

**BARCODE DLL
BARCODE PLUS DLL**

Version 4.1



BRS Systemtechnik Birger Rauh

**Information for use with the SAP[®]
R/3 System**

For SAPSprint and SAPLPD

Version May 16, 2008

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1 Smart Barcoding

1.1 Easy to use

Our Barcode DLL is supported by SAP R/3: Easy plug-and-play using the printer type SWIN.

1.2 Performant

SAPLPD multithreading is fully supported by our Barcode DLL. This feature allows parallel receiving and processing of multiple print jobs from SAP.

1.3 Flexible

Our Barcode DLL dramatically reduces your costs to print barcodes. You can use any graphic printer for Windows. You can replace broken printers with any other model and don't have to worry how to replace it with the same model.

You do not need to buy barcode hardware for each printer.

You can use our Barcode DLL to print almost any widely used barcode type including:

- Code 128 / EAN 128
- Code 39 (3 of 9)
- Code 93
- 2 of 5 family

Barcode Plus DLL adds to common 2D barcodes:

- QR Code
- PDF 417
- Data Matrix
- Maxicode

For a complete list and availability in the plus and classic version, please refer to section 3.2.2

Almost any barcode allows you to specify parameters and options. Our Barcode DLL allows you to define

- The size of the printed barcode using absolute or device dependent measurements. You may specify in millimeter as well as using fractions of inch or points.
- Rotation of barcodes.
- Rows and columns for 2D Barcodes
- Error correction mode, redundancy.
- Structured data for Data Matrix.

For a complete list, please refer to section 3.2

Support for long barcodes (more than 80 characters) to overcome the line length limitations of SAP R/3. See section 3.10

1.4 Easy configuration

The SAP R/3 is shipped with the device type SWIN, which is already optimized for the use with our Barcode DLL. Most customers will find this device type suitable for their needs. We also include a device type ZSWINE in our distribution (Examples) to reflect the latest changes.

If you need to change the default setting, our integrated test tool BARTTEST.EXE makes parameter selection and testing really easy. It will even show you, which parameters to put into your SAP print control.

This combination of support by SAP R/3 and customizing makes our Barcode DLL really unique.

1.5 Easy deployment

The Barcode DLL can be easily deployed. Install the software on one PC and distribute the resulting files C:\Windows\System32\Barcode.dll and Barcode.dat with any deployment software. These files can be distributed to C:\Windows, C:\Windows\System32 or to the SAPLPD home directory.

1.6 Cost effective

A lot of factors contribute to the cost effectiveness of our Barcode Software:

- Barcodes can be printed on almost any Windows Printer.
- Broken printers can easily be replaced without additional costs.
- Easy configuration once for all printers.
- No additional testing for all used printer types required.
- Easy deployment to the client PCs.
- Easy update of the client software.

1.7 Support included

Our online and always up to date trouble shooting section on our web site will help you in case of problems: <http://www.brs-online.de> . You are also welcome to contact us at BRSTechSupport@brs-online.de for support. The support is free until 6 Month after the purchase. Please note that we do not charge for the support in any case.

1.8 Contact us

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2 Installation

2.1 System Requirements

SAP Release 2.x, 3.x, 4.x and newer versions, SAP Netweaver using Unix, Windows, OS/400

SAPLPD version 2.x and newer versions or
SAPsprint version 1.0 or newer

Operating System: Windows 2003/XP/2000/NT/Server 2003/Server 2008/Vista

2.2 Barcode DLL

This section describes the installation of our Barcode DLL and also outlines the required changes in your SAP R/3 system.

2.2.1 Licensed Version

If you download the Barcode DLL from the Internet at <http://www.brs-online.de>, you will get a single executable BC32.EXE that contains the compressed installation set. Simply execute this program from your explorer to unpack the installation set. Executing BC32.EXE will result in the files SETUP.EXE, BARCODE.DL_, BARTEST.EX_ and BARCODE.DAT as well as this MANUAL.PDF. If you received a CD-ROM, these files can be found on the disk.

The required license key will be sent to you as email, by fax or on floppy disk. Please save the email as LICENCE.KEY in the same directory where you have the unpacked installation files or place it on floppy disk as A:\LICENCE.KEY. Please see section 3.2.19 for activation of an "Online Activation Key", which consists of approx. 15 characters starting with LC.

To install the Barcode DLL to your system, please run the supplied program SETUP.EXE from the installation set.

To install a licensed version, the license disk should be inserted to your diskette drive or the file LICENCE.KEY has to be just beside of the installation set. If this file is found at the start of SETUP.EXE, the license string is read from this file.

If you have received the license key by fax, you may enter this string manually into the field license key.

The destination directory for the Barcode DLL is set to the windows system directory. This default should normally not be changed. BARCODE.DLL and BARCODE.DAT will be installed into this directory. These files are later used by SAPLPD to actually print the barcodes.

The destination for the barcode test utility BARTEST.EXE is found in the last input field.

2.2.2 Demo Version

If you download the Barcode DLL from the Internet, you will get a single executable BC32.EXE that contains the compressed installation set. Simply execute this program from your explorer to unpack the installation set. Executing BC32.EXE will result in the files SETUP.EXE, BARCODE.DL_, BARTEST.EX_ and BARCODE.DAT as well as this MANUAL.PDF.

To install the Barcode DLL to your system, please run the supplied program SETUP.EXE from the installation set.

The destination directory for the Barcode DLL is set to the windows system directory. This default should normally not be changed. BARCODE.DLL also BARCODE.DAT will be installed into this directory. These files are later used by SAPLPD to actually print the barcodes.

The destination for the barcode test utility BARTEST.EXE is found in the last input field.

2.2.3 Upgrade from demo to a licensed Version

To upgrade from a demo version to a licensed version, you must obtain a license key from BRS Systemtechnik Birger Rauh or an authorized reseller. You may download the most recent version the Barcode DLL from the Internet at <http://www.brs-online.de>. It is the same executable as for the demo version, so if you already have downloaded the actual demo version, you can go ahead with this one.

You will get a single executable BC32.EXE that contains the compressed installation set. Simply execute this program from your explorer to unpack the installation set. Executing BC32.EXE will result in the files SETUP.EXE, BARCODE.DL_, BARTEST.EX_ and BARCODE.DAT as well as this MANUAL.PDF. If you received a CD-ROM, these files can be found on the CD-ROM.

The required license key will be sent to you as email, by fax or on CD-ROM. Please save the email as LICENCE.KEY in the same directory where you have the unpacked installation files or place it on floppy disk as A:\LICENCE.KEY. Please see section 3.2.19 for activation of an "Online Activation Key", which consists of approx. 15 characters starting with LC.

Before upgrade, please make sure that any copy the demo BARCODE.DLL and BARCODE.DAT are removed from system!

To update the Barcode DLL to your system, please run the supplied program SETUP.EXE from the installation set.

To install a licensed version, the license disk should be inserted to your diskette drive or the file LICENCE.KEY has to be just beside of the installation set. If this file is found at the start of SETUP.EXE, the license string is read form this file.

If you have received the license key by fax, you may enter this string manually into the field license key.

The destination directory for the Barcode DLL is set to the windows system directory. This default should normally not be changed. BARCODE.DLL also BARCODE.DAT will be installed into this directory. These files are later used by SAPLPD to actually print the barcodes.

The destination for the barcode test utility BARTEST.EXE is found in the last input field.

2.2.4 Upgrade from BARCODE to BARCODE PLUS DLL

To upgrade from a licensed classic barcode version to a licensed barcode plus version, you must obtain a license key for the barcode plus version from BRS Systemtechnik Birger Rauh. You may download the most recent version the Barcode DLL from the Internet at <http://www.brs-online.de>. It is the same executable as for the demo or classic barcode version, so if you already have downloaded the actual demo version, you can go ahead with this one.

You will get a single executable BC32.EXE that contains the compressed installation set. Simply execute this program from your explorer to unpack the installation set. Executing BC32.EXE will result in the files SETUP.EXE, BARCODE.DL_, BARTEST.EX_ and BARCODE.DAT as well as this MANUAL.PDF. If you have received a CD-ROM, these files can be found on the disk.

The required license key will be sent to you as email, by fax or on CD-ROM. Please save the email as LICENCE.KEY in the same directory where you have the unpacked installation files or place it on floppy disk as A:\LICENCE.KEY.

Before upgrade, please make sure that any copy the demo BARCODE.DLL and BARCODE.DAT are removed from system!

To update the Barcode DLL to your system, please run the supplied program SETUP.EXE from the installation set.

To install a licensed version, the license disk should be inserted to your diskette drive or the file LICENCE.KEY has to be just beside of the installation set. If this file is found at the start of SETUP.EXE, the license string is read form this file.

If you have received the license key by fax, you may enter this string manually into the field license key.

The destination directory for the Barcode DLL is set to the windows system directory. This default should normally not be changed. BARCODE.DLL also BARCODE.DAT will be installed into this directory. These files are later used by SAPLPD to actually print the barcodes.

The destination for the barcode test utility BARTEST.EXE is found in the last input field.

2.2.5

2.2.6 Using an Online Activation Key

Starting with version 3.6.5, the license key can be obtained online with an Online Activation Key. An Online Activation Key is a string of letters and digits, starting with the letters LC. You will receive this activation key by email, fax or as a sticker on your CD. The Online Activation Key does not replace the existing licensing mechanism based on the license key file "LICENCE.KEY". It is just another way to obtain this key file.

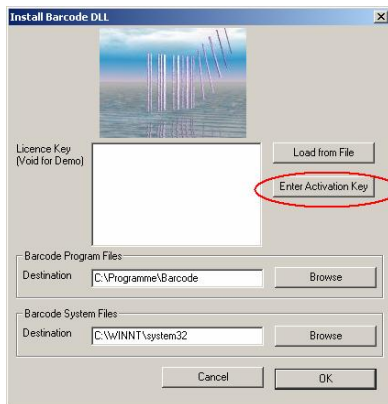
If your computer does not have direct online access:

Please visit <http://www.brs-online.de/activate.htm> from a computer with online access. You can activate your license there and transfer the resulting LICENCE.KEY file to your local computer.

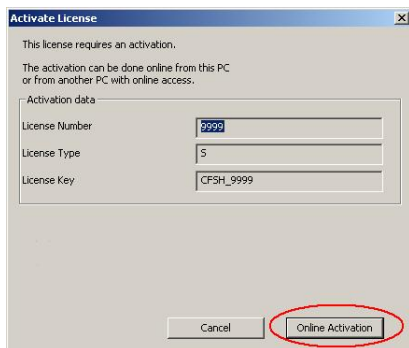
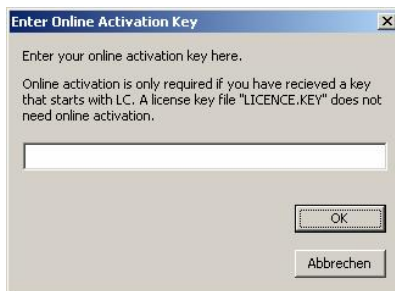
If your computer has direct online access:

Please run the program "Setup.exe" to begin the installation. After the license acceptance, you will be prompted for the license key. On the right side is a button "Enter Activation Key".

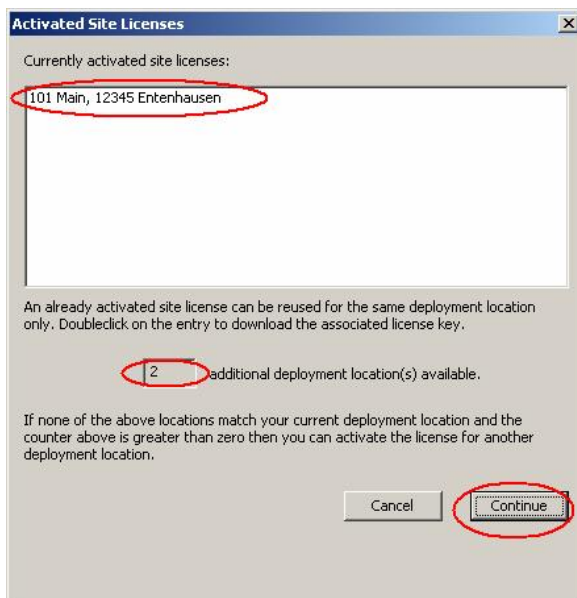
2.2.7



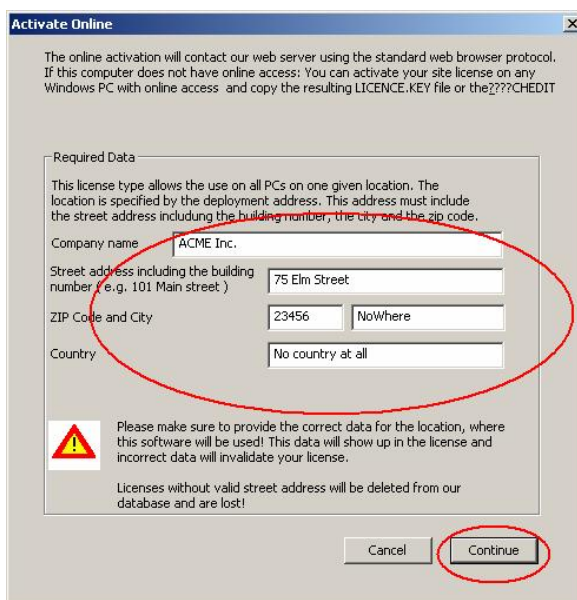
This will lead to the “Enter Online Activation Key” Dialog:



If you have purchased one or more site licenses, the activation process will check for active site licenses. On the next screen, the setup will present a list of already activated deployment locations. If your deployment location does match one location from the list then you can select it with a double click. The setup will then download the LICENCE.KEY file for this deployment location. For a 3 site license this screen may look like this one:



If you want to install the Barcode DLL on a location that is not listed, then click on the continue button.



Please provide us correct data here. We will clean up any activation record with fake data. This will result in a loss of your license. We will also provide support only for licenses with complete activation including correct address.

Activate License - Optional Data

Please nominate a contact person for communication. We will keep this information strictly confidential and contact you only for severe issues.

Optional Data

Salutation / First / Lastname Mr. John Doe

Phone / Fax w country code ++1 304 7894 341 ++1 304 7894 341

eMail John.Doe@Acme.com

Cancel OK

If you enter your contact data here, we will keep this data strictly confidential and only contact you for severe issues.

Please save the license key as "LICENCE.KEY" to a safe place. If possible, the file LICENCE.KEY should also be copied to the same directory, where your Setup.exe is. When you start the setup.exe again, the license will already be present.

The next step will bring you back to the main setup screen:

Install Barcode DLL

Licence Key (Void for Demo) <Barcode Licence>LicVersion=4,LicN Load from File

Enter Activation Key

Barcode Program Files
Destination C:\Programme\Barcode Browse

Barcode System Files
Destination C:\WINNT\system32 Browse

Cancel OK

2.2.8 Installing a newer version of BARCODE.DLL or BARCODE PLUS DLL

Any license obtained from BRS Systemtechnik Birger Rauh entitles you to use newer versions of the Barcode DLL respective Barcode PLUS DLL released up to six month after the issue date of the license.

To use this update feature, please download the newer version of barcode demo from <http://www.brs-online.de> and proceed as described under "upgrading from demo to licensed version". To be eligible for upgrading, the new Barcode DLL MUST be released within six month after the issue date of your license or you will get an error message when installing a version that was released after that date.

If you have purchased a license for Barcode DLL or Barcode PLUS DLL with maintenance contract, you may install any covered newer version of the Barcode.DLL respective Barcode PLUS DLL.

2.3 SAPLPD

SAPLPD does not need any special configuration. It is already aware of our Barcode DLL and will use it after the next restart.

You will see our copyright notice in the SAPLPD log file.

For more information about SAPLPD, please have a look at the SAP documentation.

2.4 SAPSprint

SAPSprint does not need any special configuration. It is already aware of our Barcode DLL and will use it after the next restart.

Please note that SAPSprint may be used with print method "U" (Berkeley protocol) and "S" (SAP). Both protocols can use our Barcode DLL.

For more information about SAPSprint, please have a look at the SAP documentation.

2.5 Device type

The device type describes the capabilities of a printer type and how to interact with it. To get most use out of SAPLPD's windows interface, you use device type SWIN (when available) or SAPWIN for the older versions.

Current SAP versions are aware of our Barcode DLL. You can use the device type SWIN as it is.

The Barcode DLL is controlled via print controls. These are the only items that may need to be changed. For details, please see section 3.4

If you do modify the barcode related print controls, please copy the device type SWIN / SAPWIN before doing any modifications. Use a name like ZSAPWIN for your version.

2.6 Define your print controls

Current SAP versions are aware of our Barcode DLL. You can use the print controls defined for device type SWIN.

If you are using an older SAP version, you need to define the required barcode print controls. You might want to use the copy of SAPWIN to add your barcode print controls. For details, please see section 3.4

2.7 Setup your printer

2.7.1 Named printer

The Barcode DLL is called from SAPLPD. This requires you to use the printer types SWIN / SAPWIN / ZSAPWIN. SAPLPD will call our Barcode DLL only, if you are using print method "S".

2.7.2 Front end printer

The Barcode DLL is called from SAPLPD. This requires you to use the printer types SWIN / SAPWIN / ZSAPWIN. SAPLPD will call our Barcode DLL only, if you are using print method "F". The printer name has to be "__DEFAULT" (underscore underscore DEFAULT) or %DEFAULT%. SAPGUI has to be version 3.1G or better. SAPLPD on the front end has to be version 2.42 or better. For details please see the SAP BC print manual.

2.8 Suitable printing processes

In principle every fully supported windows printer can be used for barcode printing. But the quality of the resulting printouts will differ depending of the used printing process. The commonly used printing techniques generate the output composed of individual dots. Finer and more precise positioning of the dots will increase the quality of the resulting barcode, as increased contrast will do.

2.9 Laser printer

Most laser printer are well suited to print high quality barcodes.

2.10 Inkjets

Inkjets can be used to print barcodes if suitable paper is used. The ink should not spread over the paper.

2.11 Impact printers

Impact printers, mostly dot matrix printers, should not be used to print barcodes with more than two different bar sizes (code 39 for example). If it is indispensable to print such codes, you will have to calibrate the size of the printed bars for your printer.

Make sure to use quality ribbons and change them regular. Worn out ribbons will result in errors in the barcode detection.

3 Printing barcodes from the SAP system

3.1 Requirements

The barcode DLL requires Windows 95, 98, NT, ME or Windows 2000/XP/2003. Windows 3.1 is no longer supported. The barcode DLL extends other programs but does not execute standalone.

When printing barcodes from the SAP system you need the SAP program SAPLPD version 2.17 or above and SAP Release 2.1A or above. You have to send the data to the SAPLPD using the SAP device type SAPWIN.

3.2 Parameters

When printing barcodes from the SAP system, barcode data and parameters are embedded in the data stream sent from the SAP system. The sequence <Escape>b%¹ indicates the beginning of a barcode. All following data is sent to the barcode DLL until the terminating <Escape>² is reached. This is part of the SAPLPD protocol and only noted as information for you.

The data sent to the barcode DLL consists of some parameters and the data itself. The parameters determine the properties of the printed barcode. Parameters are structured all equal. They are distinguished by a key letter, followed by an equal sign and terminated by a comma. The associated value is between the equal sign and the comma.

¹ Hexadecimal 1B 62 25

² Hexadecimal 1B

3.2.1 General Parameters

These parameters are used with most barcodes:

Parameter	Meaning
C	Barcode selection
B	Width of barcode
H	Height of barcode
P	Enable or disable checksum
A	Enable or disable caption
X	Horizontal position of the barcode
Y	Vertical position of the barcode
S1 bis S4	Relative size of the bars*
L1 bis L4	Relative size of the gaps *
RA	Ratio between smallest and next thicker bar multiplied by ten.
ADS	Additional space for gaps
ADB	Additional width for bars
I	Definition of a common printer DPI. All values for S1-L4,ADS,ADB and pixel values for X and Y will be scaled to the common printer DPI value. 0 to disable.
R	Barcode rotation (0,1,2,3 for 0,90,180 and 270 degrees)
KB	Blank removal (0,1,2,3)
Z	Short notation for combined parameter A, P, RA, ADS, ADB and R
AL	Alignment of the created barcode
D	Data follows, this must be the last parameter. An error will be flagged if no data is present.
d	Data follows, this must be the last parameter. Missing data is allowed.

The barcode specific parameters are listed in chapter 203.2.15 ff.

* S2 to S4, L1 to L4: Version 1 only, Version 2 will use this information only if RA and ADS are not given. S1 is used in version 2 to determine the size of a narrow bar as in version 1.

3.2.2 Barcode selection (C)

You select the barcode with parameter **C**. Valid selections are:

Parameter	Selected barcode
C=128	Code 128
C=128A	Code 128, Subset A
C=128B	Code 128, Subset B
C=128C	Code 128, Subset C
C=25I	Code 2 of 5 Industrial (Default)
C=25M	Code 2 of 5 Matrix
C=25L	Code 2 of 5 Interleaved
C=G11	German Postal Identcode 11
C=G13	German Postal Leitcode 13
C=39	Code 39
C=39X	Code 39 Extended
C=93	Code 93
C=93X	Code 93 Extended
C=C16K	Code 16K [‡]
C=C16KA	Code 16K [‡] , Subset A
C=C16KB	Code 16K [‡] , Subset B
C=C16KC	Code 16K [‡] , Subset C
C=C49	Code 49 [‡]
C=CODA	Codabar
C=DM	Data Matrix [‡]
C=E128	EAN 128
C=E128A	EAN 128, Subset A
C=E128B	EAN 128, Subset B
C=E128C	EAN 128, Subset C
C=E13	EAN 13

C=E13+2	EAN 13 + 2 Zusatzzeichen
C=E13+5	EAN 13 + 5 Zusatzzeichen
C=E8	EAN 8
C=E8+2	EAN 8 + 2 Zusatzzeichen
C=E8+5	EAN 8 + 5 Zusatzzeichen
C=HIBC	HIBC
C=MC	Maxicode [‡]
C=MSI	MSI Plessey
C=PDF417	PDF 417 [‡]
C=PDF417T	PDF 417 Truncated [‡]
C=PDF417M	PDF 417 Micro [‡]
C=UCC128	UCC 128
C=UPCA	UPCA
C=UPCA+2	UPCA + 2 Zusatzzeichen
C=UPCA+5	UPCA + 5 Zusatzzeichen
C=UPCE	UPCE
C=UPCE+2	UPCE + 2 Zusatzzeichen
C=UPCE+5	UPCE + 5 Zusatzzeichen
C=UPCE0	UPCE0 ³
C=UPCE0+2	UPCE0 + 2 Zusatzzeichen
C=UPCE0+5	UPCE0 + 5 Zusatzzeichen
C=UPCE1	UPCE1 ⁴
C=UPCE1+2	UPCE1 + 2 Zusatzzeichen
C=UPCE1+5	UPCE1 + 5 Zusatzzeichen
C=ZIP	ZIP Postnet

[‡] This code is licensed separately.

[‡] This code is licensed separately.

[‡] This code is licensed separately.

³ UPCE0 is a variant of UPC. It starts with a system code digit 0, followed by 6 digits data and a checksum digit. Only the 6 digits have to be supplied. Two or five extra digits can be added as supplement.

⁴ UPCE1 is a variant of UPC. It starts with a system code digit 1, followed by 6 digits data and a checksum digit. Only the 6 digits have to be supplied. Two or five extra digits can be added as supplement.

3.2.3 Width (B)

With the parameter **B**=<Number> the required width of the barcode is selected. The width is measured in millimeters. From Version 2.1, the number may be followed by "mm", "mil" or "px" to specify millimeters, milli inch or pixel.

The really printed width of the barcode might vary slightly as all bars and gaps should have the same width. Make sure that each bar and gap are printed with at least some dots. It makes no sense to print a 10-digit barcode with a width of 1 millimeter.

If no width is specified or the specified width is zero, the width of the bars and gaps is taken from the parameters **Sx** and **Px**. They are interpreted as absolute number of dots in this case. The width of a dot depends on the selected printing resolution of the printer. A typical value for current printers is 300 dots per inch. So, if the sum of all bars and gaps gives a value of 300, the resulting barcode will have a width of one inch.

Please note, that complex barcodes will not always allow specifying an absolute width.

3.2.4 Height (H)

With **H**=<number> the height of the barcode is specified in millimeters. If a positive number is used, the barcode will have its lower left corner at the current cursor of SAPLPD. If a negative number is used, the barcode will have its upper left corner at the current cursor of SAPLPD. Using a negative height together with rotation of the barcode will produce an undefined result.

3.2.5 Checksum (P)

P=1 selects the automatic generation of a checksum for the barcode if this feature is defined for the selected barcode. With **P**=0 no checksum is generated. No all barcodes can be controlled by this parameter. Some barcodes do not support checksums, some barcodes require some form of checksum.

3.2.6 Caption (A)

With **A**=0 caption is suppressed. With **A**=1 barcodes are printed with caption using the default height 5 millimeter (backward compatibility with versions prior to 2.0.4). Values larger than 1 enable the annotation and specify the size of the annotation. The size is specified in millimeter. Most 2D barcodes like PDF 417 and Data Matrix do not support annotation.

3.2.7 Blank Removal (KB)

With **KB**=0 blank removal is suppressed. With **KB**=2 or **KB**=3 barcodes are printed without leading blanks, newlines or tabs. With **KB**=1 or **KB**=3 barcodes are printed without trailing blanks, newlines or tabs. The default value is 3.

3.2.8 Horizontal and vertical Position (X,Y)

Parameters **X** and **Y** give control over the positioning of the barcode on the current page of the SAPLPD output. The position is specified in millimeters (1/1000th of a meter), milli inch (1/1000th of an inch) or pixels from the top left corner. To specify millimeter, append "mm" to the number, "mil" for milli inch or "px" for pixel. A number only is defaulted to millimeters. When the parameter is not

specified at all, the barcode is printed at the current cursor of the SAPLPD. (Version 2.0.7 or older only supports millimeters). Please see parameter "I" for "px" values.

3.2.9 Width of bars and gaps (S1)

Parameter **S1** defines the width of the smallest bar. The ratio between the size of the smallest and the next smallest bar is defined by the parameter RA (expressed as ten times the real ratio). A value of 20 defines a ratio of 2:1, a value of 25 a ratio of 2.5:1 and 30 a ratio of 3:1. For backward compatibility, the ration will be computed from S2:S1 if both values are supplied but no RA is given.

By default, the size of the bars will also be used as size of the gaps. To add some space between the bars, you can define the parameter ADS. A given value of 1 will result in a one-dot wider gap between the bars and so on. For backward compatibility, the value for ADS will be computed from given values for S1 and L1 if no ADS is given.

Please see parameter I .

3.2.10 Width of bars and gaps scaling (I)

Parameter **I** can be used to make the S1 value printer resolution independent. The S1, S2, L1, ADB and ADS are interpreted relative to this printer resolution. The option has a default value of 600. A value of 0 disables this function. This parameter will not affect the barcode if an absolute barcode width is specified (parameter B). The parameter I is new with version 4.1.

The values of parameter X and Y are also scaled when a pixel value is specified.

3.2.11 Combined parameter Z

The SAP print control is limited to 58 characters. To save some room, the parameters A (annotation), P(checksum), RA(ratio), ADS(add dots to space), ADB(add dots to bars) and R(rotation) can be specified in one short parameter **Z**. The notation is:

Z=aaposbr

Value	Parameter	Precision
aa	A	2 digits
p	P	1 digit
o	RA	1 digit, 0=2.0:1, 1=2.5:1, 2=3.0:1
s	ADS	1 digit
b	ADB	1 digit
r	R	1 digit

Example: Z=0100001 is equal to

A=1, P=0, RA=20, ADS=0, ADB=0, R=1

3.2.12 Alignment (AL)

The parameter **AL** specifies the corner of the barcode, which is printed at the current output position. The default value is the lower left corner of the barcode.

Value	Alignment
BL	Bottom Left (default)
TL	Top Left
BR	Bottom Right
TR	Top Right

3.2.13 Conversion of national character sets (UML)

Parameter **UML** controls the conversion of German "Umlaute" to their matching 7 bit ASCII characters. If UML is set to 1, these conversions are performed:

Character	Hexcode	Used ASCII	Hexcode
Ä	C4	[	5B
Ö	D6	\	5C
Ü	DC	]	5D
ä	E4	{	7B
ö	F6	|	7C
ü	FC	}	7D
ß	DF	~	7E

This feature requires the cooperation of your barcode reader to convert these special characters back to the wanted system codes.

This option can be used with these barcodes:

- Code 39, Code 39 Extended
- Code 93, Code 93 Extended
- Code 128, EAN 128, UCC 128 (not subset C)

3.2.14 Encoding of control characters (CCC)

Some barcodes like Code 128 and Code 39 Extended allow control characters. It is sometimes a little difficult to encode these characters in SAP. As an alternative, our Barcode DLL allows a more “SAP friendly” notation. This notation must be enabled in the print control with **CCC=1**.

Encoding	Meaning
\t	Tabulator character (hex 09).
\r	Carriage return (hex 0D).
\n	Newline (Hex 0A).
\xnn	Generic hex notation. The two digits nn are treated as hex value.

3.2.15 Code 128 / EAN 128 Parameters

Parameter	Meaning
F1	FNC1 placeholder A sequence of up to 7 characters. Each occurrence of the sequence in the data for Code 128 (EAN 128) is replaced with the special FNC1 symbol.
F2	FNC2 placeholder Analog FNC1.
F3	FNC3 placeholder Analog FNC1.
F4	FNC4 placeholder Analog FNC1.
SH	SHIFT placeholder Analog FNC1.

FNC1 is used to start code EAN128. It also signals special information inside EAN128. FNC2 signals multi reading. FNC3 and FNC4 are reserved for applications. SHIFT switches from Subset A to B or vice versa for the next character. Using Subset C, only FNC1 is available. For details, please refer to the EAN 128 specification.

If you do not use these parameters, the special characters are coded as follows:

SHIFT	Decimal 128 (Hex 80)
FNC1	Decimal 129 (Hex 81)
FNC2	Decimal 130 (Hex 82)
FNC3	Decimal 131 (Hex 83)
FNC4	Decimal 132 (Hex 84)

3.2.16 QR Code Parameters⁵

Parameter	Meaning
QRE	Encoding for QR Code (AUTO, ALPHA, BYTE, NUMERIC, KANJI) (AUTO is default)
QRV	Format for QR Code (0, 1, 2, ... , 40) (0=AUTO is default)
QRS	Security level for QR Code (L, M, Q, H) (L is default)
QRF	FNC1 indicator (0, 1) (0 is default)
QRK	Enable two byte Kanji data on input stream. (0, 1) (1 is default)

QR Code has optimization strategies for various code set that are typically used in the industry. If you leave the QRE parameter on AUTO, the advanced optimizer will find out the shortest possible encoding.

Double byte kanji characters (range 0x8140 to 0x9FFC and 0xE040 to 0xEAA4) will be detected on the input stream if QRK is set to 1.

Alphanumeric characters are “0”-“9”, “A”-“Z” (upper case only), Space, “\$”, “%”, “+”, “-“, “*“, “/”, “.” and “:”.

The security level specifies how much redundant data is appended to the raw data. The redundancy enables the barcode reader to correctly decode the barcode if parts of the code are missing or otherwise unreadable. Level “L” allows a recovery of about 7% missing dots, “M” 15%, “Q” 25% and “H” 30%. Increasing the security level reduces the data capacity or increases the barcode size.

In QR Code, an FNC1 identifier can be included for UCC/EAN Application Identifiers. If FNC1 is set to 1, an FNC1 is assumed before the first data byte. Additional FNC1s are represented by the character “%”.

QR Code supports 40 different code formats that have different encoding capacities. Format 1 with a low security level holds about 17 bytes, 25 alphanumeric characters or 41 digits. Format 40 at a low security level holds about 2953 bytes, 4296 alphanumeric characters or 7089 digits.

⁵ This code is licensed separately

3.2.17 PDF 417 Parameters*

Parameter	Meaning
SEC	Security for code PDF 417 and PDF 417 Truncated (0 to 8) 0 = 2 Bytes of Security / Error Correction 8 = 512 Bytes of Security / Error Correction
FR	Forced rows for code PDF 417, PDF 417 Truncated (0 = default, 3 to 90 rows), Forced Rows for Code PDF 417 Micro (0 = default, 11 to 44 rows)
FC	Forced columns for code PDF 417 and PDF 417 Truncated (0 = default, 1 to 30 columns) Forced columns for code PDF 417 Micro (0 = default, 1 to 4 columns)

3.2.18 Data Matrix Parameters*

Parameter	Meaning
DME	Encoding for Data Matrix (AUTO, TEXT, ASCII, C40, BASE256 or NONE)
DMF	Format for Data Matrix (AUTO, 10X10, 12X12, 14X14, 16X16, 18X18, 20X20, 22X22, 24X24, 26X26, 32X32, 36X36, 40X40, 44X44, 48X48, 52X52, 64X64, 72X72, 80X80, 88X88, 96X96, 104X104, 120X120, 132X132, 144X144, 8X18, 8X32, 12X26, 12X36, 16X36, 16X48)

3.2.19 Maxicode Parameters*

* This code is licensed separately

Parameter	Meaning
MCPC	Maxicode Postal Code Up to 9 digits or alphanumeric characters. Their semantic depends on the "class of service" (MCCS).
MCCC	Country Code, 3 digits, e.g. 840 for the US. For a complete list see Appendix 10
MCCS	Class of Service, 3 digits 002 is used for US destinations, 003 is used for international destinations
MCAD	Destination address, 1 to 35 alphanumeric
MCAV	Address validation (Y or N)
MCCI	Destination city, 1 to 35 alphanumeric
MCJD	Day of pickup (day in year), 3 digits
MCPN	Packet number in shipment, 1 to 3 digit
MCPT	Total number of packet in shipment, 1 to 3 digit
MCPW	Packet weight, 1 to 3 digits The weight is specified in US pounds (lb). 1 lb is about 0.4536 kg.
MCPWK	Packet weight, 1 to 3 digits The weight is specified in metric kg.
MCSI	Shipment ID, 1 to 30 alphanumeric
MCSN	UPS Shipper Number, 6 alphanumeric
MCST	Destination state, up to 2 alphanumeric
MCTR	Tracking number, up to 11 alphanumeric

Maxicode is used to label UPS⁶ packets. The parameters MCPC, MCCC and MCCS are mandatory. If any of the other maxicode parameters is specified and non-blank, the data is build completely from these parameters. The data parameter (D=) is ignored and can be omitted. Please see chapter 3.11 for SAPScript use.

⁶ UPS is a registered trademark of United Parcel Service of America, Inc.

If only MCPC, MCC and MCCS are specified, the missing data is fetched from the data parameter (D=). This data must be formatted according to the UPS requirements:

Header:	]>^{R_S} 01 ^{G_S} 96
Tracking number:	up to 11 alphanumeric characters
Field separator:	^{G_S}
Standard Carrier Alpha Code:	UPSN
Field separator:	^{G_S}
Shipper number	6 alphanumeric characters
Field separator:	^{G_S}
Julian day of pickup:	3 digits
Field separator:	^{G_S}
Shipment ID:	1 to 30 alphanumeric characters
Field separator:	^{G_S}
Package in shipment:	x/y
Field separator:	^{G_S}
Weight in lb. (US Pounds):	1 to 5 digits
Field separator:	^{G_S}
Address Validation:	Y or N
Field separator:	^{G_S}
Destination address:	1 to 35 characters
Field separator:	^{G_S}
Destination city:	1 to 35 characters
Field separator:	^{G_S}
Destination state:	up to characters
Record separator:	^{R_S}
End of transmission:	^{E_{O_T}}

^{G_S} is character 29, ^{R_S} is 30, ^{E_{O_T}} is 4

3.3 Create your own device type

To use the barcode DLL you have to copy the SAP device type SWIN or SAPWIN. This is the only base type for adding barcode information. Barcode DLL will not work with other device types because they do not use the appropriate SAPLPD interface. This is a restriction in SAPLPD. We cannot do anything about this. Copy the device type SWIN (SAPWIN) to a new device type. The name shall begin with ZSWIN (ZSAPWI). You can do this from within the transaction SPAD. Use the menu entry 'Utilities/copy device type'.

3.4 Adding necessary print controls (SAP Release 4.6 and newer)

Printing of barcodes is requested by a control code sent to the SAPLPD. This control code is known to be <Escape>b%⁷. Control codes to a printing device are generated through print controls. They have a five-letter name. You call these print controls from your ABAP program or from SAPscript. Print controls are translated into data sent to the printing device, in our case the SAPLPD. SAPLPD recognizes <Escape>b% and sends the following data until the terminating <Escape> to the barcode DLL. So when you define your print controls, they have to start with <Escape>b% and continue with the barcode parameters. The last parameter should be D= to start with the raw barcode data. The terminating Escape should be generated by a separate print control. Here an example:

Print control	Type	Hex	Value
BC25I	Extended	No	b%C=25I,B=50,H=20,P=1,D=
ESCAP	Direct	Yes	1B
SUFFIX	Direct	No	

When calling the print control BC25I, you will get a barcode of type '2 of 5 interleave', width 50 mm, height 20 mm with checksum. The print control is followed by your data. To terminate the barcode, you add the print control ESCAP to your program. Please make sure that your print controls are defined exactly as shown above. Please note the lowercase letter 'b' as the first character of the print control BC25I.

3.5 Adding necessary print controls (SAP Release before 4.6)

Printing of barcodes is requested by a control code sent to the SAPLPD. This control code is known to be <Escape>b%⁸. Control codes to a printing device are generated through print controls. They have a five-letter name. You call these print controls from your ABAP program or from SAPscript. Print controls are translated into data sent to the printing device, in our case the SAPLPD. SAPLPD recognizes <Escape>b% and sends the following data until the terminating <Escape> to the barcode DLL. So when you define your print controls, they have to start with <Escape>b% and continue with the barcode parameters. The last parameter should be D= to start with the raw

⁷ Hex: 1B 62 25; the old SAPLPD sequence 1B 62 is no longer recommended.

⁸ Hex: 1B 62 25; the old SAPLPD sequence 1B 62 is no longer recommended.

barcode data. The terminating Escape should be generated by a separate print control. Here an example:

Print control	Type	Hex	Def	Value
BC25I	5			b%C=25I,B=50,H=20,P=1,D=
ESCAP	1	X		1B
SUFFX	1			

When calling the print control BC25I, you will get a barcode of type '2 of 5 interleave', width 50 mm, height 20 mm with checksum. The print control is followed by your data. To terminate the barcode, you add the print control ESCAP to your program. Please make sure that your print controls are defined exactly as shown above. Please note the lowercase letter 'b' as the first character of the print control BC25I.

3.6 Customizing your printer definition

Printers that print barcode need to use your newly created device type. Make sure to set the device type right in the transaction SPAD to the output device. The 'print method' has to be 'S' for proper usage of SAPLPD. Further details can be found in the SAP documentation.

3.7 A small test program

Here a small test program to print barcodes from a ABAP program:

```

1  REPORT TEST1.
2
3  NEW-PAGE PRINT ON NO-HEADING.
4  WRITE: / 'Test Barcode.'.
5  FORMAT COLOR OFF INTENSIFIED OFF.
6  WRITE: / 'Start Barcode:'.

7  PRINT-CONTROL FUNCTION 'BC25I'.
8  WRITE: '1234567890' NO-GAP.
9  PRINT-CONTROL FUNCTION 'ESCAP'.
10 WRITE: ' ' NO-GAP. ''required from 2.1G
11 WRITE: / 'Continue here'.
```

Explanations:

Line 5) 'Format Color Off Intensified off' is necessary on some SAP systems as the list processor otherwise inserts print controls by its own that disturb the barcode output. If you see some strange characters in your barcode or the following SAPLPD output is corrupted, you should check the spool job with the hex display from transaction SP01. If you find unintended print controls between your print controls (e.g. between BC25I and ESCAP, line 7 and 9) please call SAP to find out the reason for it.

Line 7) Start of barcode printing. The used name BC25I is the name of the print control.

Line 8) Here we print the raw data for the barcode. Please note the 'NO-GAP' at the end of the write to suppress trailing blanks.

Line 9) Barcode termination.

3.8 System barcodes

First you have to define your barcode type or to choose a predefined barcode type. You can use the transaction SE73 to create your own barcode type.

3.9 Printer barcodes

To print barcodes from SAPscript, it is necessary to define two print controls in your newly created device type (e.g. ZSAPWIN). The first print control is sent from SAPscript to introduce the barcode, the second one to terminate the barcode. You can use the same print controls as for printing from the ABAP list processor. The second print control will be ESCAP, which can be called directly. Some versions of SAPscript complain about the name but accept it nevertheless. As an alternative you may define your own group of print controls for printing from SAPscript. This may look like the following:

Print control	Type	Hex	Def	Value
ZB25I	5			b%C=25I,B=50,H=20,P=1,D=
ZBC39	5			b%C=39,B=50,H=20,P=0,D=
ZBEND	5			
ESCAP	1	X		1B
SUFFIX	1			

In SAPscript you use the print controls ZB25I or ZBC39 as starting code, ZBEND as stop code for all barcodes. Please note that all print controls of a single group (defined by the first two letters of the name) have to have the same type code (here 5). ZBEND will be evaluated as <Escape> if everything is defined as described above.

3.10 Using long commands

The SAP system has two known limitations that restrict the barcode command:

- A print control can only contain maximal 56 characters. This will limit the length of the control part of the command.
- SAPscript and the ABAP processor will wrap long lines. This will truncate the data portion of the print control.

When using the (hex) 1B 62 25 sequence to start a barcode, SAPLPD will allow you to combine several print controls and data lines into one barcode command. Each barcode sequence ending

with "&+ConT+&" will be concatenated to the next sequence beginning with "&". The combined sequence will be sent to the Barcode DLL for encoding. Here an example to print a lot of data with data matrix:

Print control	Type	Hex	Value
BCDMA	5		b%C=DM,DME=AUTO,DMF=AUTO,D=&&
BCCON	5		b%&
ESCAP	1		\e
ESCON	1		&+ConT+&\e

This sequence of print controls will do the job:

```
<BCDMA>some data 1<ESCON>
<BCCON>some more data 2<ESCON>
<BCCON>some more data 3<ESCON>
<BCCON>final data<ESCAP>
```

The four parts of the barcode command will be combined and sent to the barcode dll as one command (<ESC> is hex 1B):

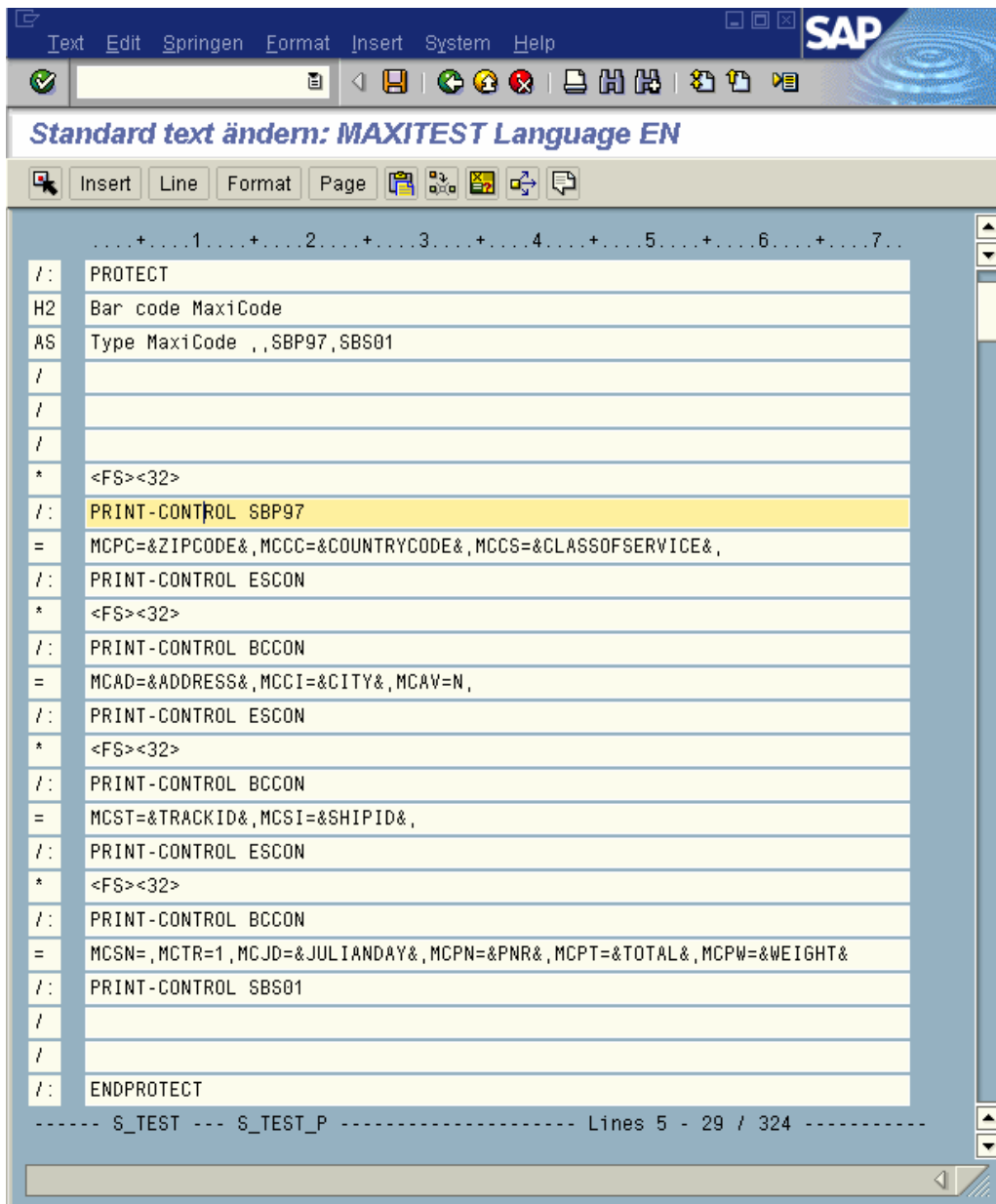
```
<ESC>b%C=DM, DME=AUTO, DMF=AUTO, D=some data 1 some more data 2 some more data 3
final data <ESC>
```

Please make sure to match each print control ESCON with a BCCON. Only the last part is terminated with a single <ESC>. Make sure, that your data does not end with "&+ConT+&".

3.11 Long Commands with MaxiCode

The Barcode DLL does support MaxiCode creation. The most convenient way is to specify the individual components and let the Barcode DLL combine them to a valid MaxiCode. Please see chapter 3.2.19 for a complete list of components.

When using SapScript, the following form snippet can be used to create the maxi code:



The print controls are defined:

SBP97	b%C=MC,S1=6,	(Extended, Converted)
ESCON	&+ConT+&\e	(Direct, Converted)
BCCON	b%&	(Extended, Converted)
SBS01	\e	(Direct, Converted)

3.12 Errormessages

When errors occur while printing a barcode, the resulting error message will be printed instead. This feature can be turned off by adding "PrintError=0" in the barcode.ini. The error message will also be passed back to the SAPLPD and included into the SAPLPD log file. If the barcode log file is enabled, the error message will also be included in the barcode log.

4 Defining Barcodes in SAPscript and SmartForms

4.1.1 Create System Barcode

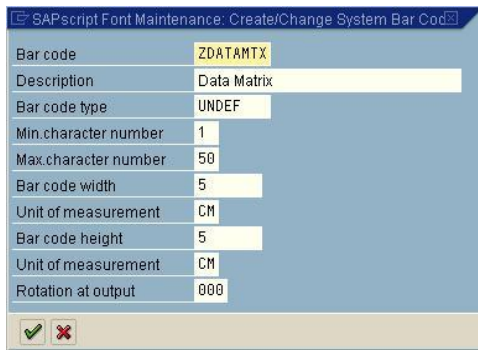
Start Transaction SE73

Select "System Barcode", Press "Change"

Bar Code	Description	Min.	Max.	Width	Unit	Height	UnitBC	Code Type	Rotatn.
ARTNR	Artikelnummer	01	10	4,80	CM	1,20	CM		000
AUFNR	Auftragsnummer	01	08	4,80	CM	1,20	CM		000
BARCLVS	Test Barcode im LVS	01	20	5,00	CM	2,00	CM		000
BC_93	Code 93	01	40	7,00	CM	1,30	CM	C93	000
BC_C128B	Code 128 B, n.txt,h=13mm	01	40	9,00	CM	1,30	CM		000
BC_CD39	Code 39 no chk, n.txt,h=13mm	01	40	5,00	CM	1,30	CM		000
BC_CD39C	Code 39 w.chk, n.txt,h=13mm	01	40	9,00	CM	1,30	CM		000
BC_EAN13	EAN 13, n.txt,h=13mm	12	12	5,00	CM	1,30	CM		000
BC_EAN8	EAN 8, n.txt,h=13mm	07	07	3,00	CM	1,30	CM		000
BC_EANH	EAN 128, n.txt,h=13mm	01	40	9,00	CM	1,30	CM		000
BC_ESC	ESC character (hex 1B)	01	01	0,00	TW	0,00	TW		000
BC_I25	Int.2of5 no chk, n.txt,h=13mm	02	26	5,00	CM	1,30	CM		000
BC_I25C	Int.2of5 w.chk, n.txt,h=13mm	01	25	5,00	CM	1,30	CM		000
BC_JAN	JAN Barcode (Japan)	01	10	4,00	CM	1,20	CM		000
BC_MSI	MSI no chk, n.txt,h=13mm	01	14	9,00	CM	1,30	CM		000
BC_MSIC	MSI mod-10 chk, n.txt,h=13mm	01	14	9,00	CM	1,30	CM		000
BC_MSIC1	MSImod10 mod10chk,n.txt,h=13mm	01	14	9,00	CM	1,30	CM		000
BC_MSIC2	MSImod11 mod10chk,n.txt,h=13mm	01	14	9,00	CM	1,30	CM		000
BC_PSN11	USPS POSTNET 11	11	11	7,00	CM	3,00	MM	POSTNET	000
BC_PSN5	USPS POSTNET 5 n.txt,h= 3mm	05	05	4,00	CM	0,30	CM		000
BC_PSN9	USPS POSTNET 9 n.txt,h= 3mm	09	09	6,50	CM	0,30	CM		000
C128A_00	Code 128A, n.txt,h= 5mm	01	15	4,00	CM	0,50	CM	C128_A	000
C128A_01	Code 128A, r=090, n.txt,h= 5mm	01	15	4,00	CM	0,50	CM	C128_A	090
C128B_00	Code 128B, n.txt,h= 5mm	01	15	4,00	CM	0,50	CM	C128_B	000
C128B_01	Code 128B, r=090, n.txt,h= 5mm	01	15	4,00	CM	0,50	CM	C128_B	090
CD39C_00	Code39 w.chk, n.txt,h= 5mm	01	15	4,00	CM	0,50	CM	C39	000
CD39C_01	Code39 w.chk,r=090,n.txt,h=5mm	01	15	4,00	CM	0,50	CM	C39	090
CD39_00	Code39 n.chk, n.txt,h= 5mm	01	15	4,00	CM	0,50	CM	C39	000
CD39_01	Code39 n.chk,r=090,n.txt,h=5mm	01	15	4,00	CM	0,50	CM	C39	090
KUNAUNR	Kundenauftragsnummer	10	10	4,80	CM	1,20	CM		000
KUNAUPS	Kundenauftragsposition	06	06	4,80	CM	1,20	CM		000
MBBARC	Test Barcode Bestandsführung	10	10	5,00	CM	2,00	CM		000
MBBARC1	Test Barcode 1 Bestandsführung	10	14	5,00	CM	1,20	CM		000
RSNUM	Reservierungsnummer	10	10	4,80	CM	1,20	CM		000
RSPOS	Reservierungsposition	04	04	4,80	CM	1,20	CM		000

Press "Create".

Fill the Popup with your chosen values. This example creates the new System Barcode "ZDATAMTX".



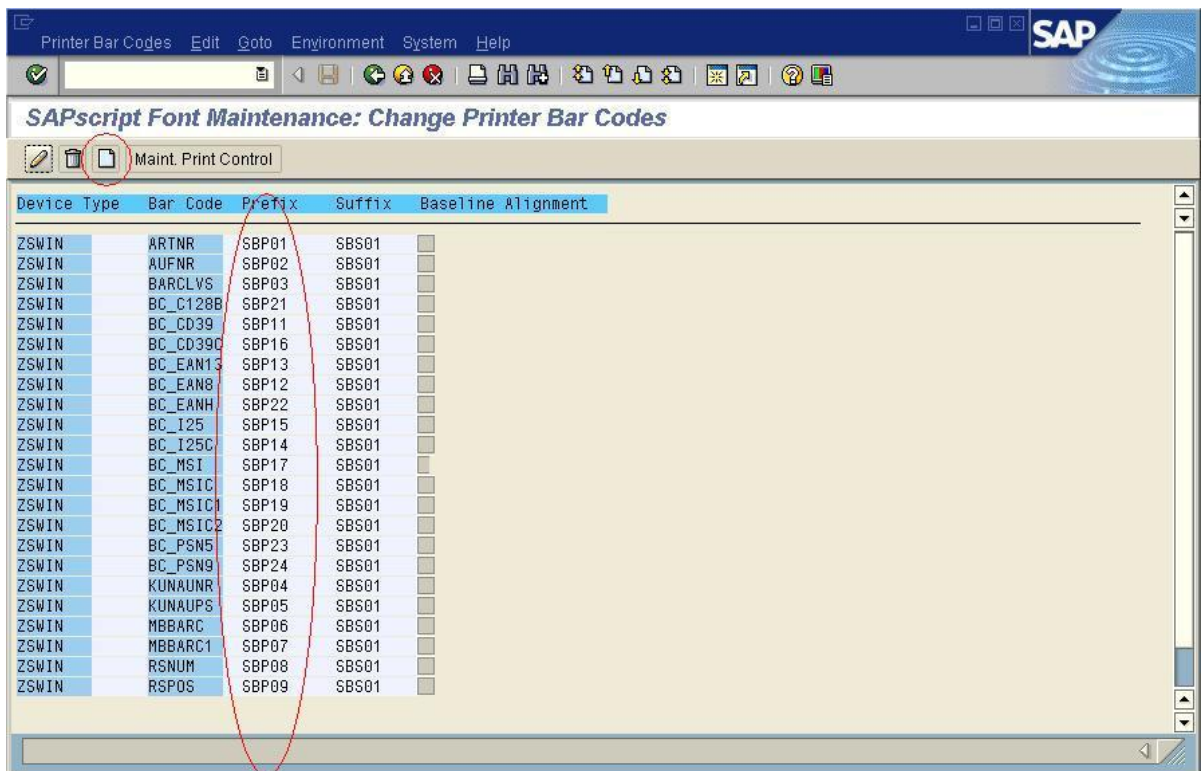
Press "Execute". If you get a popup asking for a Workbench job: Select an appropriate job or cancel for local testing.

4.1.2 Create Printer Barcode

The printer barcodes describes the necessary actions for a given printer type. If you have not created your own device type, it's now time to do it. (Transaction SPAD, copy SWIN to ZSWIN). Your device type needs to base on the type SWIN. We recommend to name it ZSWINxxx (xxx=001 or whatever you like).

Start Transaction SE73.

Select "Printer Bar Codes", press "Change", double click on your device type.

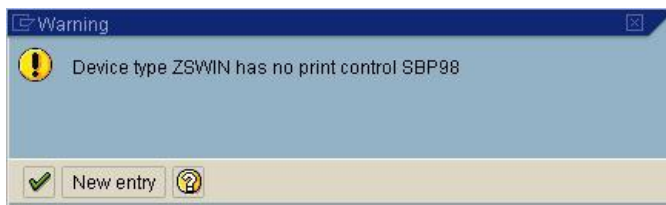


Choose a free prefix from the list, e.g. SBP98 and remember the common suffix, usually SBS01. Press "Create".



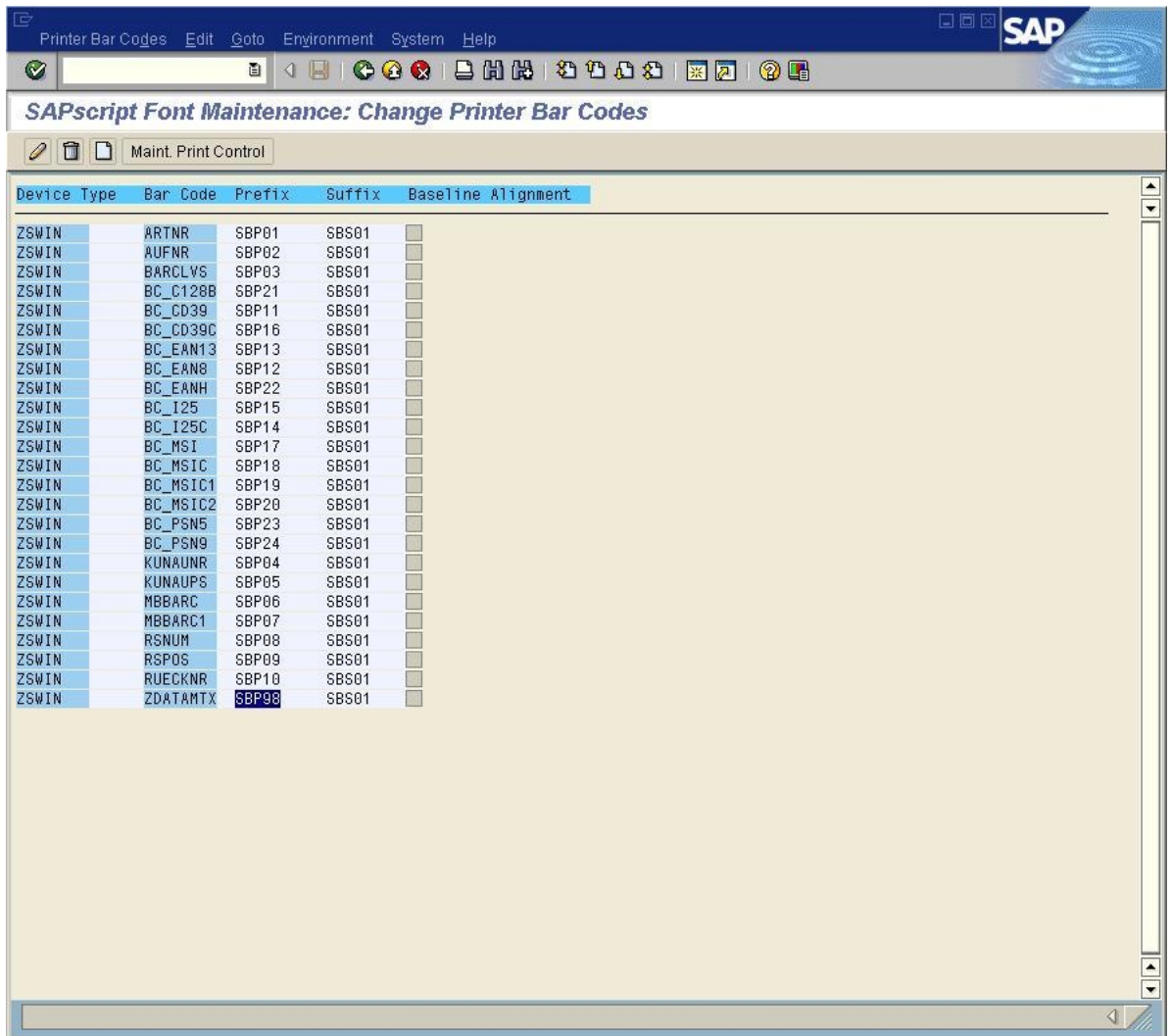
Select your newly created system barcode (ZDATAMTX) and fill the prefix and suffix fields. The prefix and suffix will be the names of the used print controls to create the barcode.

Press "Execute". If you get this warning :

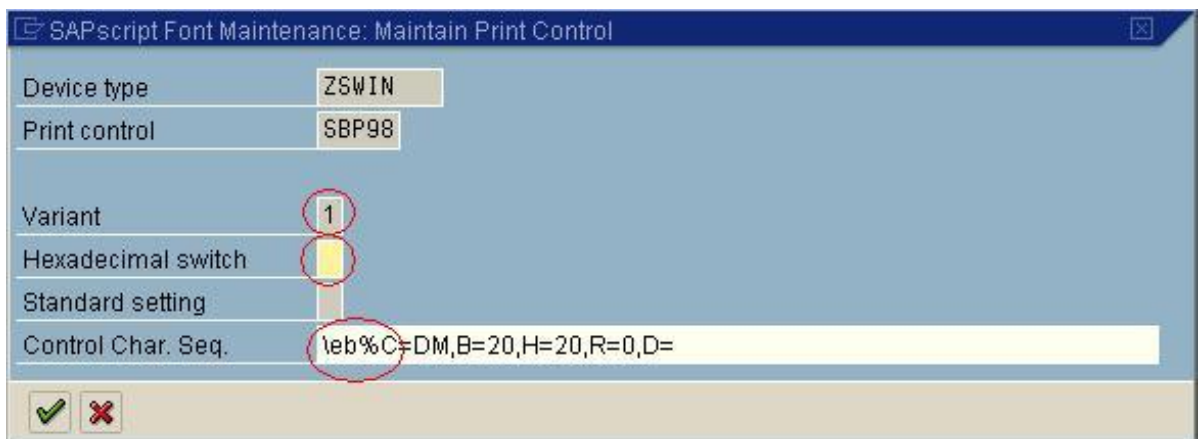


Select "New Entry" and continue.

Now we need to fill the new print control:



Select your prefix (e.g. SBP98) and press "Maint. Print Control".



Turn off the "Hex switch" (fill with blank).

If you use Variant "1", you need to start the Control Char. Seq with \eb% , Variant 5 starts with b% only.

The control sequence for our Barcode DLL can be obtained from our BARTEST.EXE, which is part of the distribution. You can create the sequence from the manual too.

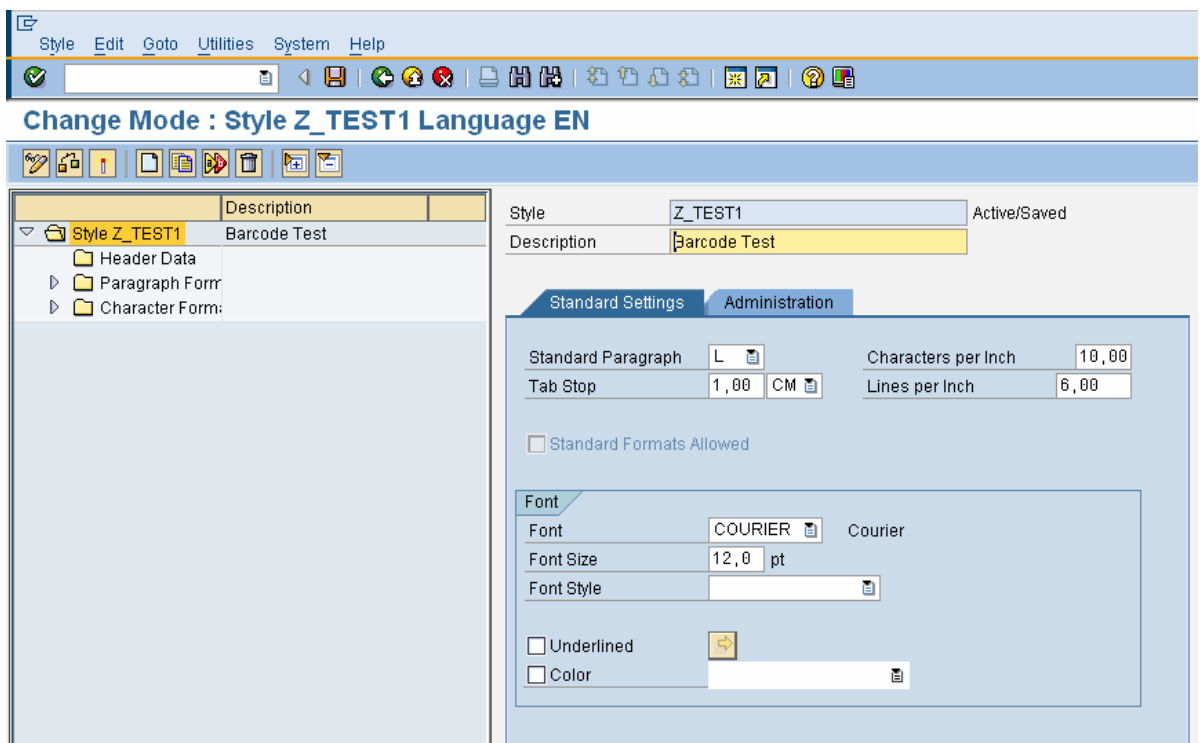
4.2 Create a simple Barcode Test with SmartForms

4.2.1 Used Barcode

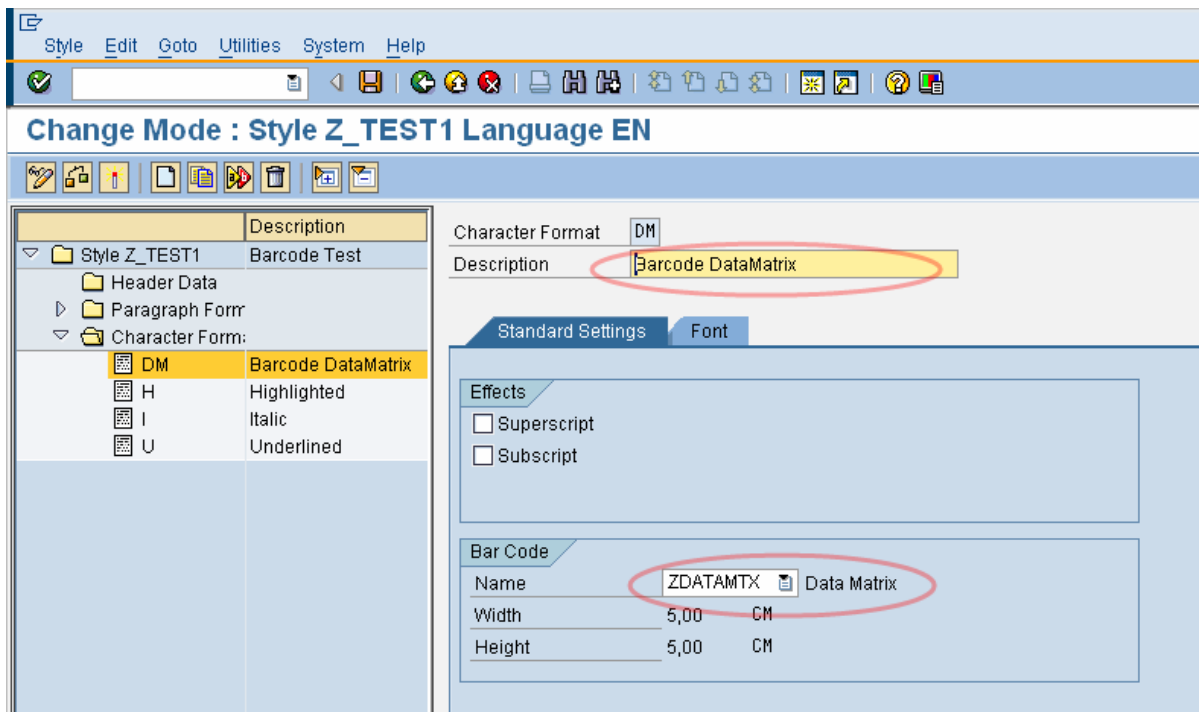
To include a barcode type into SmartForm, you need to make sure that this is a defined System Barcode (Transaction SE73) and that a correct print control is defined for each target device types.

4.2.2 Used Style

Make sure to have an appropriate style at hand. For testing, you might want to copy the style "SYSTEM" to a local "Z_TEST1" using Transaction SMARTFORMS.



Right click on „Character Formats“ and choose „Create Node“. Select a short name for the format, e.g. “BA”, “B1” or “DM” (this example).

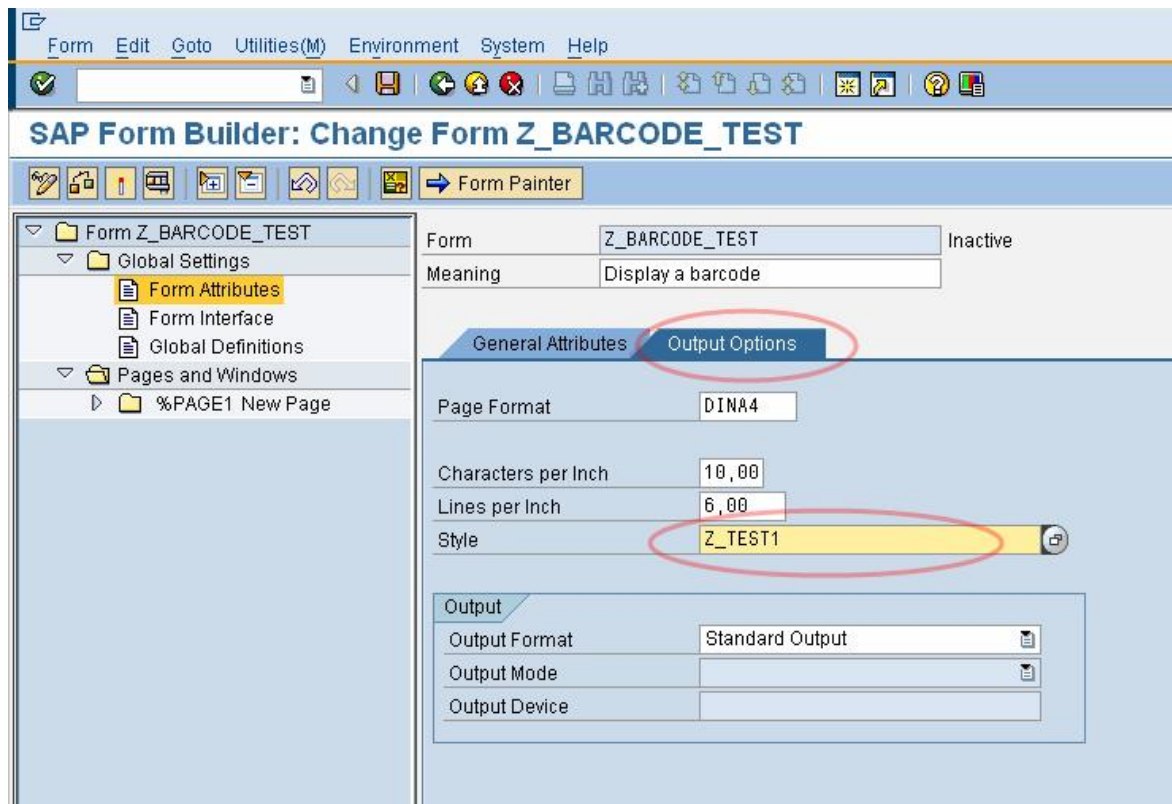


Choose the System Barcode in the lower section (“ZDATAMTX”) and fill the description field. Save and ACTIVATE. You now have a style where you can use your new barcode.

4.2.3 Create your form

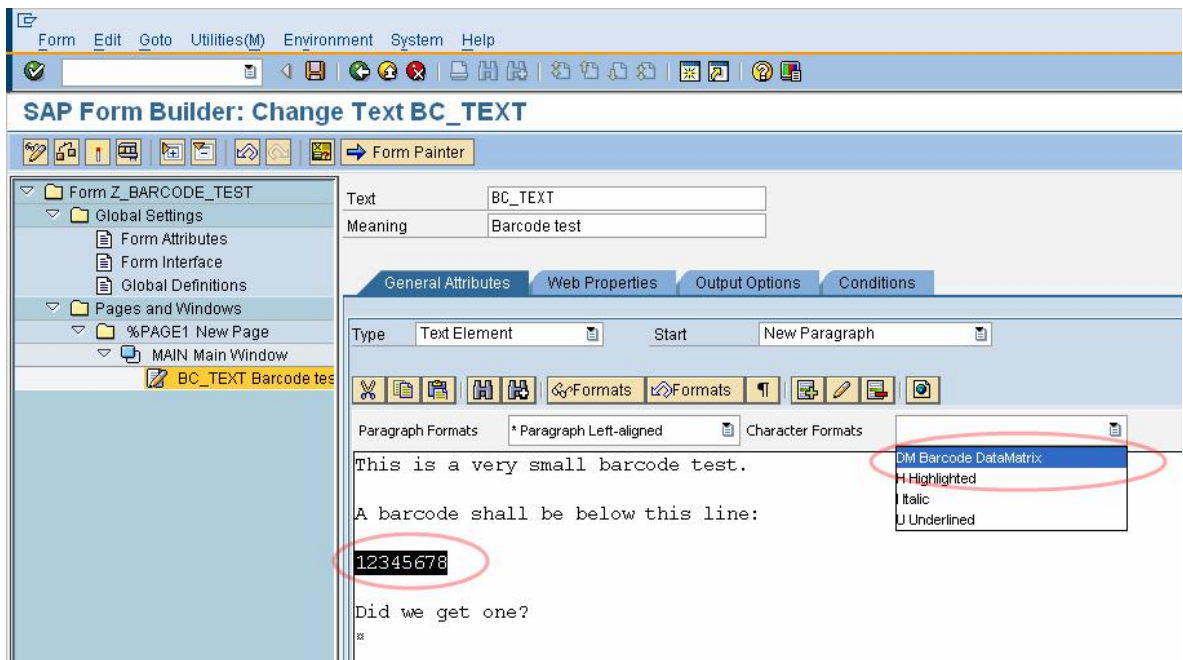
Start the form builder, select your new form name, press "Create".

Double click on "Form Attributes", select "Output Options" :



Make sure to use your new style (here "Z_TEST1").

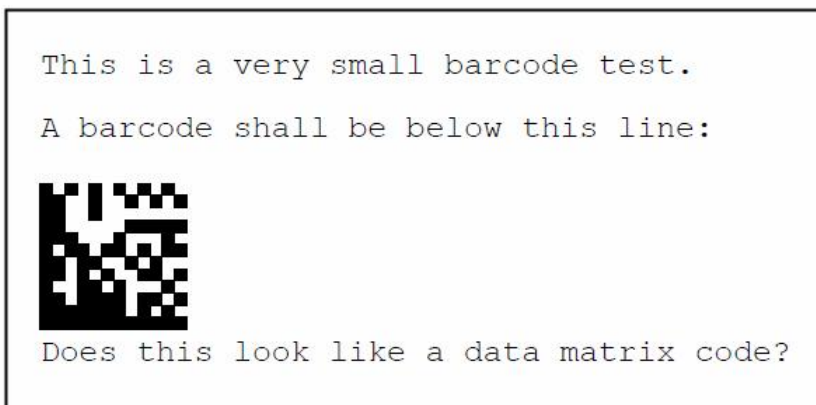
Insert your text into the form. Highlight the test data (or the SAPScript variable), that should be printed as barcode. Please make sure not to highlight anything else! No leading or trailing blanks or line wraps are allowed to be highlighted here!



Select your new character format (DM in this example).

Save and activate.

To print the form: Hit F8 three times, then select print:



5 Troubleshooting

5.1 BARCODE DLL is not used

Please make sure that the file 'BARCODE.DLL' is copied into the directory 'C:\WINDOWS\SYSTEM32', 'C:\WINDOWS' or the SAPLPD directory. SAPLPD shows the init message from our Barcode DLL at startup time. This message indicates that the DLL is found.

5.2 The wrong barcode is printed

Please check the data sent to the SAPLPD using SAP transaction SP01. Display the contents of your spool job using the hexadecimal display. Check that the right print controls are used and that no spaces or unintended print control are insert by the SAP system as it happens sometimes. If his happens please contact SAP.

5.3 Bars are to wide

Some impact printers produce dots, which are much wider as assumed. You may check this with a good magnifier. You may reduce the bar width using parameters S1 to S4.

5.4 Barcodes are not read properly

Most frequent reasons are used up ribbons or toner. Please refill these first. Try to print your barcode without specifying a width (using B=0). If this solves your problem try to use the barcode without explicit width or with a larger width. Is the barcode reader OK?

5.5 Unwanted characters printed with the barcode

Please check the data inside the R/3 Spool (function HEX display). Make sure, that there is no extra print control between the print control for barcode start and barcode end. If you see any unwanted print control between them, please check with SAP how to suppress them. We cannot help you with that problem, as it is an R/3 internal problem. With these extra print controls we will receive wrong data from SAPLPD.

5.6 Problem message

If you have problems, which are localized in the barcode DLL without doubt, please send us the required information to solve the problem:

- What is the problem,
- Why do you think the BARCODE DLL is the cause of your problem,
- Which version of the DLL is used,
- Which program is calling the BARCODE DLL,
- Which operation system is used.

If you have problems reading the barcodes with a barcode reader, so please add

- Some example printouts (with caption if possible),
- Printout of the hex display from the SAP spool,
- The definition of the used print controls,
- Description of the barcode readers response,
- Examples of barcodes from another source, which are read correctly.

6 New features / change history

Version 4.1

- a) Vista start problem fixed.
- b) New parameter I: printer independent pixel width. ** Please read before upgrading **

Most printer drivers use a common 600 dpi resolution, even if the physical resolution is higher. In order to avoid problems with a mix of 600 dpi and non 600 dpi printers, all pixel values in the parameters are scaled to a common dpi value. By default, all parameters now refer to a 600 dpi model.

The common printer resolution can be changed using the sap print control parameter I=, a value of 0 disables this new functionality.

This change affects the parameters S1, ADB, ADS, X and Y. S2 and L1 are also affected if the old notation is still used.

The absolute bar width parameters (S1, S2, L1, ADB, ADS) are now referring to the common printer resolution (600 dpi). The change has no effect if the total barcode width is specified (B=).

The barcode positioning parameters (X and Y) are now referring to the common printer resolution (600 dpi) when the unit "px" is used.

This option can also be set from the barcode.ini file:
Create or insert into the C:\Windows\Barcode.ini file:

```
[BarCode]
I=0 # (Upper case letter i with value = 0 to disable or set common printer DPI, e.g 300 or 600 )
Priv=1
```

Version 4.0.6

Installation program improved.

Version 4.0.5

Minor changes to the demo version (500-1 message fixed).

Version 4.0.4

Changes for SAPSprint Version 1.0.0.8.
(Note: DLL version 4.0.3 does only work with SAPSprint 1.0.0.4 or older and with SAPLPD).

Version 4.0.3

Minor fix: Setup spurious license install problem.

Version 4.0.2

SAP Sprint support added.

Version 3.7.1

Bugfix: QR-Code symbol generation error fixed.

Version 3.7

Bugfix: SAPScript text size was sometimes influencing barcode positioning.
This bugfix might affect existing forms that have taken positioning problems into account.

Version 3.6.8

Bugfix: Barcode command concatenation could cause a segmentation violation in SAPLPD.

Know bug: QR Code does not work with Windows NT4.

Version 3.6.7

Bugfix for Maxicode use with SAPScript.

Version 3.6.6

QR Code implemented ("plus" / 2D license required).

Maxicode is now part of the plus license.

Version 3.6.5

Online activation of special license types. This procedure does not apply for regular licenses that are shipped as LICENCE.KEY license file.

Version 3.6.4

New parameter d= allows missing data without error message. The barcode will be silently missing without data.

Version 3.6.3

Resource leak fixed. This leak exists in Version 3.0 – 3.6.2. The leak can lead to program termination or missing barcodes. **Update to Version 3.6.3 is strongly recommended.**

Version 3.6

Verified for Windows Server 2003 by Microsoft / Verisign.

Modified handling of leading and trailing white spaces. Leading and trailing white spaces (blank, newline, tab) are removed by default. See parameter KB for details.

Version 3.5

New setup.
Internal rewrite to increase encoding speed.

Version 3.0.5

Code MSI Plessey: P parameter changed to reflect SAP SWIN devicetype:
P=0: Single MOD10 checksum (SAP implies no checksum, but this is not possible with this barcode)
P=1: Single MOD10 checksum
P=2: MOD10, MOD10 checksum
P=3: MOD11, MOD10 checksum


Version 3.0


Added Documentation for SAPscript and SmartForms.
The file "barcode.dat" will be installed beside "barcode.dll". It contains configuration data for the barcode dll.


7 Appendix Hex Table

Hexcode	Character	Hexcode	Character	Hexcode	Character	Hexcode	Character
0	NUL	20	space	40	@	60	`
1	SOH	21	!	41	A	61	a
2	STX	22	"	42	B	62	b
3	ETX	23	#	43	C	63	c
4	EOT	24	\$	44	D	64	d
5	ENQ	25	%	45	E	65	e
6	ACK	26	&	46	F	66	f
7	BEL	27	'	47	G	67	g
8	BS	28	(	48	H	68	h
9	HAT	29	)	49	I	69	i
A	LF	2A	*	4A	J	6A	j
B	VT	2B	+	4B	K	6B	k
C	FF	2C	,	4C	L	6C	l
D	CR	2D	-	4D	M	6D	m
E	SO	2E	.	4E	N	6E	n
F	ST	2F	/	4F	O	6F	o
10	SLE	30	0	50	P	70	p
11	CS1	31	1	51	Q	71	q
12	DC2	32	2	52	R	72	r
13	DC3	33	3	53	S	73	s
14	DC4	34	4	54	T	74	t
15	NAK	35	5	55	U	75	u
16	SYN	36	6	56	V	76	v
17	ETB	37	7	57	W	77	w
18	CAN	38	8	58	X	78	x
19	EM	39	9	59	Y	79	y
1A	STB	3A	:	5A	Z	7A	z
1B	ESC	3B	;	5B	[	7B	{
1C	FS	3C	<	5C	\	7C	|
1D	GS	3D	=	5D	]	7D	}
1E	RS	3E	>	5E	^	7E	~
1F	US	3F	?	5F	_	7F	

8 Barcode Specifications

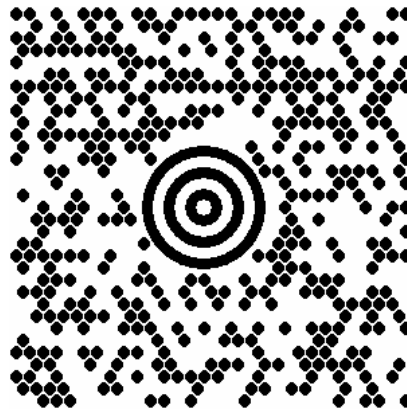
<p><u>QR Code</u></p> <p>Character set: Complete ASCII, Kanji or numeric information</p> <p>Checksum: Integrated high quality error correction</p> <p>ID: C=QR</p> <p>Required license: Barcode Plus / 2D</p>	
<p>Remarks: High Density combined with high reliability. Encodes up to 4296 ASCII characters (subset), 2953 ASCII characters (8 bit) or 7089 digits. Can be read from any direction. Implemented error correction allows reading of highly damaged codes (7% to 30% can be repaired depending on the security level).</p>	

<p><u>Data Matrix</u></p> <p>Character set: Complete ASCII or numeric information</p> <p>Checksum: Integrated high quality error correction</p> <p>ID: C=DM</p> <p>Required license: Barcode Plus / 2D</p>	
<p>Remarks: High Density (about 15 times higher than linear barcodes). Encodes up to 2334 ASCII characters (7bit), 1558 ASCII characters (8 bit) or 3116 digits. Requires special optical readers. Can be read from any direction. Implemented ECC200 error correction allows reading of highly damaged codes.</p>	

<p><u>PDF 417</u></p> <p>Character set: Complete ASCII or numeric information</p> <p>Checksum: Integrated high quality error correction</p> <p>ID: C=PDF417</p> <p>Required license: Barcode Plus / 2D</p>	
<p>Remarks: High density barcode, encodes up to 1850 ASCII characters or 2710 digits. Requires special optical readers. Can be read from any direction. The degree of possible error correction can be selected but uses additional space on the print out.</p>	

Maxicode

Character set: 0-9A-Z
Checksum: Yes
ID: C=MAXI
Required license: Barcode Plus / 2D



Remarks: UPS packet labeling

Code 16K

Character set: Complete ASCII or
numeric
information
Checksum: Yes
ID: C=C16K
Required license: Barcode Plus / 2D



Remarks: Stacked 2-D barcode, encodes up to 77 ASCII characters or
154 digits.

Code 49

Character set: Complete ASCII or
numeric
information
Checksum: Yes
ID: C=C49
Required license: Barcode Plus / 2D



Remarks:

<u>Code 128</u>	
Character set: 7 Bit ASCII	 ABab123%
Checksum: Yes	
ID: C=128	
Required license: Barcode Classic or Barcode Plus	
Remarks: Complete 7 Bit ASCII character set, high density, low error resistance.	

<u>Code 39</u>	
Character set: A-Z 0-9 - . \$ / + % and space	 AB123
Checksum: Optional	
ID: C=39	
Required license: Barcode Classic or Barcode Plus	
Remarks: Robust code, low density for upper case letters and digits.	

Code 39 extended

Character set: Full 7 Bit ASCII
Checksum: Optional
ID: C=39X
Required license: Barcode Classic or
Barcode Plus



ABab123%

Remarks: Very low density code, most characters are encoded by two code 39 characters.

Code 93

Character set: A-Z 0-9 - . * \$ / +
% and space
Checksum: Optional
ID: C=93
Required license: Barcode Classic or
Barcode Plus



AB123

Remarks: Robust code, low density for upper case letters and digits.

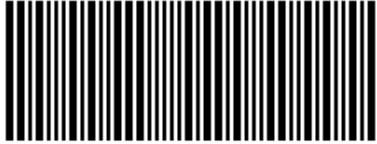
Code 93 extended

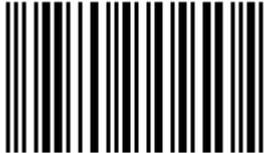
Character set: Full 7 Bit ASCII
Checksum: Optional
ID: C=93X
Required license: Barcode Classic or
Barcode Plus



ABab123%

Remarks:

<p><u>Code 2 of 5 Industrial</u></p> <p>Character set: Digits only</p> <p>Checksum: Optional</p> <p>ID: C=25I</p> <p>Required license: Barcode Classic or Barcode Plus</p>	 <p>123456</p>
<p>Remarks: Robust, low density code for digits ONLY.</p>	

<p><u>Code 2 of 5 Interleaved</u></p> <p>Character set: Digits only</p> <p>Checksum: Optional</p> <p>ID: C=25L</p> <p>Required license: Barcode Classic or Barcode Plus</p>	 <p>123456</p>
<p>Remarks: Robust code for digits ONLY. Requires even number of digits without checksum or odd number of digits plus checksum. A 0 digit will otherwise be placed in front of the data. Higher density than 2 of 5 Industrial and 2 of 5 Matrix.</p>	

Code 2 of 5 Matrix

Character set: Digits only
Checksum: Optional
ID: C=25M
Required license: Barcode Classic or
Barcode Plus



123456

Remarks: Robust code for digits ONLY. Higher density than 2 of 5 Industrial.

9 QR Code Data Capacity

Format	Error Correction Level	Data capacity format 1 - 8			
		Numeric	Alphanumeric	8-bit Byte	Kanji
1	L	41	25	17	10
	M	34	20	14	8
	Q	27	16	11	7
	H	17	10	7	4
2	L	77	47	32	20
	M	63	38	26	16
	Q	48	29	20	12
	H	34	20	14	8
3	L	127	77	53	32
	M	101	61	42	26
	Q	77	47	32	20
	H	58	35	24	15
4	L	187	114	78	48
	M	149	90	62	38
	Q	111	67	46	28
	H	82	50	34	21
5	L	255	154	106	65
	M	202	122	84	52
	Q	144	87	60	37
	H	106	64	44	27
6	L	322	195	134	82
	M	255	154	106	65
	Q	178	108	74	45
	H	139	84	58	36
7	L	370	224	154	95
	M	293	178	122	75
	Q	207	125	86	53
	H	154	93	64	39
8	L	461	279	192	118
	M	365	221	152	93
	Q	259	157	108	66
	H	202	122	84	52

Format	Error Correction Level	Data capacity format 9 - 16			
		Numeric	Alphanumeric	8-bit Byte	Kanji
9	L	552	335	230	141
	M	432	262	180	111
	Q	312	189	130	80
	H	235	143	98	60
10	L	652	395	271	167
	M	513	311	213	131
	Q	364	221	151	93
	H	288	174	119	74
11	L	772	468	321	198
	M	604	366	251	155
	Q	427	259	177	109
	H	331	200	137	85
12	L	883	535	367	226
	M	691	419	287	177
	Q	489	296	203	125
	H	374	227	155	96
13	L	1022	619	425	262
	M	796	483	331	204
	Q	580	352	241	149
	H	427	259	177	109
14	L	1101	667	458	282
	M	871	528	362	223
	Q	621	376	258	159
	H	468	283	194	120
15	L	1250	758	520	320
	M	991	600	412	254
	Q	703	426	292	180
	H	530	321	220	136
16	L	1408	854	586	361
	M	1082	656	450	277
	Q	775	470	322	198
	H	602	365	250	154

Format	Error Correction Level	Data capacity format 17-24			
		Numeric	Alphanumeric	8-bit Byte	Kanji
17	L	1548	938	644	397
	M	1212	734	504	310
	Q	876	531	364	224
	H	674	408	280	173
18	L	1725	1046	718	442
	M	1346	816	560	345
	Q	948	574	394	243
	H	746	452	310	191
19	L	1903	1153	792	488
	M	1500	909	624	384
	Q	1063	644	442	272
	H	813	493	338	208
20	L	2061	1249	858	528
	M	1600	970	666	410
	Q	1159	702	482	297
	H	919	557	382	235
21	L	2232	1352	929	572
	M	1708	1035	711	438
	Q	1224	742	509	314
	H	969	587	403	248
22	L	2409	1460	1003	618
	M	1872	1134	779	480
	Q	1358	823	565	348
	H	1056	640	439	270
23	L	2620	1588	1091	672
	M	2059	1248	857	528
	Q	1468	890	611	376
	H	1108	672	461	284
24	L	2812	1704	1171	721
	M	2188	1326	911	561
	Q	1588	963	661	407
	H	1228	744	511	315

Format	Error Correction Level	Data capacity format 25-32			
		Numeric	Alphanumeric	8-bit Byte	Kanji
25	L	3057	1853	1273	784
	M	2395	1451	997	614
	Q	1718	1041	715	440
	H	1286	779	535	330
26	L	3283	1990	1367	842
	M	2544	1542	1059	652
	Q	1804	1094	751	462
	H	1425	864	593	365
27	L	3517	2132	1465	902
	M	2701	1637	1125	692
	Q	1933	1172	805	496
	H	1501	910	625	385
28	L	3669	2223	1528	940
	M	2857	1732	1190	732
	Q	2085	1263	868	534
	H	1581	958	658	405
29	L	3909	2369	1628	1002
	M	3035	1839	1264	778
	Q	2181	1322	908	559
	H	1677	1016	698	430
30	L	4158	2520	1732	1066
	M	3289	1994	1370	843
	Q	2358	1429	982	604
	H	1782	1080	742	457
31	L	4417	2677	1840	1132
	M	3486	2113	1452	894
	Q	2473	1499	1030	634
	H	1897	1150	790	486
32	L	4686	2840	1952	1201
	M	3693	2238	1538	947
	Q	2670	1618	1112	684
	H	2022	1226	842	518

Format	Error Correction Level	Data capacity format 33 - 40			
		Numeric	Alphanumeric	8-bit Byte	Kanji
33	L	4965	3009	2068	1273
	M	3909	2369	1628	1002
	Q	2805	1700	1168	719
	H	2157	1307	898	553
34	L	5253	3183	2188	1347
	M	4134	2506	1722	1060
	Q	2949	1787	1228	756
	H	2301	1394	958	590
35	L	5529	3351	2303	1417
	M	4343	2632	1809	1113
	Q	3081	1867	1283	790
	H	2361	1431	983	605
36	L	5836	3537	2431	1496
	M	4588	2780	1911	1176
	Q	3244	1966	1351	832
	H	2524	1530	1051	647
37	L	6153	3729	2563	1577
	M	4775	2894	1989	1224
	Q	3417	2071	1423	876
	H	2625	1591	1093	673
38	L	6479	3927	2699	1661
	M	5039	3054	2099	1292
	Q	3599	2181	1499	923
	H	2735	1658	1139	701
39	L	6743	4087	2809	1729
	M	5313	3220	2213	1362
	Q	3791	2298	1579	972
	H	2927	1774	1219	750
40	L	7089	4296	2953	1817
	M	5596	3391	2331	1435
	Q	3993	2420	1663	1024
	H	3057	1852	1273	784

10 ISO 3166 Codes (Country Codes)

These country codes are used with Maxicode to specify the destination.

Country	Number
Afghanistan	004
Albania	008
Algeria	012
American Samoa	016
Andorra	020
Angola	024
Anguilla	660
Antarctica	010
Antigua And Barbuda	028
Argentina	032
Armenia	051
Aruba	533
Australia	036
Austria	040
Azerbaijan	031
Bahamas	044
Bahrain	048
Bangladesh	050
Barbados	052
Belarus	112
Belgium	056
Belize	084
Benin	204

Bermuda	060
Bhutan	064
Bolivia	068
Bosnia And Herzegowina	070
Botswana	072
Bouvet Island	074
Brazil	076
British Indian Ocean Territory	086
Brunei Darussalam	096
Bulgaria	100
Burkina Faso	854
Burundi	108
Cambodia	116
Cameroon	120
Canada	124
Cape Verde	132
Cayman Islands	136
Central African Republic	140
Chad	148
Chile	152
China	156
Christmas Island	162
Cocos (Keeling) Islands	166
Colombia	170
Comoros	174
Congo	178
Cook Islands	184

Costa Rica	188
Cote D'ivoire	384
Croatia	191
Cuba	192
Cyprus	196
Czech Republic	203
Denmark	208
Djibouti	262
Dominica	212
Dominican Republic	214
East Timor	626
Ecuador	218
Egypt	818
El Salvador	222
Equatorial Guinea	226
Eritrea	232
Estonia	233
Ethiopia	231
Falkland Islands (Malvinas)	238
Faroe Islands	234
Fiji	242
Finland	246
France	250
France, Metropolitan	249
French Guiana	254
French Polynesia	258
French Southern Territories	260

Gabon	266
Gambia	270
Georgia	268
Germany	276
Ghana	288
Gibraltar	292
Greece	300
Greenland	304
Grenada	308
Guadeloupe	312
Guam	316
Guatemala	320
Guinea	324
Guinea-Bissau	624
Guyana	328
Haiti	332
Heard And Mc Donald Islands	334
Honduras	340
Hong Kong	344
Hungary	348
Iceland	352
India	356
Indonesia	360
Iran	364
Iraq	368
Ireland	372
Israel	376

Italy	380
Jamaica	388
Japan	392
Jordan	400
Kazakhstan	398
Kenya	404
Kiribati	296
Korea, Democratic People's Republic Of	408
Korea, Republic Of	410
Kuwait	414
Kyrgyzstan	417
Lao People's Democratic Republic	418
Latvia	428
Lebanon	422
Lesotho	426
Liberia	430
Libyan Arab Jamahiriya	434
Liechtenstein	438
Lithuania	440
Luxembourg	442
Macau	446
Macedonia	807
Madagascar	450
Malawi	454
Malaysia	458
Maldives	462
Mali	466

Malta	470
Marshall Islands	584
Martinique	474
Mauritania	478
Mauritius	480
Mayotte	175
Mexico	484
Micronesia, Federated States Of	583
Moldova, Republic Of	498
Monaco	492
Mongolia	496
Montserrat	500
Morocco	504
Mozambique	508
Myanmar	104
Namibia	516
Nauru	520
Nepal	524
Netherlands	528
Netherlands Antilles	530
New Caledonia	540
New Zealand	554
Nicaragua	558
Niger	562
Nigeria	566
Niue	570
Norfolk Island	574

Northern Mariana Islands	580
Norway	578
Oman	512
Pakistan	586
Palau	585
Panama	591
Papua New Guinea	598
Paraguay	600
Peru	604
Philippines	608
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