or more consecutive zeros. (See Section 3.2.)

The check digit in UPC numbers is calculated according to the same standard algorithm as described in Sect. 2.1.1.

Note 1: The UPC code numbering system also allows of longer forms of numbering using a longer form of bar code symbol. These longer forms have not as yet been adopted by the EAN and ANA Systems, and are therefore not described in this Manual.

Note 2: Users of the ANA and other EAN systems whose item files are consequently of 13 digit field length can equally accommodate UPC numbers in those files without ambiguity. But, users of UPC numbers who have organised their files to a field of 12 digits only, will not be able to accommodate EAN numbers without increasing their file length.