



## Getting Started Guide

The AM Labels series of guides contain everything that you need to know about barcoding, labelling and scanning your products. This guide is essentially a hardware and software guide covering the essentials of barcoding, scanning and mobile computing. Additional guides are available through the links below, covering:

- [Barcode Types](#)
- [Labelling Guide](#)
- [Printer Selection Guide](#)
- [Scanner Selection Guide](#)

We would be grateful to have your feedback on this guide, please feel free to let us know if you find this guide useful, or if you would like to see anything covered here that isn't already, by clicking on the [link](#) and filling in the short form.

### 1. What is a Barcode?

Barcodes are a way of displaying information as a printed symbol that can easily read by electronic devices. They are used to hold information about a product or item such as a product code, asset number or patient ID. One of the most common applications for barcodes is in shops and supermarkets.

### 2. Why Use Barcodes?

Barcodes are used for capturing data electronically, using either an electronic reader or scanner. The process of capturing data electronically is referred to as Auto ID Data Capture (AIDC). Systems for barcode AIDC consist of three phases:

- i. Printing the barcode either directly on the item, packaging or on a label.
- ii. Capturing the barcode data using a scanner or reader and inputting the information into a computer, handheld terminal or PDA.
- iii. Retrieving information from or updating a local or central database.

The main benefits of using barcodes for electronic data capture are:

- A reduction in man-made errors
- Much quicker and more efficient entry of information.
- Inexpensive and easy to implement - bar code scanners are relatively low cost and extremely accurate.
- Businesses can produce detailed and up-to-date information/reports on stock levels and the movement or tracking of items and products.

### 3. Common Applications For Barcodes

Some of the most common uses for Barcodes are:

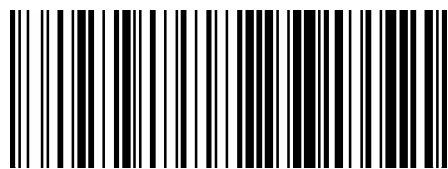
- The management of processes and stock control within manufacturing.
- In all industries, Government organisations and the Public Sector for accurate asset tracking.
- Within retail barcodes enable goods to be identified at the point of sale, so that the correct pricing can be retrieved and stock levels instantly updated.
- Within healthcare barcodes are used for identifying patients, drugs, blood and samples etc.
- Logistics and delivery services use barcodes for tracking parcels and goods.

### 4. 1D & 2D Barcodes.

Barcodes come in two main types or symbologies; one dimensional barcodes (1D or linear) and two dimensional barcodes (2D).

#### 1D / Linear Barcodes

These barcodes consist of lines (commonly called bars) and spaces



AMLABELS1234  
Code 128



5 010303 002392  
EAN 13

Code 128 and EAN 13 are two of the most common 1D barcodes. 1D barcodes typically contain a part number, product code or patient number etc. When a barcode is read and input into a computer, it is typically cross referenced to either a local or central database, where large amounts of information can be automatically retrieved for the item scanned. The database could contain information on pricing in a retail application, location and stock in manufacturing, or location and keeper in an asset tracking application.

**Code 128** is a general purpose barcode, widely used across all industries including the public sector and government bodies and can contain letters and numbers.

**EAN 13** is probably the most widely recognised barcode and is the type used to identify goods in shops and supermarkets by scanning at the till, checkout or point of sale system. This barcode can only contain numbers.

The use of EAN 13 barcodes is regulated by GS1 UK to ensure that each manufacturer has a unique range of numbers to avoid duplication. To register, please follow the link; [http://www.gs1uk.org/membership/membership\\_types.asp](http://www.gs1uk.org/membership/membership_types.asp)

#### 2D Barcodes

2D barcodes typically contain more detailed information about the item, e.g. the full address of the recipient in the case of parcel delivery.



Datamatrix

**Datamatrix**, as shown here, is one of the most common 2D barcodes, and is typically used in parcel delivery and healthcare. Whereas the Code 128 and EAN 13 barcodes above contain 12 and 13 characters respectively, the Datamatrix barcode shown above contains 108 characters.

For a full list of the different types of barcode available, please see the AM Labels Barcode Guide, [here](#)

### **5. How Do I Barcode My Products?**

Barcodes can either be printed directly onto the product, onto packaging or onto a label, ticket, tag, wristband or other material which can then be applied to the item.

There are two ways of printing your own barcodes, either using a conventional office printer and A4 laser or inkjet labels, or a dedicated (thermal) label printer. Using a dedicated thermal printer is easier and more efficient than using a conventional office printer, and has a number of benefits including:

- Much wider choice of label materials and adhesives so that a solution can be tailored more closely to your specific requirements.
- No more paper jams. The thermal printing process does not involve heating the labels as it does with laser printers. This heating process in laser printers can cause the adhesive to leach out causing paper jams.
- Labels are normally printed in a continuous form, either on rolls or fan folded, for ease of application.
- Thermal label printers can be fitted with automatic cutters so that labels or tags can be cut to the desired length.
- Greater range of shapes and sizes available off the shelf.

### **Barcode and Label Software**

There are a number of software solutions for designing and printing labels and documents with barcodes, including:

- Standard Windows programs such as Word or Excel using a barcode font.
- Dedicated label design programs such as Bartender.
- Most thermal printers have built-in barcode software in the form of barcode fonts. This allows barcodes to be printed with suitable software on your PC or other devices such as PLCs (Programmable Logic Controllers). If you would like more information on this method of printing barcodes, please call the AM Labels Technical Support Team for advice on 01536 414222)

AM Labels can provide solutions for all the above options. Most thermal label printers come with a free, basic label design program which will allow you to print 1D and 2D barcodes. More advanced versions will also allow you to connect to external databases.

For more information on selecting a label printer, please see our thermal printer selection guide, or call our friendly and knowledgeable sales team on 01536 414222.

## 6. Barcode Scanning

Barcode scanners or readers come in a wide variety of forms to suit every application. There are two important considerations when choosing the correct scanner for your needs, which are:

- The scanner technology e.g. CCD, laser or imager.
- Scanner type: e.g. corded scanners (connected via a cable), cordless scanners (wireless), PDA and handheld terminal scanners and barcode verifiers.

### Scanner Technology

- CCD (Charge Coupled Device) scanners illuminate the barcode with light from LEDs and are available in two types. Contact scanners have read ranges from contact to 2-3cm and medium range types have read ranges from 20-30cm.
- Laser scanners illuminate the barcode with light from a laser and are therefore capable of reading barcodes at a greater distance. Standard laser scanners typically read barcodes up to 30cm, with long range versions able to read barcodes up to 10M.
- Imager technology uses a small camera to capture 1D and 2D barcodes. The barcode is then decoded using digital image processing.

### Scanner Types

#### Corded Scanners

Corded scanners are handheld devices connected via an interface cable to a PC or laptop. Interface cables are typically 1.5m to 2m long, which means that the item to be scanned has to be brought to the scanner. A typical application would be point of sale, where the barcode is scanned at the checkout.

The main types of corded scanner are:

- **Office/Retail Scanners** – low cost, light weight devices with drop specifications up to 1.5M. These scanners will typically read 1D (linear) barcodes.
- **Industrial Scanners** – These are ruggedised devices sealed against dust and moisture to IP65 , with drop specifications of up to 2m onto concrete.
- **2D Scanners** – these are handheld devices able to read 1D and 2D barcodes. 2D scanners usually capture an image of the barcode and are therefore omnidirectional (i.e. able to read a barcode at any orientation). These scanners come in office/retail and industrial (rugged) versions.
- **Presentation Scanners** – these scanners are specifically designed for hands-free scanning and are also omnidirectional. They're often found in retail applications at the point of sale.
- **Fixed Mount Scanners** – These devices are commonly mounted on production lines and scan the barcode as it passes. 1D, 2D and omnidirectional versions are available.
- **Wands** – these are hand-held devices shaped like a thick pen, which are used to scan barcodes by running them across the surface of the barcode.

When choosing a corded scanner you will need to select the correct interface cable to suite the software and connection on your PC or laptop. The most common types are USB, serial and keyboard wedge

### **Cordless or Wireless Scanners**

Cordless scanners are handheld devices connected via a Bluetooth or proprietary wireless link to a base station or access point. Cordless scanners can either replace a corded scanner, providing the operator with greater freedom of movement, or form part of a network, where a number of scanners would communicate with a single base station or a network of access points. The wireless range varies from 15m to 50m.

Cordless scanners come in a variety of types. These include office/retail, industrial, 2D/omni-directional, small handheld scanners and “ring” scanners. [Click here to find out more.](#)

### **PDA Scanners**

These are small devices that can be plugged into the SD or CF socket in the top of a PDA, converting the PDA into a handheld data capture device. 1D, 2D and RFID versions are available.

### **Barcode Verifiers**

These are specialist barcode readers designed to measure the quality of barcodes in terms of the contrast between the bars and spaces and the ratio between the width of the bars and spaces. It is a requirement of many supermarkets that barcodes are checked by an approved barcode verifier. Barcode verifiers measure the quality of barcodes to international standards such as ISO/IEC 15416 and ANSI X3.182.

## **7. Mobile Computing and Data Capture**

Mobile computers or Portable Data Entry Terminals (PDETs) are used in applications where information needs to be collected or a barcode scanned in locations away from a conventional computer or PC, such as in a warehouse. Mobile computers come in a range of designs, sizes and levels of ruggedness and have the advantage of being able to process the information, either before being passed on to a remote computer or for use by the operator.

Applications for mobile computers include:

- Stock replenishment in shops and supermarkets.
- Booking in, despatch, order picking and stock takes in warehousing and manufacturing.
- Administering drugs in health care.
- Booking in and out items and audits in asset tracking.
- Field sales and delivery (route accounting).
- Law enforcement (e.g. issuing parking tickets).

### **Mobile Computer Operating Systems**

The type of operating system on the PDA handheld terminal will determine your choice of application programs and software development tools. There are two main types of operating system software used in mobile computers, Pocket PC / Windows CE and proprietary operating systems:

- Pocket PC / Windows CE – these are versions of the industry standard Microsoft Windows operating systems, specifically designed for mobile devices with limited memory and small screens (1/4 VGA). These operating systems are becoming increasingly common, with a wide range of applications and development tools available. Windows CE is a subset of Pocket PC without applications such as Windows Explorer.
- Proprietary or non-standard operating systems are more commonly found on low cost handheld terminals. These devices often come with Application Programme Generators (APGs), which allow simple applications to be quickly and easily developed by non-programmers.

## 8. Mobile Computing Application Software

There are a wide range of applications and development tools for Pocket PC and Windows CE based PDAs and handheld terminals available from AM Labels. The options for application software include:

- Off-the-shelf applications such as Stock Control, Asset Tracking, Field Sales and Delivery.
- Application Programme Generators (APGs). These are designed for non-programmers and allow sophisticated applications to be developed quickly and easily. An example is the MCL-Collection from Zetes. Please call our sales team on 01536 414222 if you would like more information.
- Bespoke programming service; AM Labels offers a cost effective programming service for applications requiring a dedicated solution.

Examples of previous bespoke solutions developed by AM Labels include:

- Various applications for issuing and receiving stock, linked to Enterprise Resource Planning (ERP) systems.
- Auditing housing stock
- Issuing parking tickets
- Mobile caretakers
- Waste management systems
- Programming by the customer using programming languages such as C++, C# or Visual Basic. AM Labels can provide advice and support should you wish to develop your own application in this way.

## 9. Wireless Applications

The choice of wireless solution will depend on your specific application. Some of the most popular systems for wireless communication are:

- **Wireless Personal Area Network (WPAN).** The most common type of link in this category is Bluetooth and this is typically used for short range communication (up to 15M) between a PC or PDA and devices such as headsets, mobile printers and cordless scanners.
- **Proprietary wireless networks.** For example the Datalogic narrow band, Star system, allows up to 32 scanners to communicate with a single base station and up to 2000 scanners in the same area.

- **Wireless Local Area Network (WLAN).** The industry standard for this type of wireless network is 802.11 b/g (also known as Wi-Fi). Wireless LANs are typically used to link computers or other devices within buildings with a wireless range of up to 50M from the nearest access point (some coverage outside of buildings is also possible). Most laptops, PDAs and handheld terminals come with this type of wireless network as standard. As this type of wireless network is low cost and easy to install, it is increasingly found in shops, offices, factories, warehouses and homes.
- **Wide Area Networks (WANs)** are computer networks that allow data communication over large distances, e.g. between regions and countries. This type of wireless network would be the system of choice for mobile workers such as field sales and delivery people. Many modern devices cater for WAN technology; PDA cell phones come with a WAN capability as standard, and Rugged PDAs and handheld terminals have the option for a WAN capability and simply require a SIM card (Subscriber Identity Module) to be fitted to allow access to the internet and wireless data communication. The international standard for WAN communication is GSM, (Groupe Spécial Mobile, also known as the Global System for Mobile communication). There is now a newer version, GPRS (General Packet Radio Service) designed specifically for internet use and data communication.

### **10. Wireless Application Software**

The main advantage of wireless systems is that information can be updated in real time (i.e. information on both the handheld and the main computer system can be completely up to date.) The options for wireless applications are very similar to those described in 'Section 8; Mobile Computing Application Software', with the exception of Terminal Emulation.

Terminal Emulation – with this type of system, you do not need specialist application software on your handheld terminal or PDA, you simply run the application program resident on the host computer using terminal emulation software. Traditionally, terminal emulation has been used in warehouses to replace a “dumb” VDU display and keyboard with a wireless handheld terminal, providing the user with greater freedom of movement. Some of the more common types of emulation are 5250, 3270, VT and HP.