

# Bar Code Printing Options for SAP End Users



A ZEBRA BLACK&WHITE PAPER





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# Executive Summary

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Producing bar code output from the SAP® environment has traditionally been a challenge. The specialized, rugged printers used for printing bar code labels on production lines, warehouses, shipping docks, and other industrial environments use different command languages than the office printers supported by SAP software. Middleware or printer-specific SAPscript was always needed to get the bar code printer to recognize SAP output.

In 2004, SAP simplified what formerly had been a complex task for its customers by including native bar code printing capability in its software, and including a true bar code printer driver for the first time. The functionality is available for mySAP™ Business Suite versions 4.6c and higher, included with Smart Forms, and included in the new Interactive Forms product, which is based on Adobe® software co-developed with Adobe Systems. Interactive Forms is part of the new SAP NetWeaver™ platform. The bar code printer control language SAP chose to embed in its products is Zebra Printer Language (ZPL®) from Zebra Technologies. That means Zebra® printers can print labels with data from SAP applications right out of the box with no additional software, drivers, print servers or programming required. ZPL joins PostScript® and PCL® as the only printer languages native to SAP.

**The following table summarizes bar code output options available for different versions of SAP.**

|   |  |
|---|--|
| * | Recommended solution   |
| ✓ | Indicates the solution will work but may not be the best solution available. |
| — | Indicates the solution is not applicable.                                    |

| SAP Version                      | Middleware or Output Management | Upload Method | SAP Smart Forms | Interactive Forms Based on Adobe Software |
|----------------------------------|---------------------------------|---------------|-----------------|---|
| Pre 4.6c (R/3)                   | ✓                               | *             | —               | —   |
| 4.6c-4.7<br>mySAP Business Suite | ✓                               | ✓             | *               | —   |
| mySAP ERP                        | ✓                               | ✓             | ✓               | *   |



There is no “right” or “best” way to output bar codes from SAP. The enterprise IT and label printing environment and the desired label and forms output are all variables that help determine the most appropriate method for your enterprise. This white paper is intended to provide a high-level overview of the different SAP bar code printing solutions offered by Zebra. Please refer to other Zebra white papers listed at the end of this white paper for more detailed information about each SAP printing application. Visit [www.zebra.com/smartforms](http://www.zebra.com/smartforms) to keep abreast of Zebra’s product offerings. This paper will:

- Present options for bar code printing from SAP;
- Explain the advantages and limitations of different output methods for common SAP usage scenarios including:
  - Direct Printing from SAP (SAP Smart Forms and Interactive Forms)
  - Upload Method (SAPscript)
  - Zebra’s Upload Solution: Zebra **BAR-ONE**® for *mySAP*™ *Business Suite*
  - Third-party Bar Code Software for Upload
  - Output Management Software
  - PC-based Labeling Software (Middleware);
- Describe how to use Unicode™-enabled printers to avoid custom forms design to support international character printing; and
- Explain how SAP information can be output from mobile and wireless printers.

Zebra has extensive SAP bar code printing experience and has specific products to support each method. Zebra is thus uniquely positioned to recommend the optimal SAP bar code printing solution for its customers, regardless of their legacy environment.

## I n t r o d u c t i o n

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Without native support, printing bar codes from SAP requires software to execute several functions. Static and/or variable data required for the bar code label must be extracted from the SAP system. Next, information must be encoded in a bar code or otherwise formatted to meet the content and presentation requirements for specific label fields. The label file, with all bar code, text, and graphics, also needs to be formatted for the printer control language of the printer where the output is directed.

Prior to SAP’s breakthrough developments, a variety of alternatives were developed so SAP customers could output enterprise information in bar code format wherever and whenever necessary. All the approaches for bar code label printing from SAP are based on either uploading the printer control language to the SAP application, or downloading SAP conversion functionality to the print system. The three most common approaches for bar code printing in the SAP environment are:

- The upload method, in which bar code labels are designed using a third-party software package and uploaded into *mySAP*™ *Business Suite* through SAPscript programming. This is by far the



simplest, least expensive, and most common method of driving bar code label printers today. One product for the upload method is called Zebra **BAR-ONE** for mySAP™ Business Suite.

- Using third-party output management software to design forms and labels. This approach is known as middleware as it requires that the software convert SAP output into bar codes and commands that printers can recognize.
- Running bar code labeling software networked to the SAP system to query directories or print queues. This is another middleware approach and normally requires the software to run as a Windows Server™ converting SAP output to that of the printer control language.

Printer control language support has been the main obstacle to efficiently integrating bar code label printers with SAP systems. For years, SAP software only supported two printer control languages, PostScript and PCL. These languages are common in laser, inkjet, and other office printers, but are not supported by thermal bar code printers, which are designed to produce labels, not documents. So, further data conversion and command manipulation was always required so bar code printers could recognize SAP output.

Finding the best way to make the conversion depends on several variables. These include the number of label formats that are used, the frequency that labels change and that new formats are needed, the number of bar code printing locations, the legacy base of bar code label printers, and the amount of SAP programming and support resources you want to commit.

The following sections present the options for generating bar code label output from SAP, with guidance to where each method is appropriate.


## Direct Printing from SAP (SAP Smart Forms and Interactive Forms)

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SAP built native bar code printing support into its software by adding bar code rendering functionality and including drivers for Zebra printers. Bar code rendering and printing support can be applied from 4.6c onwards via SAP Support Packs available directly from SAP. Bar code labels and forms for output from SAP applications are created in the familiar Smart Forms environment. If the destination printer can recognize ZPL, PostScript, or PCL output, it can print bar codes with no additional programming required. This is also true of Interactive Forms, SAP's next generation form design tool available through SAP NetWeaver (available in Web Application Server v 6.40). Interactive Forms includes the easy-to-use Adobe Form Designer, and is seamlessly integrated with ABAP Workbench and SAP NetWeaver Developer Studio. Interactive Forms also supports ZPL and bar code design.

Simplicity is the biggest advantage of printing bar codes directly from SAP. It makes the process of printing bar codes from the SAP environment as easy as printing a Word document on a PC. There are no additional software licenses, servers, or PCs to buy and support. The approach is very economical, because SAP customers can take advantage of their existing Smart Forms license to satisfy their label and form printing needs. Support of the ZPL bar code printer command language provides users with an easy way to migrate their label production from laser printers to thermal printers, which are much more efficient to operate and offer many additional features.





There are limitations to direct bar code output from SAP. Users need a PostScript, PCL, or ZPL printer. PostScript and PCL laser printers are built to print documents and are poorly suited for enterprise bar code label printing. They frequently lack the bar code print quality, speed, media options, and reliability required for daily label production, and often make inefficient use of toner and label material. Zebra's ZPL thermal printers are available in numerous sizes, enclosures, and configurations, including compact desktop units; rugged, metal-encased industrial models; and mobile printers that can be worn on a belt or carried by hand. A variety of interfaces are also available for ZPL printers, including Ethernet, 802.11b-standard wireless, USB, and more. Other thermal printer makers may develop ZPL emulation, but these devices will not be able to provide all the compatibility, features, and performance available in true ZPL devices.

Please refer to SAP OSS Notes 430887, 750002, and 750772, available on the [www.service.sap.com](http://www.service.sap.com) Web site, for more information about SAP Smart Forms bar code support. Also see Zebra's white paper "*Using SAP® Smart Forms for Bar Code Label Printing from mySAP™ Business Suite*" or Zebra's SAP Smart Forms technical documentation on Zebra's Smart Forms Web page, which you can reach via links from [www.zebra.com/smart-forms](http://www.zebra.com/smart-forms).

## Upload Method (SAPscript)

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SAP users have made the upload method the most popular way to generate bar code labels from their applications. Bar code labels are designed using a third-party label design software application. Then, through SAPscript, the bar code design file is uploaded into the SAP form. Bar codes can then be printed directly from SAP without additional processing.

The simplicity of direct printing is the biggest attraction to the upload method. Printing systems are easy to administer, because after the one-time uploading into the SAPscript form is completed, there is print server hardware to maintain. Direct printing also enables fast label output, which is important for many distribution, warehousing, and production operations.


The upload method may require ABAP programming upfront to make output convenient. Each label format will require manual modifications being made to the printer control language file. These modifications are required to embed the SAP variables names and SAPscript logic, which adds time and expense. Binary files cannot be uploaded, which prevents the use of Asian characters, restricts graphics capabilities, and on some printers prevents the use of TrueType™ fonts. The upload method also places some limitations on text wrapping, justifications and variable field scaling.

### **Zebra's Upload Solution: Zebra BAR-ONE for mySAP™ Business Suite**

Zebra BAR-ONE for mySAP™ Business Suite is a software product from Zebra Technologies for bar code label design and output in the SAP environment. The main attributes that set this approach apart from others are that no manual modifications or scripting is required. This means that the end user does not need to become an expert in ZPL and may not even need any SAPscript experience. Label formats can be created in a fraction of the time it would take to generate and continually modify SAPscript.

Labels are designed in the BAR-ONE software environment and uploaded to the SAP system through the mySAP Business Suite Windows® client. The BAR-ONE software takes care of the conversion from the desktop design environment to SAP compatibility by automatically generating SAPscript in mySAP Business Suite





Internal Text Format (ITF). The SAP system can direct bar code label output to Zebra printers at any enterprise location. A single license of the bar code design software is all that is required and covers printing at all enterprise locations.

See the “*Zebra BAR-ONE for mySAP™ Business Suite*” white paper for a more comprehensive description of the solution and its benefits. This white paper, as well as a demo of the software, can be downloaded by visiting [www.zebra.com/smartforms](http://www.zebra.com/smartforms). Zebra’s *BAR-ONE for mySAP™ Business Suite* can also be used to design labels for Zebra’s ZPL-enabled mobile printers such as the QL 420™. Visit [www.zebra.com](http://www.zebra.com) to learn about ZPL-enabled mobile printers.

### **Third-Party Bar Code Software for Upload**

Independent software vendors offer PC-based bar code label design and output software designed to provide similar functionality as BAR-ONE. Most packages offer general-purpose label design and printing features. The main benefit these packages provide is that one software package can be used to create labels for printers from different vendors.

However, there are drawbacks to a multiple vendor environment. Third-party upload software requires modifications to labels to be made manually in the design output file. Therefore, users need programming capabilities for each printer control language that is used. In addition, once files are manually modified they cannot be changed within the label design application, because all manual modifications would be lost.

## **O u t p u t   M a n a g e m e n t   S o f t w a r e**

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Output management software serves as middleware for processing SAP data into bar code format for output in specific printer languages. SAP’s own Smart Forms and Interactive Forms products are essentially forms output management applications that are tightly integrated with the SAP enterprise system. Third-party output management applications for use with mySAP Business Suite are available from Adobe, FormScape, Optio, StreamServe, and other ISVs.

Output management software can tremendously improve the readability of forms and documents and adds powerful font and graphics capabilities to SAP output. Multiple document printers and technologies are typically supported. However, because the software is forms oriented, support is usually stronger for office printers than for bar code label printers. Now that Smart Forms and Interactive Forms have native ZPL support, output can be directed to ZPL printers in addition to devices that can process PostScript, PCL, and Adobe PDF files.

Unless Smart Forms or Interactive Forms are used, the output management approach gives users another software application to license, learn, implement, roll-out, and maintain. It also introduces another layer to the print system, which can slow performance. The features and benefits of output management applications vary by vendor and should be investigated thoroughly if this approach is considered.



## PC - Based Labeling Software (Middleware)

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Another third-party option is to use bar code labeling software that resides outside the SAP system, normally running as a Windows service, and communicates print jobs through a network connection. Middleware on a Windows Server box processes SAP data, formats it into a bar code label, and directs it to the appropriate printer for output. The third-party application is responsible for monitoring the SAP system to pick up and process any print jobs that have been sent.

This labeling software middleware approach enables enterprise print operations to be managed centrally. The solutions are also frequently used in mixed-printer environments where SAP output is directed to label printers from different manufacturers.

The amount of integration required to connect third-party labeling middleware with SAP applications varies by solution. All will require some additional software, and may also require the use of a dedicated server or PC.

## International Printing for mySAP Business Suite — Unicode

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Multinational businesses and companies working across borders should also consider what language support they may need from their label printer. Western European languages are fully supported, but special consideration must be given to Eastern European, Middle-Eastern, and Asian languages. Zebra supports all major business languages from 4.6c onwards via Unicode (UTF-8) for both Smart Forms and the SAPscript upload method using Zebra's **BAR-ONE** for mySAP™ Business Suite. It is not necessary to use SAP 4.7 Enterprise to take advantage of Unicode with Zebra bar code label printers. This means users can implement the same printer model and SAP forms at all locations without having to worry about local languages and dialects. This avoids the need for many derivatives.

For more detailed information about our International Printing (Unicode) Solution for SAP, download the “Zebra’s Solution for Printing International Characters from mySAP™ Business Suite (Unicode™ UTF-8)” white paper at [www.zebra.com/smartforms](http://www.zebra.com/smartforms).


## Mobile and Wireless Printing

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Note that the main function the various SAP bar code output solutions all provide is converting SAP data into something the user’s printer control language will recognize. Printer networking, interface, and communications capabilities are unchanged. This is an important consideration in the bar code environment, because many innovative solutions have been developed to provide real-time enterprise information access and output wherever it is needed. One of the most powerful ways to leverage the investment in an SAP system is to extend information access to non-office workers. Wireless networks are an effective medium for extending information access, and wireless printers can enhance applications by enabling output.

Zebra Xi™ series printers and select other models, including mobile printers, can connect to 802.11b-standard wireless local area networks. Because 802.11b was created to provide the wireless equivalent of Ethernet connec-





tivity, the methods used for SAP output on Ethernet networks can be applied to wireless printers. The wireless-enabled printer gets an IP address and appears as a device on the network. Print jobs and other commands are sent wirelessly instead of over Ethernet cable, but all necessary data conversions and formatting can remain the same as if a physical connection was used. If printer drivers are used, the same drivers used for specific models of printers will also work for wireless versions.

Mobile printers can receive print jobs from SAP applications in one of two ways. Network-addressable wireless mobile printers would interface with the host system the same way as described above for stationary mobile printers. Mobile printers that do not connect directly to the network would receive print jobs from the mobile computer they are used with. It is also possible to control mobile printers with a Bluetooth® connection from a PC or other device, but additional software work would be required.

SAP Console and WebSAP Console deliver SAP's WMS/LES transactions to the mobile worker on handheld devices via wireless local area networks. This same technology also fully supports Zebra's QL series mobile printers to empower the warehouse worker to print labels where and when they are needed.

## RFID Printing/Encoding

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Zebra is the first company to offer RFID printer/encoders that work seamlessly with SAP's new Auto-ID Infrastructure. Zebra offers several products with this feature including the R110Xi™, R170Xi™, R4Mplus™ EMEA version, and R110PAX™ printer/encoders. The new Zebra XML-based solution enables the tag commissioning feature of SAP's RFID software.

Learn more about Zebra's direct connect to SAP Auto-ID Infrastructure by visiting [www.zebra.com/smartsforms](http://www.zebra.com/smartsforms). To inquire about Zebra's RFID pilot programs, please call +1 847 793 2600 or +1 800 423 0442. Visit [www.rfid.zebra.com](http://www.rfid.zebra.com) to stay up to speed on Zebra RFID products and country certifications.

## Conclusion

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The primary challenge to outputting bar codes from SAP applications has been getting the software and printer to speak the same language. Now, SAP and Zebra bar code label printers speak the same language—ZPL. SAP users who use versions prior to 4.6c must either use the upload method or middleware to enable bar code label output. Zebra recommends its Zebra **BAR-ONE** for *mySAP™ Business Suite* software.

SAP customers using versions 4.6c and onwards can use the upload method, middleware, or Smart Forms. Zebra believes that Smart Forms provides the best ROI, maximizing existing skills and infrastructure. Companies using SAP NetWeaver should also consider Interactive Forms, the latest generation of SAP forms technology. This new tool developed in conjunction with Adobe Systems, a long-time partner of both SAP and Zebra, offers drag-and-drop support for bar codes and includes native support for a single bar code printer manufacturer—Zebra.

A variety of effective solutions for enabling bar code output from SAP have been developed. To find the best method for their operations, companies must assess their label and form printing needs, legacy printer base and replacement schedule, and available SAPscript /ABAP programming resources. By matching the method to the enterprise environment, companies can successfully satisfy their SAP bar code printing needs.





Zebra Technologies supports all the SAP printing methods described in this paper. Together with our partners we have successfully completed more than 1,000 SAP printing installations, using BAR-ONE and other upload software, print servers, output management software, and direct printing from SAP. With more than 30 years of experience and four million printers sold, Zebra is the trusted brand for more than 90 percent of Fortune 500 companies. Visit [www.zebra.com/smartforms](http://www.zebra.com/smartforms) to learn more about Zebra printers, labeling software, connectivity and support options, and integration partners.

## A b o u t   Z e b r a   T e c h n o l o g i e s

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Zebra Technologies Corp. (Nasdaq: ZBRA) delivers innovative and reliable on-demand printing solutions for business improvement and security applications in 100 countries around the world. More than 90 percent of Fortune 500 companies use Zebra-brand printers. A broad range of applications benefit from Zebra-brand thermal bar code, “smart” label, receipt, and card printers, resulting in enhanced security, increased productivity, improved quality, lower costs and better customer service. The company has sold more than 4 million printers, including RFID printer/encoders and wireless mobile solutions, and also offers software, connectivity solutions, and printing supplies. Information about Zebra bar code and RFID products can be found at [www.zebra.com](http://www.zebra.com).





## Resources

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Please visit [www.zebra.com/smartforms](http://www.zebra.com/smartforms) to read more about Zebra's SAP solutions:

### SAP press releases

- “*Zebra Delivers Bar Code Functionality Directly From mySAP Business Suite*” press release dated October 6, 2004.
- “*Zebra Technologies First to Offer RFID Printer/Encoders for SAP's New Auto-ID Infrastructure*” press release dated January 17, 2005.
- “*Zebra Technologies Now Shipping First High Performance UHF RFID Printer/Encoders Specifically Designed for European RFID Specifications and Frequencies*” product release May 16, 2005.
- “*Zebra Technologies Introduces Industry First Thermal Label Printers to Support Unicode for mySAP Business Suite*” press release dated July 19, 2005.

### Download White Papers

- *Zebra's Solution for Printing International Characters from mySAP™ Business Suite (Unicode™ UTF-8)*
- *Using SAP® Smart Forms for Bar Code Label Printing from mySAP™ Business Suite*
- *BAR-ONE® for mySAP™ Business Suite: Bar code label design software from Zebra*

### Zebra SAP Smart Forms Information

- SAP Smart Forms FAQs
- SAP Smart Forms Technical Documentation
- *Using SAP® Smart Forms for Bar Code Label Printing from mySAP™ Business Suite* white paper
- Download SAP OSS Notes 430887, 750002, and 750772, available on the [www.service.sap.com](http://www.service.sap.com) Web site, for more information about SAP Smart Forms bar code support.

### Zebra's BAR-ONE for mySAP Business Suite

- Download a demo of Zebra's BAR-ONE for mySAP™ Business Suite by visiting [www.zebra.com/smartforms](http://www.zebra.com/smartforms).

### Unicode

Visit [www.service.sap.com/unicode](http://www.service.sap.com/unicode) to learn more about SAP's Unicode support.





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