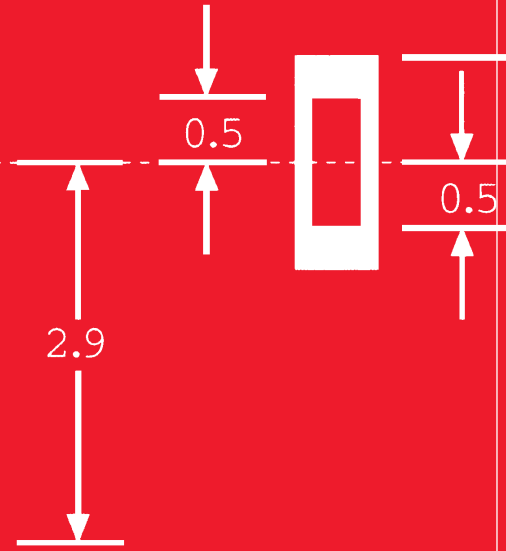
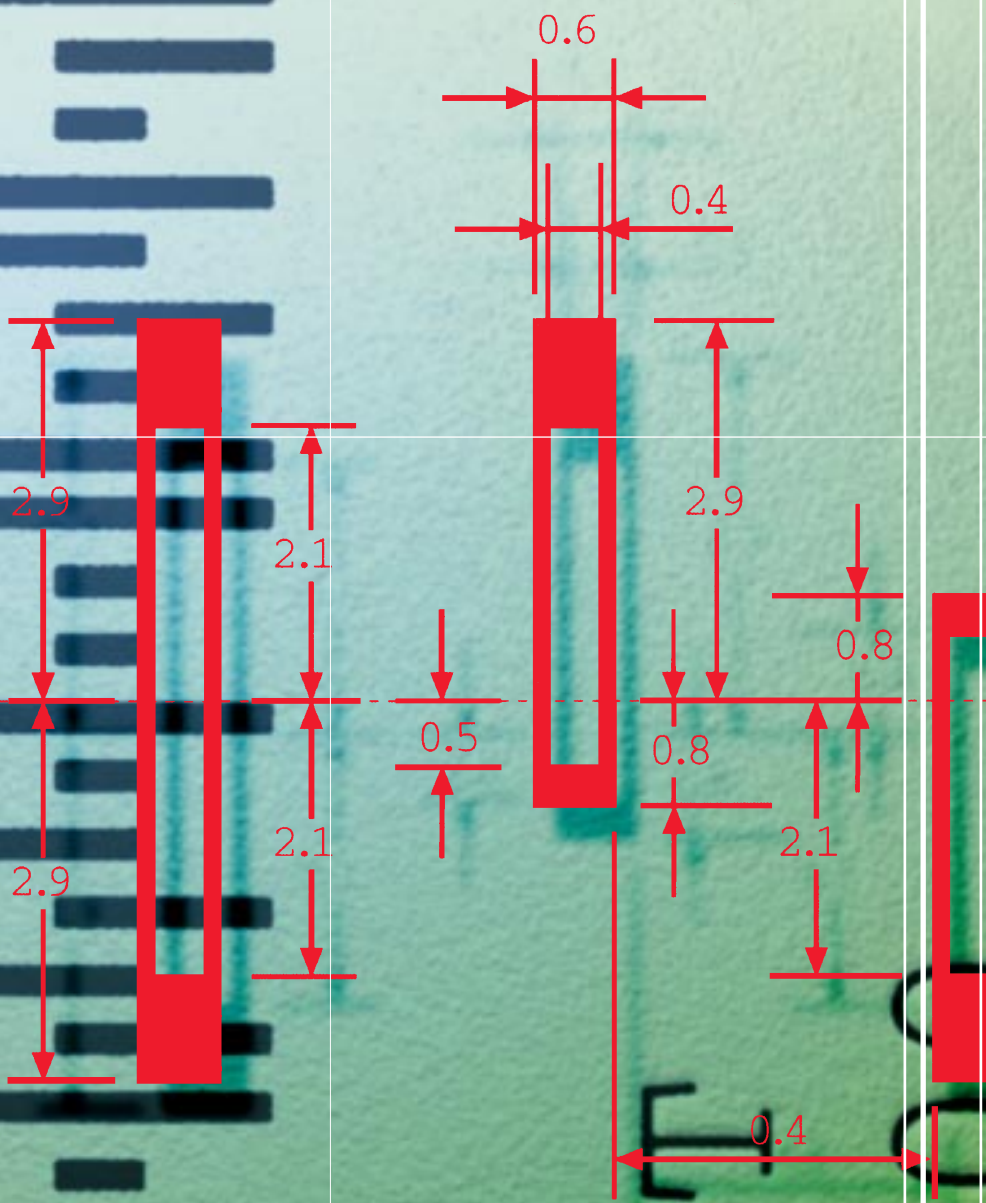


Customer Barcoding Technical Specifications



June 1998



Revised 3 Aug 2012

Contents

Introduction	2
Key features of the barcoding system	2
About this document	2
Why we are introducing Customer Barcoding	3
Benefits of Customer Barcoding	3
Customer impact	3
The barcode symbology we have chosen	4
The four 'states'	4
How bars are interpreted	4
Barcode fields	5
Overview of barcode structure	5
Start Bars	5
Format Control Code Field	5
Sorting Code Field	6
Customer Information Field	6
Reed Solomon Error Correction Bars	6
Stop Bars	7
Standard barcode formats	8
Standard Customer Barcode	8
Customer Barcodes 2 & 3	9
Encoding Tables	10
Bar symbols	10
N Encoding Table	10
C Encoding Table	11
Bar to Decimal Conversion Table	11
Dimensions, placement and printing of barcodes	12
Constraint factors	12
Dimensions	12
Skew tolerance	12
Bar Density	13
Reflectance	13
Quiet Zones	13
Dot Matrix Printing	13
Placement of barcodes	14
Text representation of the barcode	14
Measurement of barcodes in final form	14
Barcode fonts	15
Glossary	16



Introduction

Australia Post is implementing a new Customer Barcoding system for letters. From 1998 onwards, sophisticated new sorting equipment called Barcode Sorters (BCS) will be installed at our mail centres. The equipment will enable us to simplify and accelerate the sorting of mail through the Australia Post network.

Key features of the barcoding system

When the system is introduced, customers will be able to print barcodes above the address information on their letters. Information embedded in the barcodes, will uniquely identify every address or delivery point in Australia. When the barcoded mail enters Australia Post's network, the BCSs will scan and read the barcodes.

About this document

Customers will require software to develop and print barcodes on their mail. This document provides information for software developers involved in building this software. It describes the symbology, format, fields, values and other characteristics of the Customer Barcodes.

A separate document, 'A Guide to Printing the 4-State Barcode', is also available. It explains how to write the programming code to generate the 4-State Barcode and includes information on coding the Reed Solomon Error Correction and test data.

Why we are introducing Customer Barcoding

Customer Barcoding is an important part of Australia Post's strategy to improve our services to customers mailing bulk quantities of letters.

By introducing a '4-State' Barcode, we will be able to use equipment to sort letters to individual addresses, rather than to postcode level. This will improve our sorting efficiency.

Benefits of Customer Barcoding

Customer Barcoding will provide the following benefits:

1. Simplified pre-sorting requirements. Customers will no longer need to bundle letters.
2. Enhanced service. Barcodes can be read faster and more accurately than address text. This improves sorting efficiency.
3. Greater addressing flexibility. With Customer Barcoding, the range of fonts and envelope layouts is enhanced.
4. Simplified pricing structure. The efficiency of Customer Barcoding enables pricing structures to be simplified.

Customer impact

To introduce Customer Barcoding, customers will need to undertake the following steps.

1. Review and modify, if necessary, their customer database/s to accommodate the eight digit Delivery Point Identifier (DPID). DPIDs are explained on page 6.
2. Validate their customer database against Australia Post's Postal Address File (PAF), using approved address-matching and correction software. This software will append the correct DPID in the field created in Step 1.
3. Print the barcode using the approved address-matching and correction software used in Step 2, or by acquiring barcode printing software.

The barcode symbology we have chosen

There are several barcode symbologies currently on the market. Australia Post has chosen the 4-State Barcode, a derivation that is already used successfully by other postal administrations.

Advantages of the 4-State Barcode

The main advantages of the 4-State Barcode are as follows:

- Contains more information in a set length than most other barcode symbologies;
- The barcodes can be read accurately through envelope window panels; and,
- The barcodes can be reliably printed using simple printing techniques such as dot matrix, bubble/ink jet, and laser.

The four 'states'

The barcode comprises four types of bars (four 'states'), each of which is identified by both a name and a value.

Diagram 1 shows an example of a 4-State Barcode.

The four 'states' of bars

Each bar comprises a 'tracker' (middle section), to which an 'ascender' (top section) and/or 'descender' (bottom section) may be added.

As Diagram 2 shows, this creates four possible bar states:

- Tracker with Ascender and Descender,
- Tracker with Ascender,
- Tracker with Descender, and
- Tracker on its own.

Names of the states

Each of these states has a name: H, A, D, or T, and a corresponding value: 0, 1, 2, or 3. Bars in different states can be grouped together to form symbols.

How bars are interpreted

Within a barcode, the bars are grouped in various ways to designate numerical and alphabetical characters.

Although a barcode looks like a consistent string of individual bars, the bars are actually sorted into fields. Each field is allocated a set number of symbols (grouped bars). The symbols make sense by reference to an Encoding Table. The particular configuration of fields, symbols, bars and codes in a barcode are determined by the barcode's format.

Note: The next three sections deal with fields, formats and codes in more detail.

Diagram 1

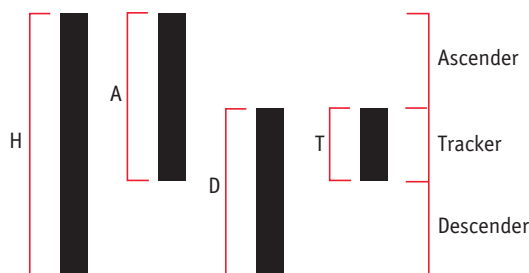
11 96184209 32 57 38 54



Mr John Citizen
PO BOX 6
FOOTSCRAY WEST VIC 3012

Sample Customer Barcode. The characters designated by the bars are printed directly above the barcode. The barcode is generally placed above the address as shown here

Diagram 2



Bar	Elements	Value
T	Tracker	3
D	Tracker, Descender	2
A	Tracker, Ascender	1
H	Tracker, Ascender, Descender	0

The four 'states' of the bar

Barcode fields

Overview of barcode structure

Within a barcode, the bars are separated into 'fields'. Each field contains bar symbols, coded according to an Encoding Table. These symbols represent characters. The characters are a further set of codes, representing a range of sorting rules and other information.

Diagram 3 is an example of a barcode, showing its fields.

Field characteristics

Fields have the following characteristics:

- Each field has a fixed number of bars allocated to it.
- Each field is assigned a particular Encoding Table. The bars within a field are coded into symbols by the Encoding Table.

Format

The exact configuration of bars in a particular field depends on the barcode's format. Several set formats are available, and these are described on pages 8 and 9. Each format comprises the following bars and fields:

- Start Bars
- Format Control Code (FCC) Field
- Sorting Code Field
- Customer Information Field (some formats only)
- Filler Bar
- Reed Solomon Error Correction Bars
- Stop Bars.

Start Bars

The first two bars in any barcode belong to the Start Bars. These bars always have the bar values of '1' and '3', respectively, as shown in Diagram 4.

The Start Bars ensure that the beginning of a barcode can never be mistaken, even when the barcode is upside down.

Format Control Code Field

The Format Control Code (FCC) Field identifies the barcode's format; the particular configuration of fields and bars that applies to the whole barcode. This field always occupies bar positions 3 to 6 (inclusive) in every barcode, as shown in Diagram 5.

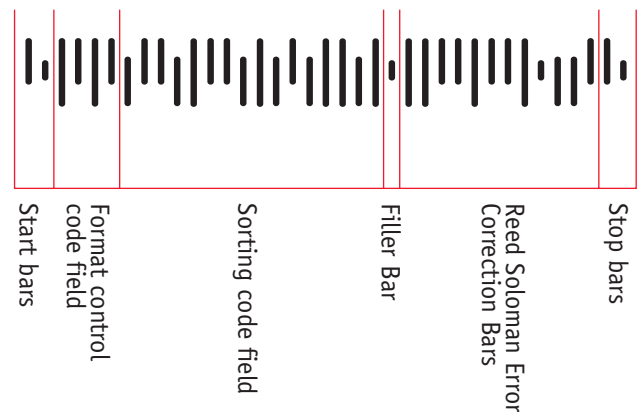
The four bars in this field are encoded by the 'N' Encoding Table. (The N Encoding Table is provided on page 10.) Thus, if the bars have values of '0101', this means the Format Control Code is '11'.

The table below shows the Format Control Codes of the customer 4-State Barcodes currently in use, and the type of barcode each code designates.

A bar value of...	Means the FCC is...
0000	00 (Null Customer Barcode, only valid if DPID is 00000000).
0101	11 (Standard Customer Barcode)
1230	59 (Customer Barcode 2)
2002	62 (Customer Barcode 3)

Note: The zero FCC barcode format is a non-machine readable barcode, it is intended for customer use only).

Diagram 3



Fields in the standard Customer Barcode

Diagram 4



Start bars highlighted in red

Diagram 5



Format Control Field bars highlighted in red

Australia Post internal use only

The Format Control Codes in the table below must not be used by customers unless authorised by Australia Post.

A bar value of...	Means the FCC is...
0122	18 (-)
1010	33 (-)
1111	44 (-)
1112	45 (-)
1202	52 (Customer Business Reply Paid*)
2021	67 (Customer Business Reply Paid*)
2100	70 (-)
2102	72 (International Business Reply Paid*)
2121	77 (International Business Reply Paid*)
3002	92 (-)

*Note: Upon customer registration to the Reply Paid service, Australia Post will supply the artwork for the Reply Paid 4-State Barcode.

Barcode fields (cont)

Sorting Code Field

The Sorting Code Field identifies the Australia Post Sorting Code, an eight-digit number that encodes the destination of a piece of mail. This field comprises 16 bars, occupying positions 7 to 22 inclusive in the barcode. An example of this is shown in [Diagram 6](#).

The bars in the Sorting Code Field are encoded by the N Encoding Table. This means that the 16 bars in this field represent eight digits.

The eight digit sorting codes

The eight digit sorting codes in this field represents the Delivery Point Identifier (DPID).

DPIDs uniquely identify the point to which Australia Post delivers the mail. The point can be the letterbox of a house, a PO Box, a Rural MailBag, or other point. Each such point in Australia is allocated a unique DPID.

Customer Information Field

The Customer Information Field is only available in the Customer Barcode 2 and 3 formats. It enables customers to include their own information in the barcode.

As [Diagram 7](#) shows, the field can be either 16 or 31 bars long, depending on the barcode format.

These bars can be coded by any of the two Encoding Tables, 'C' or 'N', or alternatively customers can encode these bars using their own proprietary techniques. The Encoding Tables are provided on pages 10 and 11.

Uses of the field

The Customer Information Field is a free format field. Customers can represent any information they want in it, provided they can:

- code the information using one of the two Encoding Tables, and
- remain within the bar limit prescribed by the barcode format (16 or 31 bars).

If customers cannot fill the field, they can use filler bars (value 3 bars) to fill the gap.

Reed Solomon Error Correction Bars

The Reed Solomon Error Correction bars perform a 'back-up' or 'quality control' function for the barcode. The bars enable the barcode to be resistant to errors or erasures. These errors/erasures might be caused by faulty printing or too much reflectance from envelope windows, or other factors such as smudging.

There are always 12 of these bars. They are always positioned immediately prior to the Stop Bars as shown in [Diagram 8](#).

The level of correction provided by the Reed Solomon Error Correction Bars obeys the following formula:

$$(2 \times \text{errors}) + \text{erasures} = < 4$$

This means that:

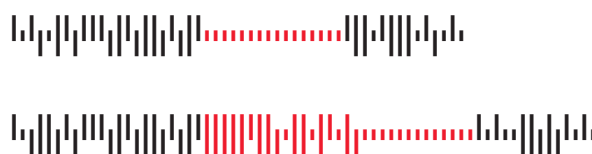
- up to two symbols (in this case symbols means groups of three bars) can have errors, or
- up to four symbols can have erasures (missing bars).

Diagram 6



Sorting Code Field bars and code highlighted in red. The Sorting Code is the DPID number. The DPID number is shown above the barcode.

Diagram 7



Customer Information Field bars highlighted in red in Customer Barcode 2 (top) and Customer Barcode 3 (bottom) formats.

Diagram 8



Reed Solomon Error Correction bars highlighted in red.

Errors and erasures

If the errors or erasures are within these constraints, then the data in the barcode can be recovered. Similarly, if only one of the symbols has an error then up to two symbols can have erasures and the data in the barcode can be recovered.

Error Correction

The 12 Reed Solomon Error Correction Bars are in effect the four parity check symbols of a (n,k) Reed Solomon code over Galois Field **GF(64)**.

The code uses:

- generator polynomial $(x-\alpha) (x-\alpha^2) (x-\alpha^3) (x-\alpha^4)$
- primitive polynomial $1+ \alpha + \alpha^6$, and
- generating element $\alpha = 000010$.

Each symbol (group of 3 bars) is equivalent to a 6 bit Galois Field element, where:

- **n** is the total number of symbols in the 4-State barcode not including the Start Bars and the Stop Bars.
- **k** is the number of symbols in the information part of the barcode. That is the part of the barcode that does not contain the 12 error correction bars nor the Start and Stop Bars.

Excluding the Start and Stop Bars, the barcode is equivalent to a Reed Solomon codeword of $C_{n-1}, C_{n-2}, \dots C_0$ where:

- $C_{n-1}..C_4$ are the information symbols,
- C_3, C_2, C_1, C_0 are the parity symbols, and
- **n** is the number of symbols in the code.

The left-most triple of bars represents information symbol C_{n-1} and the right most triple of bars represents parity symbol C_0 .

Examples

Diagram 9 and 10 on this page show the process of encoding an information string into a barcode and generating the Reed Solomon Error Correction Bars.

The first example, **Diagram 9**, uses a 37 bar barcode with a Format Control Code of **11** and a Delivery Point ID of **39549554**.

This example shows the barcode representation of **1139549554** encoded from the N Encoding Table. This barcode is then broken into triples of bars (symbols). Those triples are converted into their decimal equivalent via the Bar to Decimal Conversion Table.

The decimal representation of the bars is then used as input to the Reed Solomon software. The resulting parity symbols $C_3..C_0$ are added to the end of the original information symbols $C_{n-1}..C_4$ to form the Reed Solomon codeword, $C_{n-1} \dots C_0$.

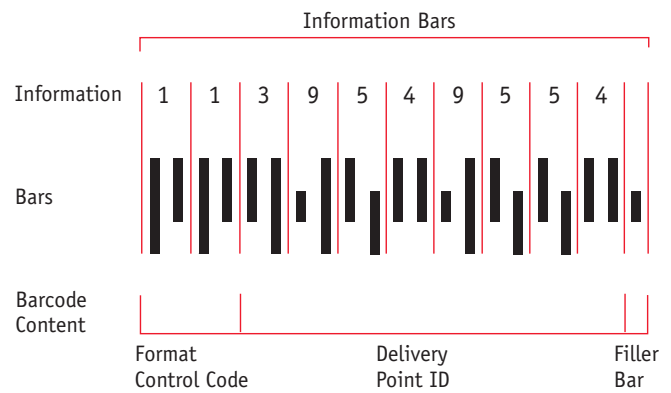
To complete the barcode, as **Diagram 10** shows, the following occurs:

- the parity symbols are converted to bars.
- the Start and Stop Bars are added.

Stop Bars

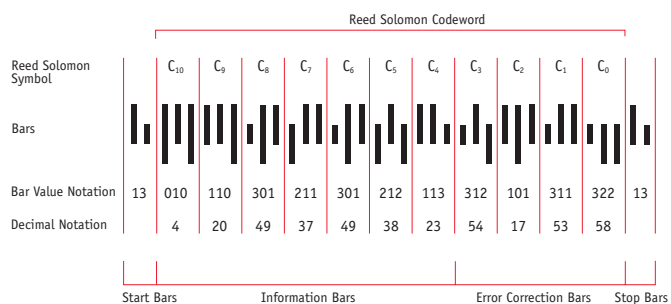
The last two bars in any barcode comprise the Stop Bars. The bars have the bar values of '1' and '3' respectively. Like the Start Bars, the Stop Bars ensures that the bar is read the right way around, even when the barcode is upside down.

Diagram 9



The original barcode

Diagram 10



The barcode broken down into 'triples' of bars. These triples are converted via the Bar to Decimal Conversion Table.

Standard barcode formats

The fields, number of bars and codes used in a particular barcode depend on the barcode's format. Three barcode formats have been established for Customer Barcoding.

The table below provides a high level summary of each format available to customers. It lists the title and code name for each, along with the Format Control Code number and the number of bars defined for the barcode format.

Barcode format	FCC	No. of bars
Standard Customer Barcode	11	37
Customer Barcode 2	59	52
Customer Barcode 3	62	67

The rest of this section explains the purpose of each of these barcode formats and provides field-level specifications for each format.

Standard Customer Barcode

The Standard Customer Barcode is expected to be the most widely-used barcode. Its main purpose is to identify the Delivery Point for each piece of mail. It does not provide a Customer Information Field, unlike Customer Barcodes 2 and 3.

The Standard Customer Barcode has the following format.

Bar position	Field	Code used	No. of bars
1-2	Start Bars	Bars (A & T)	2
3-6	FCC	N Table	4
7-22	Sorting Code (Delivery Point ID)	N Table	16
23	Filler Bar	Bar (T)	1
24-35	Reed Solomon EC Bars	Bar to Decimal Conversion Table	12
36-37	Stop Bars	Bars (A & T)	2
Total Bars			37

Customer Barcodes 2 & 3

The Customer Barcodes 2 & 3 are exactly the same as the Standard Customer Barcode, with the addition of a free-format Customer Information Field. This field is 16 bars long in Customer Barcode 2 and 31 bars long in Customer Barcode 3.

The format of Customer Barcode 2 is as follows.

Bar position	Field	Code used	No. of bars
1-2	Start Bars	Bars (A & T)	2
3-6	FCC	N Table	4
7-22	Sorting Code (Delivery Point ID)	N Table	16
23-38	Customer Information	Free Format	16
39-50	Reed Solomon EC Bars	Bar to Decimal Conversion Table	12
51-52	Stop Bars	Bars (A & T)	2
Total Bars			52

The format of Customer Barcode 3 is as follows.

Bar position	Field	Code used	No. of bars
1-2	Start Bars	Bars (A & T)	2
3-6	FCC	N Table	4
7-22	Sorting Code (Delivery Point ID)	N Table	16
23-53	Customer Information	Free Format	31
54-65	Reed Solomon EC Bars	Bar to Decimal Conversion Table	12
66-67	Stop Bars	Bars (A & T)	2
Total Bars			67

Encoding Tables

Bar Symbols

The bars within a barcode only ‘make sense’ by reference to Encoding Tables. The Encoding Tables assign groups of bars/values to specific characters.

Example

In the N Encoding Table, for example, two bars with values of 0 and 1 represent the digit ‘1’, as shown below.



Types of Encoding Tables

Customer Barcoding uses two Encoding Tables. These are as follows:

- N Encoding Table
- C Encoding Table

A third Encoding Table is used specifically by the Reed Solomon encoding software. It is the Bar to Decimal Conversion Table.

Bar symbols

The Encoding Tables create symbols out of the bars. In the N Encoding Table, the symbols comprise two bars. In all the other tables, the symbols comprise three bars. Each symbol is designated a unique set of bar values.

N Encoding Table

The N Encoding Table, shown at right, is used to encode the digits 0 to 9. It uses 2-bar symbols.

N Encoding Table

Number	Bar Value
0	00
1	01
2	02
3	10
4	11
5	12
6	20
7	21
8	22
9	30

C Encoding Table

The C Encoding Table is used to encode the following:

- Uppercase characters, from A to Z
- Space and # characters
- Lower case characters, from a to z
- Digits 0 to 9.

This table uses 3-bar symbols. The full set of symbols is represented on this page in three tables, for easier reference.

Character	Bar Value
A	000
B	001
C	002
D	010
E	011
F	012
G	020
H	021
I	022
J	100
K	101
L	102
M	110
N	111
O	112
P	120
Q	121
R	122
S	200
T	201
U	202
V	210
W	211
X	212
Y	220
Z	221

Character	Bar Value
a	023
b	030
c	031
d	032
e	033
f	103
g	113
h	123
i	130
j	131
k	132
l	133
m	203
n	213
o	223
p	230
q	231
r	232
s	233
t	303
u	313
v	323
w	330
x	331
y	332
z	333

Number	Bar Value
0	222
1	300
2	301
3	302
4	310
5	311
6	312
7	320
8	321
9	322
Space	003
#	013

Bar to Decimal Conversion Table

The Bar to Decimal Encoding Table is used to represent a decimal value. It is mostly used in the Reed Solomon Error Correction Bars.

This table uses 3-bar symbols. The full set of symbols is represented below in two tables, for easier reference.

Decimal Value	Bar Value
0	000
1	001
2	002
3	003
4	010
5	011
6	012
7	013
8	020
9	021
10	022
11	023
12	030
13	031
14	032
15	033
16	100
17	101
18	102
19	103
20	110
21	111
22	112
23	113
24	120
25	121
26	122
27	123
28	130
29	131
30	132
31	133

Decimal Value	Bar Value
32	200
33	201
34	202
35	203
36	210
37	211
38	212
39	213
40	220
41	221
42	222
43	223
44	230
45	231
46	232
47	233
48	300
49	301
50	302
51	303
52	310
53	311
54	312
55	313
56	320
57	321
58	322
59	323
60	330
61	331
62	332
63	333

Dimensions, placement and printing of barcodes

Constraint factors

To ensure that a barcode can be read by Australia Post's sorting equipment, certain printing and placement constraints must be met. There is often room for variance within these constraints, but it is important for software developers and customers to know the parameters tolerated.

The following constraint factors must be considered:

- Dimensions
- Skew tolerance
- Bar density
- Reflectance
- Quiet Zones
- Placement of barcodes
- Text Representation of the Barcode
- Measurement of barcodes in final form
- Barcode fonts.

Dimensions

The dimensions and spacing of individual bars within a barcode are important, as any major discrepancies can cause a barcode to be invalidated by the sorting equipment.

The minimum gap is the most important dimension. The Reed Solomon Error Correction Bars allow for some errors and/or erasures of the actual bars. The barcode fields are described in detail on pages 5 to 7.

Diagram 11 and the table below provides the minimum and maximum dimensions allowable.

Bar type	Value	Min. Dimension (mm)	Max. Dimension (mm)
T	3	1.0	1.6
A	1	2.6	3.7
D	2	2.6	3.7
H	0	4.2	5.8
Bar gap		0.4	0.7
Bar width		0.4	0.6

Skew tolerance

When barcodes are printed, they are sometimes skewed by the printer. A certain amount of skew is tolerated by the sorting equipment. Customers must be able to recognise the limits of any skew.

There are two types of skew:

- code skews, and
- bar skews.

Code skew

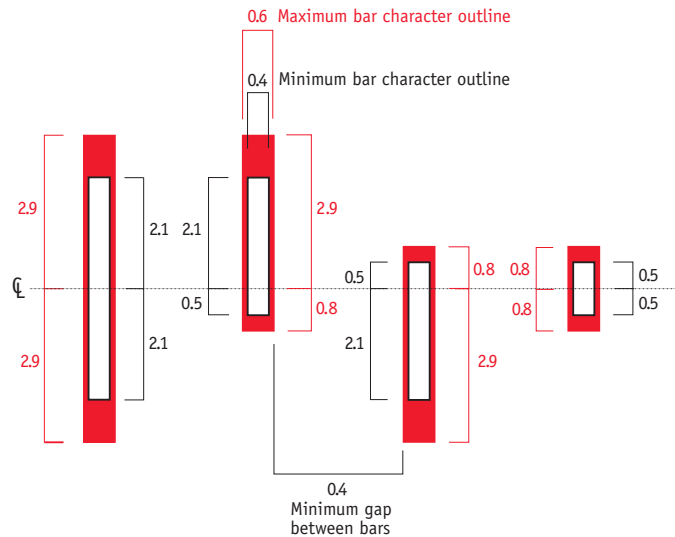
A code skew is when the entire barcode is skewed in relation to the bottom edge of a piece of mail. Code skews of less than +/- 5 degrees horizontal can still be read.

See [Diagram 12](#).

Bar skew

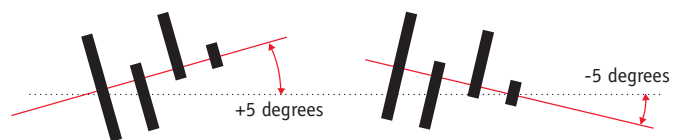
A bar skew is when individual bars are skewed in relation to the centre line of the barcode. See [Diagram 13](#).

Diagram 11



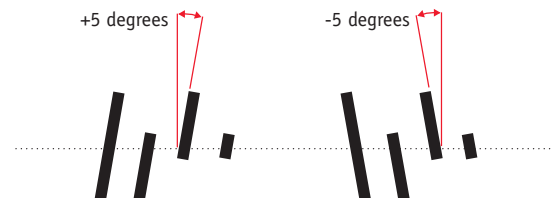
Bars and Gaps: minimum measurements in black, maximum measurements in red

Diagram 12



Code skew tolerance. The bars skew horizontally

Diagram 13



Bar skew tolerance. The bars skew vertically.

Bar skews of less than +/- 5 degrees vertical can still be read.

Combined skews

If a barcode is skewed both ways (code and bar) it can still be read, as long as the total skew is less than 5 degrees.

Bar density

Barcodes must be printed with a bar density of 22 to 25 bars per 25.4mm.

The minimum and maximum lengths for each of the barcode formats are described in the following table.

Barcode Format	Min. Length (mm)	Max. Length (mm)
37	37.0	42.2
52	52.2	59.5
67	67.5	76.8

Reflectance

'Reflectance' is the degree to which light reflects from a surface. Barcode reader devices are sensitive to the reflectance of the following:

- the printed barcode;
- the space around the barcode; and,
- the window material through which barcodes are scanned.

Spectral range

Barcode reader devices operate within the spectral range of 400 to 650 nanometers. Within this range, the following measurements must be met:

- maximum bar reflectance (Rb) is 25%; and,
- minimum space reflectance (Rs) is 50%;

The reflectance difference (MRD) must be greater than 50%, where MRD is defined as follows:

$$MRD = R_s - R_b > 50\%$$

The Print Contrast Signal (PCS) must be greater than 0.75 where PCS is defined as follows:

$$PCS = \frac{R_s - R_b}{R_s} > 0.75$$

Opacity of the substrate

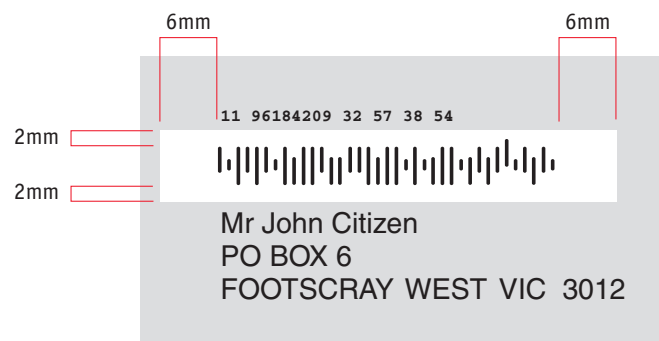
The material on which the barcode is printed (the 'substrate') must be opaque, to prevent unwanted information showing through and obscuring the barcode. This requirement is met if the MRD is at least 50% when the material is backed with a black surface having a reflectance below 5%.

Quiet Zones

'Quiet Zones' are the minimum margin spaces around a barcode that must be kept blank (free of printing or other distractions) if the barcode is to be properly scanned. Barcodes require a Quiet Zone immediately above, below, and to the right and left of the barcode.

The required Quiet Zones are shown in [Diagram 14](#).

Diagram 14



Minimum Quiet Zone around barcode indicated by white area.

Dot Matrix Printing

Ideally, dot matrix printing should yield dots that touch or overlap. If not touching, the space between the dots must not exceed 0.127mm. See [Diagram 15](#).

For barcodes represented by a single column of dots the diameter of printed dots must be in the range of 0.4mm to 0.6mm. See [Diagram 16](#).

For barcodes represented by a column of dots with more than one dot per row, the width (bar character outline) of the printed bar must be in the range of 0.4mm to 0.6mm. See [Diagram 17](#).

Diagram 15

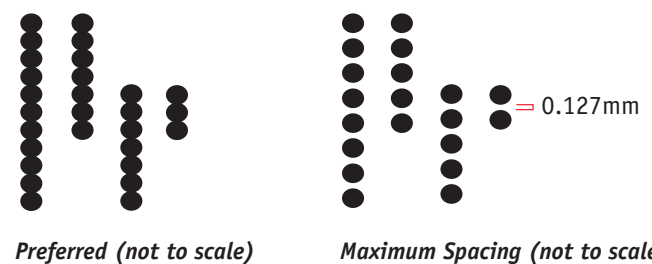


Diagram 16

0.4mm - 0.6mm



Not to scale

Diagram 17

0.4mm - 0.6mm



Not to scale

Dimensions, placement and printing of barcodes (cont)

Distractions in a Quiet Zone

Any of the following constitute 'distractions' within a Quiet Zone, and may affect a barcode's ability to be scanned:

- any printing or other ink or marks;
- patterns or textured paper/substrate; and,
- printing showing through from another page.

Dimensions of the Quiet Zone

The following minimum dimensions must be met for each barcode:

- the smallest allowable Quiet Zone on the left and right of a barcode is 6 mm;
- the smallest allowable Quiet Zone above and below the barcode is 2mm.

Placement of Barcodes

Certain constraints apply to the location of a barcode on an envelope. These constraints apply to any letter.

In general, the preferred location for barcodes is above the address, and the barcode must fall within the non-shaded zone in [Diagram 18](#) on the next page.

Orientation

The barcode must be printed parallel to the bottom (long) edge of the letter.

Printable area

As [Diagram 18](#) shows, barcodes must be printed within the following margins:

- no less than 15 mm from the bottom edge of the piece of mail;
- no more than 100mm up from the bottom edge of the piece of mail;
- no less than 20mm down from the top edge of the piece of mail; and,
- no less than 15mm from either side of the piece of mail.

Other placement rules

The following placement rules also apply:

- no part of the barcode must appear in the Cancelling and Metering Zone: and,
- regardless of where the barcode is placed, the address must be located in the Address Zone. The margins of the Address Zone are the same as those in [Diagram 18](#), except the top margin is 40mm rather than 20mm.

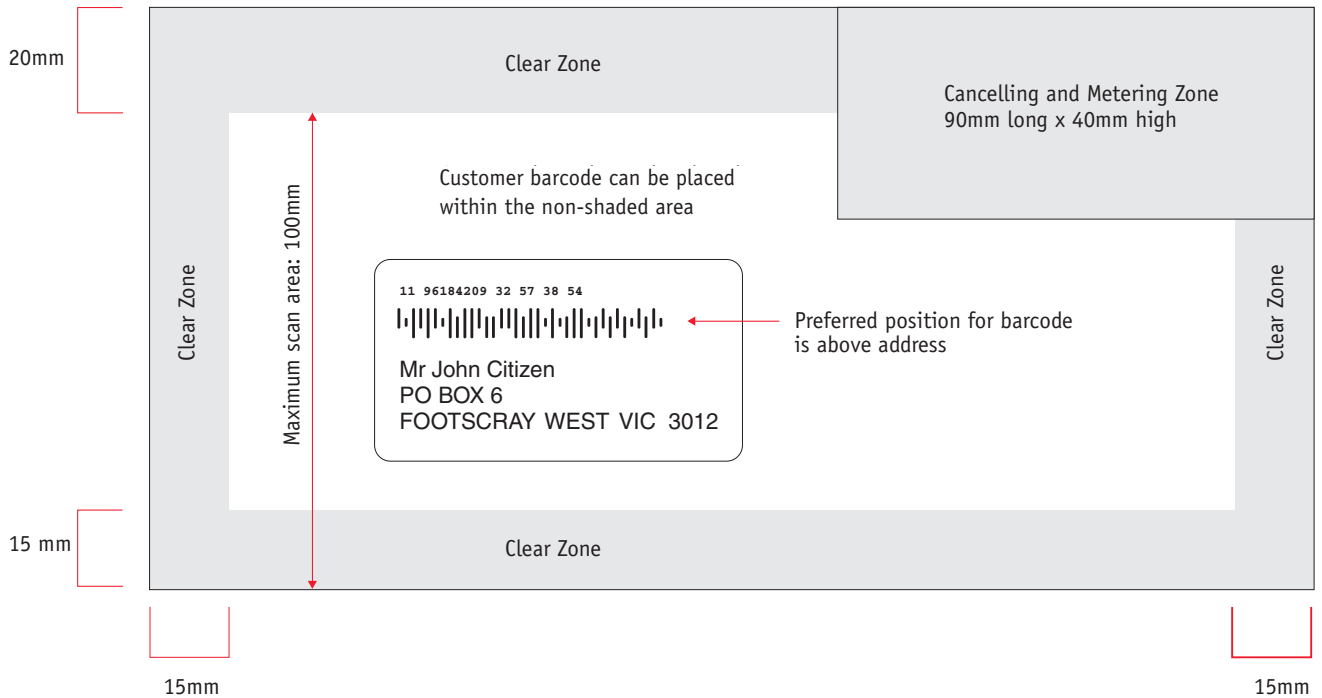
Text representation of the barcode (Optional)

Text representation of the barcode is optional. If printed, it should appear above the barcode in 8 point type or less. This text must be outside of the barcode's minimum Quiet Zone.

Measurement of barcodes in final form

The print quality of a barcode can only be determined in its final form; ie as it actually appears on the letter. The correct location and reflectance can only be determined once the barcode is viewed through envelope window material or plastic wrapping, as applicable.

Diagram 18



Allowable printing zones for barcodes. Note: Diagram not to scale

Barcode fonts

Barcode bars can be printed using any appropriate font. The barcode font must allow bars to be printed by sending the printer the appropriate printer command followed by the hexadecimal values representing the bars to be printed.

The ASCII and EBCDIC values corresponding to the bar values are shown below.

Bar Value(Decimal)	ASCII(Hex)	EBCDIC(Hex)
3	33	F3
2	32	F2
1	31	F1
0	30	F0

Blank characters

A blank character (space) can be used in a barcode. Blank characters are the same width as the bars.

The ASCII and EBCDIC values corresponding to the blank character are as follows.

Bar Value(Decimal)	ASCII (Hex)	EBCDIC (Hex)
3	33	F3

The blank character can be used, if required, for positioning the barcode in the print line.

Invalid bar values

In the event that a communication, or other error, results in an invalid bar value, a blank must be printed in its place.

Glossary

4-State Barcode

The barcode symbology used by Australia Post. The symbology enables the delivery destination and other information to be designated on a piece of mail in a barcode format. The name derives from the fact that the codes are made of four types (states) of bars.

Alphanumeric

A character set containing letters, numbers, and other characters.

ASCII

The character set and code described in the American National Standard Code for Information Interchange, ANSI X3.4-1977.

Bar

A single vertical printed line that forms a part of a barcode. The length of the bar may vary, depending on the value of the bar.

Barcode

A series of bars organised according to specific rules into various symbols. The symbols represent letters, numerals, and other human readable characters.

The characters represented by the bars are a further set of codes, representing a range of sorting rules and other information.

Bar Density

The number of characters that a barcode can represent in a length of 25.4 mm.

Barcode Symbol

A group of bars that represent characters or data elements in a particular symbology.

Bar Format Encoded

Any information string that has been converted from the original alpha or numeric representation to a bar by bar representation. In case of the 4-State barcode it would be a string of 0, 1, 2 or 3's in the appropriate order to represent the information required.

Character

An individual letter, number, or other symbol represented by a group of bars.

Character Set

Characters available for encoding within a barcode.

Contrast

The difference in reflectance between the bars and paper or other material the barcode is printed on.

Customer Barcode

A barcode that can be printed on mail items by Australia Post customers.

Customer Information Field

A part of the barcode that is set aside for an Australia Post customer to use to store their own information. The data contained in the Customer Information Field must comply to the format published for the barcode being used.

Delivery Point Identifier (DPID)

An eight digit number that uniquely identifies a physical point to which Australia Post delivers mail.

Font

A specific size and style of type used by printers.

Format

The physical arrangement specified for a particular barcode symbol.

Format Control Code (FCC)

A two digit number encoded in all barcodes that identifies the fields/Encoding Tables used in the barcode. The FCC provides the 'recipe' for the barcode, enabling the barcode to be decoded.

Opacity

The relative ability of paper or other material to prevent light showing through. Opacity affects the ability of the reader devices to scan barcodes.

Print Contrast

Comparison of reflectivity between bars and spaces.

Pre-sorting

The process of a customer sorting their mail to defined sorting breaks prior to lodgement into the Australia Post network.

Quiet Zone

A zone defined by the distance immediately preceding the first Start Bar, and following the last Stop Bar, and the distances above and below the barcode. This zone must be kept clear of other printing to assist barcode reading.

Reed Solomon Error Correction

A process used to protect a barcode from errors and erasures.

Reflectance

The amount of light reflected back from a surface.

Start/Stop Bars

A pair of bars used for the beginning or end of a barcode that allow the barcode scanner to identify if the printed barcode is upside down.

This prevents the barcode scanner from reading the barcode in the wrong direction. If the scanner identifies the orientation of the barcode by checking the Start/Stop Bars it can then attempt to read the barcode in the correct direction.