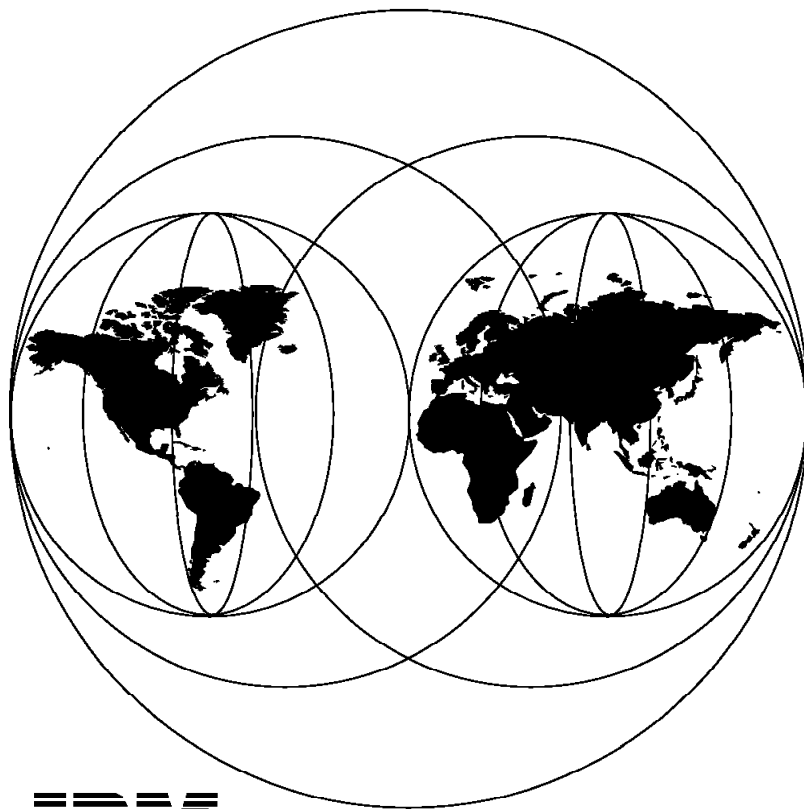


International Technical Support Organization

SG24-4629-00

**AFP Printing for SAP  
Using R/3 and R/2**

November 1995



**International Technical Support Organization  
Boeblingen Center**





International Technical Support Organization

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Before using this information and the product it supports, be sure to read the general information under "Special Notices" on page xi.

**First Edition (November 1995)**

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## Abstract

This document describes how to print from SAP's R/2 and R/3 applications on AFP printers. It gives an overview of the functional capabilities and the setup required to enable and use AFP printing on various operating system platforms.

Depending on the operating environment basic knowledge of UNIX, AIX, OS/2, MVS or VSE is required.

(64 pages)



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## Special Notices

This publication is intended to help persons who are involved in the installation, application development and usage of SAP R/2 and R/3. The information in this publication is not intended as the specification of any programming interfaces that are provided by R/2 and R/3 from SAP AG in Walldorf, Germany. See also the PUBLICATIONS section of the IBM Programming Announcement for SAP's R/3 for more information about what publications are considered to be product documentation.

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## Preface

This document shows how to print from SAP applications on AFP printers. It provides a description of R/2 and the necessary steps to set up R/3 for high volume printing.

It is intended to be used by persons who are involved in the installation, application development and usage of these products.

---

## How This Document is Organized

The document is organized as follows:

- Chapter 1, "Introduction"

A brief introduction to the topic is given.

- Chapter 2, "AFP Printing from SAP R/3"

This chapter gives an overview of the functional capabilities of AFP printing from SAP R/3.

- Chapter 3, "SAP2AFP User's Guide"

How to prepare the installation on the R/3 side to enable and use AFP printing.

- Chapter 4, "SAP2AFP Administration Guide"

This chapter describes the initialization files and the setup of SAPZAFP.

- Chapter 5, "AFP Printing from SAP R/2"

Details are provided about the functions available under the host system of SAP R/2 to enable AFP printing.

---

## Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document.

- *PSF for AIX Licensed Program Specifications*, G544-3815
- *Print Services Facility for AIX: Print Administration*, S544-3817
- *PSF/MVS Download Guide*, G544-5294
- *Printer Information*, G544-3290
- *Print Services Facility/MVS, NetSpool Guide*, G544-5301

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## Chapter 1. Introduction

Volume printing is a long time requirement raised by large SAP customers. The initial SAP system, R/2, offered mainly printing capabilities for terminal printers, and - over the years - a path to the system spool of host systems.

With R/3 which is based on UNIX or AIX, the first step was printing on slow printers using the PostScript and HP PCL data streams. Relatively fast, R/3 took over large host applications which used to print in production shops with high speed printers where IBM AFP is the de facto standard. Again, the requirement of volume printing had to be addressed.

This publication describes how to print from SAP applications on AFP printers. It is not meant in any way to be a substitute for any SAP documentation. SAP terms are discussed only to show their relations to AFP counterparts.

Basically this documentation consists of four parts:

- AFP Printing from SAP R/3  
gives an overview of the functional capabilities of AFP Printing from SAP R/3, especially the ones available with the new SAP OTF transform, also called SAPZAFP.
- R/3 AFP User's Guide  
describes the preparations on the R/3 side to enable and use AFP printing.
- SAP2AFP Administration Guide  
describes the initialization files and the setup of SAPZAFP.
- AFP Printing from SAP R/2  
details what is available under the host system of SAP R/2 to enable AFP printing.

This documentation is based on the experiences made in Germany in recent years. Hopefully, it is correct but it can never be complete. Any suggestions, improvements, and corrections are greatly appreciated and should be sent to the author at:

- SPIMUE@DE.IBM.COM or
- IBMMAIL(DEIBMGQQ)

Again many thanks to the people who contributed with their ideas and showed so much patience to complete this project successfully.



---

## Chapter 2. AFP Printing from SAP R/3

Today, SAP R/3 contains four printer drivers which produce printer device data streams: A printer driver for PostScript, one for HP - PCL4 or PCL5, one for Kyocera printers, and a printer driver for ASCII line printers. With SAPZAFP a fifth printer driver will be available. To connect R/3 with AFP printers, three methods can be used.

- Using SAP2AFP via SAP's native spool data format

SAPZAFP is a new, additional method to connect AFP printers with R/3. It provides a direct transformation of SAP's print data into AFP's native data stream containing text records which are printed using fonts.

- Using PS2AFP via PostScript

The PS2AFP converter is an integral part of PSF for AIX. It converts the PostScript pages produced by SAP's standard PostScript Printer driver into AFP full page images. A full page image composes the page from individual pixels (laser dots) as opposed to using text records and fonts.

- Using PCL2AFP via HP PCL

The PSL2AFP converter of PSF for AIX converts the HP PCL4/5 pages which were produced by SAP's standard PCL Printer driver into AFP full page images.

The following sections describe each alternative in detail and present some considerations for its usage.

---

### 2.1 Printing from SAP R/3 Using SAP2AFP

SAP2AFP is a separately priced feature of PSF for AIX Version 2.1, Prog. No. 5765-505. It converts OTF (Output Text Format) into the 'native' objects of AFP, the presentation text objects (PTOCA records). OTF is SAP's spooler data format for word processing. In addition, it transforms the traditional ABAP listing format into line data.

#### 2.1.1 SAPscript and OTF

SAPscript is the formatting program developed by SAP. It is used in most of the commercial applications which comprise R/3. Invoices, bills, reminders, paychecks and most of the commercial output produced by R/3 are in OTF format. Usually it uses typographic fonts such as Times or Helvetica. SAPscript's functions can be compared to IBM's Document Composition Facility (DCF).

Basically SAPscript has four functions:

- Placing constant text on fixed locations on a page

To create simple forms SAPscript is used to place constant text on fixed locations on a page, for example the name of a company in a letterhead or banking information at the bottom. This function must be compared with IBM's Overlay Generation Language (OGL/370, Prog. No. 5688-191). The font support is equivalent, as well as placing text on a page. OGL has better functions to draw boxes and circles and SAPscript has no image support for signatures and logos at all.

- Placing constant text at varying positions on a page

Constant text may float when it must be adjusted to variable data, for example when it follows customer names which vary in length.

In SAP's terminology a 'form' is a mixture of these two text types while in OGL terms an overlay contains only the fixed text at fixed positions. In IBM terms an SAP form is a mixture of application data and forms text, whereas an AFP overlay contains only forms text and is totally separated from the application data.

- Placing the variable data on a page

The third function of SAPscript is to place the variable data on the page as it is produced in the application. For simple data structures this function is done by the AFP PAGEDEF module, but when the data becomes more complex and variable and needs real formatting the functions of a full blown text formatter must be available.

- Specifying the print options to be used for the print job or the page.

A limited number of print options can be passed with the data. The most important print options are the number of copies, the printer destination, the paper resource to be used, just to name a few.

For the formatting, SAPscript uses different device types, which contain initialization information for the printers and the metrics of the fonts. The following is a list of all device types which are delivered by SAP R/3 in the releases 2.2E and 2.1K.

<u>Dev-Type</u>	<u>Name</u>
ARCHIXOS	IXOS Archive
ASCIIPRI	Some generic ASCII printer
COMPU960	Bull Compuprint 960,4/66
DECLA75P	DEC LA75Plus matrix printer
DECLN07	DECLaser1100/DEC LN07 printer
GAMMAFAX	Gamma Telefax
HP256X	HP 256X printer series
HP2930	HP 2930 Line printer
HPDJ500	HP DeskJet 500
HPLJIIID	HP LaserJet III series
HPLJSIND	HP Laserjet 2,3: driver STN2
HPLJ_II	HP LaserJet II series
IBMAFP	AFP converter ISO 8859-1 240 pel printers
KYOF1000	Kyocera F-1000
KYOF1200	Kyocera F-1200, F-1200S
KYOP2000	Kyocera PostScript P-2000
MT600	Mannesmann Tally MT600 USASCII
MT600GER	Mannesmann Tally MT600 GERMAN
MT600GER	Mannesmann Tally MT600 GERMAN
MT600NDA	Mannesmann Tally MT600 NOR/DAN
OKI341	OKI Microline 3410 EPSON EMUL.
POSTGRAP	PostScript-Typ SAP-Graphik
POSTSCTP	PostScript-Printer
QMSPS410	Qume Postscript 410
S4440XTG	SEL Alcatel 4440XT, GERMAN
SAPWIN	MS-Windows-Drucker via SAPLPD
SCREEN	ABAP-List
SNI4009	Siemens/Nixdorf 4009 (EPSON)

SNI4010	Siemens/Nixdorf 4010 (EPSON)
SNI9014	Siemens/Nixdorf 9014 (EPSON)
SNIZD13	Siemens/Nixdorf ZD13
TOPCALL	TOPCALL: Telefax

The result of SAPscript processing is a datastream in OTF format containing the print options, the fixed text, and the variable data placed on the page in accordance with the metrics of the fonts for a particular printer. The first records contain the print options, they are then followed by the data records intermixed with the records with font control information.

## 2.1.2 ABAP Listing Format

The ABAP listing format is the classical computer listing format with fixed character and line positions using fixed fonts such as Courier. It is created when a user asks for a report. Some applications use report printing for outputting forms.

## 2.1.3 The Access Method 'Z'

The regular printer drivers which are provided with R/3 transform OTF into the device dependent printer data streams, for example into PostScript or HP - PCL4/5 and enqueue the converted files into the AIX or UNIX print queues.

Beginning with releases 2.2E and 2.1K SAP offers a new access method, 'Z' which passes print files to an external (for SAP) program such as SAPZAFP. The access method 'Z' can be used for OTF and for ABAP listings as well.

## 2.1.4 Available Print Options

The following list shows the print options which are passed by the access method 'Z'. The parameters which are **highlighted** affect the processing in SAPZAFP.

```

V0100
*MAJOR=1
*MINOR=1
*PJDEST=AFPU
*PJTELENUM=
*PJCOPIES=1
*PJPRIO=3
*PJPAPER=DINA4
*FORMAT=OTF
*CODEPAGE=1148
*PJSTRIPPAGE=0
*PJENDPAGE=0
*RQID=11701
*PJNUMMER=1
*PJTITLE=
*NAME=SCRIPT
*SUFFIX1=
*SUFFIX2=
*PJCLIENT=003
*PJOWNER=DEMO
*RQCLIENT=003
*RQOWNER=DEMO
*PJRECEIVER=DEMO
*PJDIVISION=

```

```

*RQCREATIME=1995081016511500
*PJCREATIME=1995081016512100
*PJWORKHOST=sicc980
*RQTYPE=OTFHPL2
*PRNAME=dummy
*PRTYPE=IBMAFP3
*ORIGDEST=AFPU
*ORIGPRTYPE=IBMAFP3

```

Only a few parameters affect the processing in SAPZAFP or the printing in PSF for AIX respectively. They are:

- \*PJDEST=           The destination printer. SAP restricts the length of the printername to **four** characters only. It should be noted that the name used here must be defined in the PRINTERS.TAB initialization table of SAPZAFP.
- \*PJCOPIES=        The number of copies for this print job.
- \*PJPAPER=         The name of the formatting to be used - in SAP's terminology the paper type. This parameter has two effects:  
  
For files with FORMAT=OTF, PJPAPER will be mapped into the name of a FORMDEF only for files with FORMAT=LIST, PJPAPER will be mapped into the name of a FORMDEF and a PAGEDEF.
- \*FORMAT=          Defines the data format; can be either OTF or LIST.
- \*CODEPAGE=        Defines the code page which was used for the formatting. It should be noted that the codepage name used here must be defined in the codepage mapping initialization table of SAPZAFP.
- \*PJOWNER=         Submitter of the print job in SAP R/3.

### 2.1.5 OTF Records

OTF is documented in SAP publications and will not be described here. It is a data stream, similar to AFPDS, the records contain commands, for example for font control, or the print data. As with AFPDS, it is based on pages and has a header which sets up the environment of the print request.

Beginning with R/3 Rel. 3.0A OTF will support an information record which describes the paper resource. This record will be transformed into an IMM-record by SAPZAFP. Then it will be possible to switch the copy group and the overlay for every single page. In release 2.2E and 2.1K it is only possible to specify **one** PJPAPER-name for the complete print request and all pages of this request will be printed with the same FORMDEF and overlay.

### 2.1.6 The Printing Language in R/3

One general remark to specifications in R/3. While in IBM's batch world nobody cares if the request can be executed, for example only the poor little print server coughs if a keyword contains a typo and the requested resource is not in the resource library, SAP does not allow for loose ends. Everything must be predefined in tables which are interconnected. This puts the load on the people who must prepare the system and may create long lists from which to select, but the end user makes fewer mistakes.

Printing in R/3 is controlled by the elements which are defined in the R/3 spool administration. Before we take a closer look at them a brief remark about naming in SAP systems must be made.

## 2.1.7 Naming Conventions

SAP's naming convention reserves the company's right to change anything which does not start with **Z** or **Y**.

This means that any transaction, report, paper type, or device type which is modified by the customer must start with **Z** or **Y**. (As **Z** is most commonly used we changed the natural order of the characters and list it first.) Any item in an SAP system which does not have a name beginning with **Z** or **Y** may be accidentally hit in a release change if SAP chooses to use this name.

## 2.1.8 Elements of Printing

In our context we need only to look into the elements of the spool administration which affect printing. They are:

- Printer names

A print request must be directed to a printer which must have a name. Printer names can be up to four characters long, they can be chosen freely, with no restriction such as the '**Z**'-rule being applied. Printer names are used as attributes for spool requests. A printer name must be connected with the device types which can be used for that printer.

- Device types

The standard device types delivered by R/3 have already been listed. For the printing, a particular device type must be connected with a particular device initialization and can be connected with a particular paper type. This combination is then a user defined device type which must begin with '**Z**' if you want to be sure that it will survive a release change.

- Page formats

Page formats describe the format of a page, for example the size, landscape or portrait and have no influence on SAPZAFP and AFP printing.

- Paper types

Define how a page will be formatted. For ABAP listings they specify the number of characters per line and the number of lines per page. As the formatting in OTF is done by SAPscript the paper type has no effect there. But SAPZAFP maps the paper type into the name of a FORMDEF which calls out an overlay. So for AFP printing the paper type is very important. It should be noted that the paper type must be connected with a device type.

- Device initialization

The device initialization contains parameters to control the individual printers. For AFP printing the device initialization has no effect, but must be maintained for formal reasons. So we have to copy the dummy device initializations of the IBMAFP device type for every paper type and we **must not** use the device initializations of a device type other than an IBMAFP device type.

## 2.1.9 Prerequisites for SAP2AFP

Let us look at the hardware and the software requirements for SAP2AFP.

### 2.1.9.1 SAP

R/3 runs under AIX on IBM hardware and under UNIX on non-IBM hardware. The spool exit which passes the R/3 spooler data to an external printer driver runs on any platform. It is provided beginning with the following SAP R/3 releases:

- SAP R/3 Release 2.2E
- SAP R/3 Release 2.1K
- SAP R/3 Release 3.0A

### 2.1.9.2 IBM

SAP2AFP is a separately orderable and priced feature of PSF for AIX Version 2.1 (Prog. No. 5765-505). If only OTF data is to be printed the base feature of *PSF for AIX* is not required. Based on individual service contracts SAP2AFP can be provided under PSF/2 as well.

SAP2AFP runs under AIX V.3.2.5 and above, and AIX V.4.1.2; the following table shows additional information about version prerequisites.

SAP2AFP with PSF for AIX V.2	Uni. Processor with AIX 3.2.5	Uni. Processor with AIX 4.1.2	SMP with AIX 4.1.2	SMP with AIX 3.2.5
R/3 Rel 3.0A	---	ok	ok	---
R/3 Rel 2.2E	ok	ok	ok	ok
R/3 Rel 2.1K	ok	ok	ok	ok
/370 Channel Emulator Card	ok	Note 1	Note 1	ok

Note 1. Planned for first quarter of 1996

### 2.1.9.3 Hardware Requirements

SAPZAFP and PSF for AIX run on any RS/6000 system with AIX.

### 2.1.9.4 Printers Supported

The output of SAPZAFP can be printed on any AFP printer supported by PSF for AIX. They are: IBM 3900-0Wx, IBM 3900-D0x, IBM 3900-001, IBM 3835, IBM 3935, IBM 3112, IBM 3116, IBM 3130, IBM 3160, IBM 3825, IBM 3829, IBM 3912, IBM 3916, IBM 3930.

In addition PPDS printers and HP PCL 4/5 printers attached to the parallel and/or serial interface are supported. For detailed information about the different printers and their attachment possibilities in PSF for AIX see *PSF for AIX Licensed Program Specifications*.



### 2.1.9.5 Bar Codes

Some R/3 applications require that data is printed as bar code. All the bar codes which can be specified in R/3 are printable in AFP. If OTF specifies bar code data SAP2AFP converts it into BCOCA data, which is understood directly as bar codes by the control unit of the AFP printer.

BCOCA is supported by the following printers: IBM 3900-0Wx, IBM 3900-DWx, IBM 3160, IBM 3130, IBM 3116, IBM 3112, IBM 3935, IBM 3930, IBM 3916, IBM 3912, IBM 4028, IBM 3816, IBM 3812.

---

## 2.2 Use of AFP Resources

The clean separation between data and resources is one of AFP's distinct advantages. Reusable information, as fonts or constant text is placed into resources and kept isolated from application data. This section looks into the aspects of using AFP resources as extensively as possible.

### 2.2.1 Mapping of Names

As already mentioned, the paper type is mapped into a FORMDEF. As it triggers some user defined processing it must start with a 'Z' or 'Y'. If it does not, the default FORMDEF of the printer will be used. The first six or fewer characters which follow the 'Z' will be used for the FORMDEF name.

For instance, a PJPAPER=ZINVOIC will be mapped into a FORMDEF=F1INVOIC.

With ABAP listing format, the first six characters (after the 'Z or Y') will be mapped into the name of an entry in the pagedef.tab initialization table. The name of the FORMDEF and the PAGEDEF will be taken from there. This applies only to ABAP reports with user specific formatting. All the usual paper types provided by SAP which start with X\_ have matching PAGEDEFs already defined in the pagedef.tab initialization file of SAPZAFP and are automatically resolved.

### 2.2.2 Using Overlays

As the functionality of OGL is superior to that of SAPscript and as there may be a large investment in OGL overlays already, it is strongly recommended to do the programming of new forms in OGL and to try to adjust the SAPscript formatting to use existing overlays. When developing new applications the forms part should be taken from SAPscript.

Overlays cannot be created on the AIX platform. The 'Overlay Generation Language, Prog. No. 5688-191' is available for /390 hosts only, but the modules produced are compatible. To use them in PSF for AIX they can be downloaded using TCP/IP File Transfer Program (FTP) or they can be directly accessed via TCP/IP Network File System (NFS) from the host libraries.

To create AFP resources on PC platforms programs are provided by independent companies, such as ISIS, Elixir, or FormScript. These programs can be used to create overlays, FORMDEFs, and if necessary PAGEDEFs as well.

In addition, overlays can be created by any WINDOWS application using the WINAFP printer driver provided as part of PSF for AIX or PSF/2, or via PostScript and the PostScript conversion routine of PSF for AIX.

### 2.2.3 Using FORMDEFs

FORMDEFs describe the physical medium on which to print, if it is simplex or duplex, from which bin it comes, and if it contains an overlay. FORMDEFs can be created at the AIX platform by 'PPFA for AIX' which is an extra feature of PSF for AIX. They can be created as well by the PC programs mentioned above or on a host platform using PPFA/370.

### 2.2.4 Using PAGEDEFs

There are customers who depend on their old PAGEDEFs and want to continue to use them, for example if their applications depend on functions such as conditional processing. If they insist on doing this it might be an alternative for them to restrict the formatting of SAPscript to a simple ASCII line printer using a grid of fixed lines and print positions. Then SAPscript could be asked to place the variable data at those positions as they are defined in the PAGEDEF. The ASCII printer driver does not support channel codes; the printing functions available here are very limited.

The print files created by this process are then printed with SAP's ASCII printer driver and subsequently processed by the LNE2AFP process of PSF for AIX using a special shell script which takes the FORMDEF and the PAGEDEF names from the first print line.

It should be noted that this is for severe PAGEDEF addicts only.

### 2.2.5 Using Fonts

The device types IBMAFP and IBMAFP3 support the three font families Courier, Helvetica, and Times. These font families are supported as IBMs Core Interchange Fonts as well. The default codepage supported by SAP is ISO 8859-1 (Latin-1) which is mapped in the FONTS.TAB initialization table of SAPZAFP into the German T1V10273 codepage. This codepage must be modified for non-Latin-1 R/3 installations. For ABAP listings the font Letter Gothic Latin1 of the coordinated font family is used. If an installation does not want to install the coordinated font family and wants to use the traditional gothic text fonts from the compatibility fonts, the font names in the pagedef.tab file can be adjusted.

If a customer wishes to use a different font which is not yet supported, the following steps would have to be done. The customer purchases the font as Adobe Type 1 font and converts it into raster fonts using the IBM AFP Font Collection, Prog. No. 5648-113. The subsequent steps, to cut out the metrics from the raster fonts must be done at IBM as a billable service. The administrative steps still must be worked out. Please contact the author of this document for further information.

---

## 2.3 Printing from SAP R/3 Using PostScript

PSF for AIX contains a PostScript conversion routine which converts PostScript into AFPDS full page images. Full page images are larger than text records and result in more traffic on the network and may print more slowly. The printed pages on the AFP printer look identical to those printed on a PostScript printer.

Using the PostScript conversion is an attractive solution for those R/3 installations who do most of their printing on PostScript printers and want only occasional access to AFP printing, for example for backup reasons.

In this case they are using SAP's regular PostScript printer driver (R/3 device type POSTSCRIPT) and sending the output to a PostScript queue in PSF for AIX which activates the conversion process and sends the file to the printer. How to set up the PostScript conversion and to define the printers is described in detail in *Print Services Facility for AIX, Print Administration*.

There is no way to map the paper type to a FORMDEF name for each print request as with SAPZAFP. This means that with the PostScript conversion each FORMDEF must have its own queue defined. This limits the useability to a certain degree. In addition, the possibility to switch overlays between pages (supported in R/3 Rel. 3.0A) will not work.

---

## 2.4 Printing from SAP R/3 Using HP PCL

Everything which was said about the PostScript conversion in the previous section, applies as well to the HP PCL conversion. The usage scenario will be the same, except that here the normal printing is done on HP PCL printers.

---

## 2.5 Installations with Multiple Systems

In the simplest case the spool work process of R/3 with the exit and SAPZAFP and PSF for AIX run together on the same platform. There are many variations possible to split this between several homogenous and heterogeneous platforms. This section discusses some of the combinations. They all have in common that the actual printer driver which runs the AFP printers is Print Service Facility (PSF) which is available on /390 platforms (PSF/MVS, PSF/VM, and PSF/VSE), on AIX (PSF for AIX), on OS/2 (PSF/2), and on AS/400. The transfer of the printfile of the print options must be automatic and without interaction. A transfer using a file transfer program and subsequent submission of a print job at the receiving platform is considered inadequate.

### 2.5.1 Multiple AIX Systems

If R/3 does not run on the same node as PSF for AIX, the connection between the two systems must be in a way that the spool work process of R/3 and SAPZAFP run on the same node and print to a **remote queue**. The remote queue directs the output to the second node which has PSF for AIX running.

### 2.5.2 UNIX to PSF/2

This scenario is a technical possibility which can be offered based on an individual service contract. It has been tested and works in several installations already.

Here R/3 runs on non-IBM platforms, for example on HP or Sun. The spool work process uses the access method 'Z', the spool exit. The profile of the R/3 spool work process does not call SAPZAFP, as shown in the *R/3 AFP User's Guide*, but issues the regular print command QPRT with an additional parameter -qv and sends the SAP spool data file to a remote queue which runs on an OS/2 system. The OS/2 system has a new conversion process defined in PSF/2 which starts with SAPZAFP and enqueues the converted file to PSF/2.

This offers AFP printing to all those R/3 customers who do not want to install an RS/6000. The administrative part, how to make SAPZAFP available with PSF/2

still must be worked out. Technically it is no problem as SAPZAFP is written in 'C' and easily portable.

### 2.5.3 UNIX to PSF for AIX

This scenario is similar to the previous one. The exit calls LPR and transports the OTF file via a remote queue to the AIX system where SAPZAFP and PSF for AIX are running on a RS/6000. On the sending side a remote queue must be defined which is connected to a local queue on the receiving side.

The following shows the screen to define the queue on the receiving side using SMIT.

#### Add a Local Queue

Type or select values in entry fields.  
Press Enter AFTER making all desired changes.

	[Entry Fields]	
* NAME of queue to add	[sap1]	
ACTIVATE the queue?	yes	+
Will this become the DEFAULT queue?	no	+
Queueing DISCIPLINE	first come first serve	+
ACCOUNTING FILE pathname	[ ]	
* NAME of device to add	[ ]	
BACKEND OUTPUT FILE pathname	[/var/psf/tmp/sap1.log]	
ACCESS MODE of backend output file	write only	+
* BACKEND PROGRAM pathname	<f/sap2afp/recscr MVSP]	
Number of FORM FEEDS prior to printing	[0] #	
Print HEADER pages?	never	+
Print TRAILER pages?	never	+
ALIGN pages between files within jobs?	yes	+

F1=Help	F2=Refresh	F3=Cancel	F4=List
F5=Reset	F6=Command	F7=Edit	F8=Image
F9=Shell	F10=Exit	Enter=Do	

The backend shell script (recscr) might look like:

```

#|/bin/ksh
#-----
# Script file for backend program for a AIX queue to accept SAP OTF Data
#-----
# next three commands only for logging into the BACKEND OUTPUT FILE
# be sure that the file exist - otherwise the queue goes down |||
echo -----
date
echo $*
# string operations to extract the filename $file from parameter list
last=echo $* ` wc -w
file=echo $* ` cut -f $last -d† †
# type the file and redirect it to the converter
cat $file ` /usr/local/afp/sap2afp -d $1 -i

```

## 2.5.4 Windows NT to PSF for AIX

This scenario is similar to the previous one and works already in a customer installation. But the installation must be different, as we had to learn that NT's LPR does not exactly behave like AIX's LPR. The only way to solve the problem was to install the spool work process of R/3 at the AIX platform. Now the R/3 clients use the spool work process at the AIX platform, and the exit there calls directly SAPZAFP.

### Installation Tip

After we installed the AIX PTF IX50187, which corrects LPD we got it running in the way it was originally planned. That is that NT has the spool work process and issues an LPR command. AIX has a backend shell script as shown in the previous section.

## 2.5.5 AIX to PSF/MVS

It might be the majority of large companies who plan to install R/3 for new applications and want to continue to use the large production print shop they have installed under MVS and PSF/MVS. Today, we don't have an automatic process to transfer AFPDS spool files from AIX to MVS. The functions of LPR and LPD in MVS are too limited.

For an automatic connection between AIX and PSF/MVS we must wait for the new AIX UPLOAD function which is planned for year end '95. Looking at its counterpart, the MVS Download feature which is already available, we can expect that it will select AIX spool files which belong to a specific queue and send the print file together with the print options like copies or FORMDEF to JES. JES will spool the file and have PSF/MVS print it.

From recent customer installations we learned that even with FTP an absolutely satisfactory solution can be accomplished. The RACF administrator will swallow a bit, but no further no hickups exist.

The gag is that AIX sends out an MVS-job to be submitted there. It contains the name of an AIX-file, which is called via FTP from MVS and then subsequently printed. This job is invoked by the MVSAFP shell script as shown in the following example:

```
#|/bin/ksh
#*-----*#
#*                                     *#
#*  MVSAFP      :  Enqueue SAP2AFP printfile for MVS system      *#
#*                                     *#
#*               Arg : Queue, Node, Filename, Copies, ÄFormdefÜ  *#
#*                 1     2     3         4         5              *#
#*                                     *#
#*               Req :  -                                         *#
#*-----*#
#
ML=†Aexpr †$ä3##*/üt : çÖ(.....Ö)ç†
LL=†Aexpr †$ä3##*/üt : ç.....Ö(.*Ö)$ç†
LL=$äLL%.*ü$äLL##*.ü
FN=$ML.$LL
FTPJOB=/var/psf/tmp/ftpjob
#
```

```

/bin/echo †----- MVSAFP Start -----† >> /var/psf/tmp/MVSAFP.log
/bin/echo $* >> /var/psf/tmp/MVSAFP.log
/bin/echo †file name on MVS: $FN† >> /var/psf/tmp/MVSAFP.log
/bin/echo †----- MVSAFP End -----† >> /var/psf/tmp/MVSAFP.log
#
touch $FTPJOB
#
echo †//SAP001DR JOB (‡08ZK5.4‡,SAP),SAPPRINT,CLASS=2,MSGCLASS=W† > $FTPJOB
echo ‡//ALLOC EXEC PGM=IEFBR14‡ >> $FTPJOB
echo ‡//SYSPRINT DD SYSOUT=*‡ >> $FTPJOB
echo ‡//FILEU DD DSN=SAP.PRINT.‡$FN‡.U,‡ >>$FTPJOB
echo ‡//
DISP=(,CATLG,DELETE),UNIT=SYSDA,SPACE=(CYL,(1,2)),‡ >>$FTPJOB
echo ‡//
DCB=(RECFM=VB,BLKSIZE=12300,LRECL=12288,DSORG=PS)‡ >> $FTPJOB
echo ‡//FILER DD DSN=SAP.PRINT.‡$FN‡.AFPDS,‡ >>$FTPJOB
echo ‡//
DISP=(,CATLG,DELETE),UNIT=SYSDA,SPACE=(CYL,(1,2)),‡ >>$FTPJOB
echo ‡//
DCB=(RECFM=VEM,BLKSIZE=32000,LRECL=31996,DSORG=PS)‡ >> $FTPJOB
echo ‡//FTP EXEC PGM=FTP‡ >>$FTPJOB
echo ‡//SYSPRINT DD SYSOUT=*‡ >> $FTPJOB
echo ‡//OUTPUT DD SYSOUT=*‡ >> $FTPJOB
echo ‡//INPUT DD *‡ >> $FTPJOB
echo ‡10.16.101.2‡ >> $FTPJOB
echo ‡MVSFTP‡ >> $FTPJOB
echo ‡MVSFTP‡ >> $FTPJOB
echo ‡BINARY‡ >> $FTPJOB
echo ‡GET /var/psf/tmp/‡$FN† ‡SAP.PRINT.†$FN†.U‡ (REPLACE† >> $FTPJOB
echo ‡DELETE /var/psf/tmp/‡$FN >> $FTPJOB
echo ‡QUIT‡ >> $FTPJOB
echo ‡//DUVSREB EXEC PGM=IKJEFT01‡ >> $FTPJOB
echo ‡//SYSPROC DD DSN=SAP.SYSTEM.CLIST,DISP=SHR‡ >> $FTPJOB
echo ‡//SYSTSPRT DD SYSOUT=*‡ >> $FTPJOB
echo ‡//SYSTSIN DD *‡ >> $FTPJOB
echo ‡ AFRREBLK SAP.PRINT.‡$FN‡.U PRINT.‡$FN‡.AFPDS‡ >> $FTPJOB
echo ‡//PRINT EXEC PGM=IEBGENER‡ >> $FTPJOB
if ‡Ä -z $5 Ü; then
    echo ‡//OUTAFP OUTPUT CLASS=A,DEST=‡$1‡,COPIES=‡$4 >> $FTPJOB
else
    echo ‡//OUTAFP OUTPUT CLASS=A,DEST=‡$1‡,COPIES=‡$4‡,FORMDEF=‡$ä5##F1ü >> $FTPJOB
fi
echo ‡//SYSPRINT DD SYSOUT=*‡ >> $FTPJOB
echo ‡//SYSUT1 DD DISP=(OLD,DELETE,DELETE),DSN=* .ALLOC.FILER‡ >> $FTPJOB
echo ‡//SYSUT2 DD SYSOUT=(,),OUTPUT=(*.OUTAFP)‡ >> $FTPJOB
echo ‡//FILEU DD DISP=(OLD,DELETE,DELETE),DSN=* .ALLOC.FILEU‡ >> $FTPJOB
echo ‡//SYSIN DD DUMMY‡ >> $FTPJOB
#
cp $3 /var/psf/tmp/$FN
ftp -n $2 << FINE
user SAPUSER0 SAPUSER1
site filetype=jes
put /var/psf/tmp/ftpjob
bye
FINE
#
src=$äERRNOü
rm -f $3
rm /var/psf/tmp/ftpjob
return $äsrcü

```

This shell script transfers the print files to the hosts and does not create any serialization problems.

## 2.5.6 MVS to PSF for AIX

If the SAP applications - R/2 in this case - run under MVS and want to print on a PSF for AIX system, there are new functions available for PSF/MVS to transport the print files into the AIX spool, the MVS DOWNLOAD feature. How to bring R/2 print data into the MVS spool please see Chapter 5, "AFP Printing from SAP R/2" on page 55.

MVS Download, running as a JES2 or JES3 output writer, selects output data sets from the JES spool according to installation-defined work-selection criteria that correspond to JCL parameters specified by the job submitters. It transmits the output data sets, with associated JCL parameters, to AIX systems in the TCP/IP network. PSF for AIX receives the files and prints them. For further details about MVS Download please see the *PSF/MVS Download Guide*.





## Chapter 3. SAP2AFP User's Guide

This section describes the steps required to prepare the R/3 system and applications for AFP printing. Make sure that the official documentation of the IBM Printing Systems Company is available.

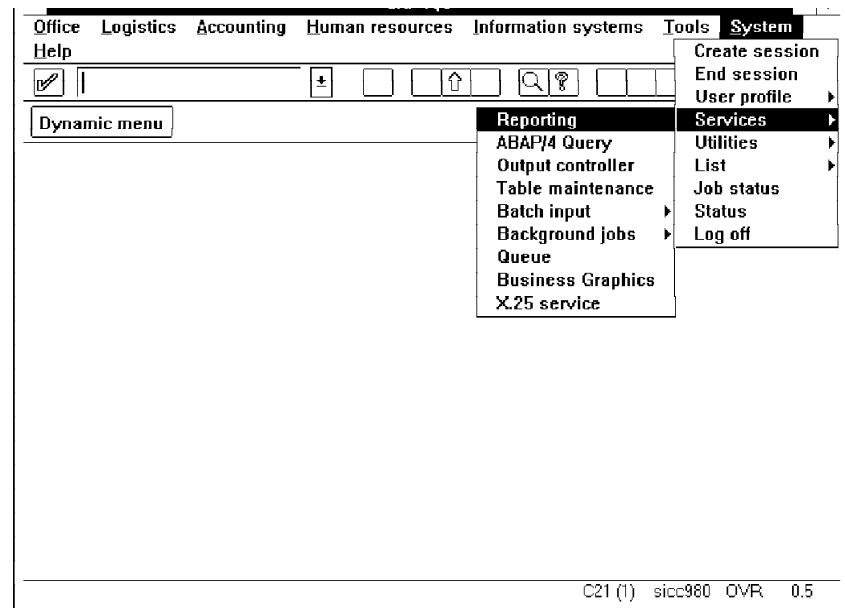
The steps are:

- Install the printer device types
- Activate the new 'Access Method Z' (activate the spool exit)
- Define an AFP Printer
- Define specific device types, paper formats, and paper types for the use of overlays
- Make an overlay available for production printing
- Printing of reports

The first three steps will disappear over time, as SAP2AFP will be integrated into the PSF/AIX build process and all device types will be distributed by SAP, but for the time being you must check if they are still necessary for your system.

A word to our notation: It is difficult for the author and boring for the reader to describe the steps through an interactive system but we see no other way than to display the screens and write down what a user must enter. This documentation was put together based on an early development system, which has constantly been changed over the time. It could be that names as shown on the screens do not match what you see in your system, and you may see some inconsistencies in the flow of our screens. If in doubt, the screen is always right.

Sometimes an additional problem occurs. When we do several selections in a row, the last selection cannot be shown, as highlighting and entering occur together and the subsequent screen would then be shown. This happens whenever multiple selections are shown as in the screen below. In this case the selection item printed in italic letters must be selected instead of the highlighted one as shown in the following example.



**Screen Selection Sequence**

SYSTEM, SERVICES, and *OUTPUT CONTROLLER*

### 3.1 Install the Printer Device Types

With early releases of R/3 Rel. 2.2E and 3.0A it is possible that the SAP device types IBMAFP and IBMAFP3 are not delivered. To find that out you must start at the R/3 main menu or take the shortcut via the ok-Code-field: **SPAD**. You should remember the shortcut **SPAD** because we will use it frequently. When using the R/3 main menu, as shown in Figure 1, please activate the following screens:

**Screen Selection Sequence**

TOOLS, ADMINISTRATION, SPOOL, *SPOOL ADMINISTRATION*

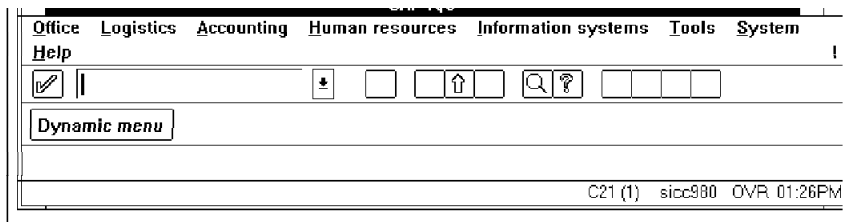


Figure 1. R/3 Main Menu

You will get a list of all spool related menus.

On the following screen, please select **Device types** to get an overview of all devices which are supported by the system.

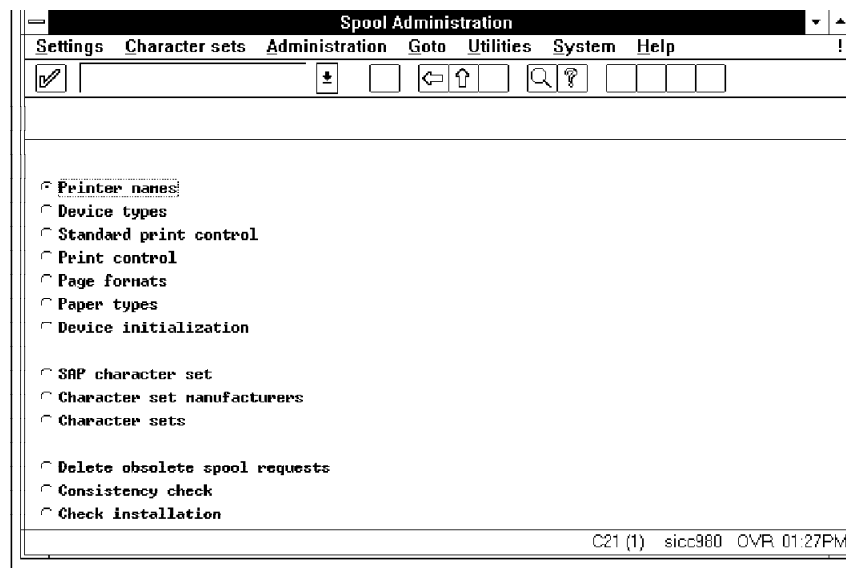


Figure 2. Spool Administration

The list of device types could look like the following screen.

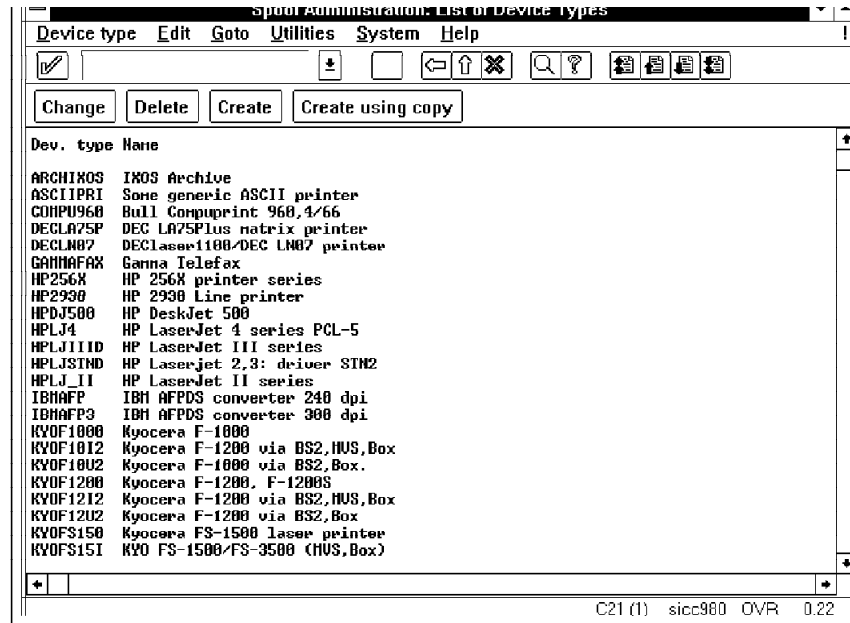


Figure 3. Spool Administration: List of Device Types

Now you can check if the device types IBMAFP and IBMAFP3 are already in the system. As of today (September 95) the IBMAFP device types are not included in SAP's shipment of the releases 2.2E, 2.1K and 3.0A and they are treated as customer modules, as they have the names ZIBMAFP and ZIBMAFP3.

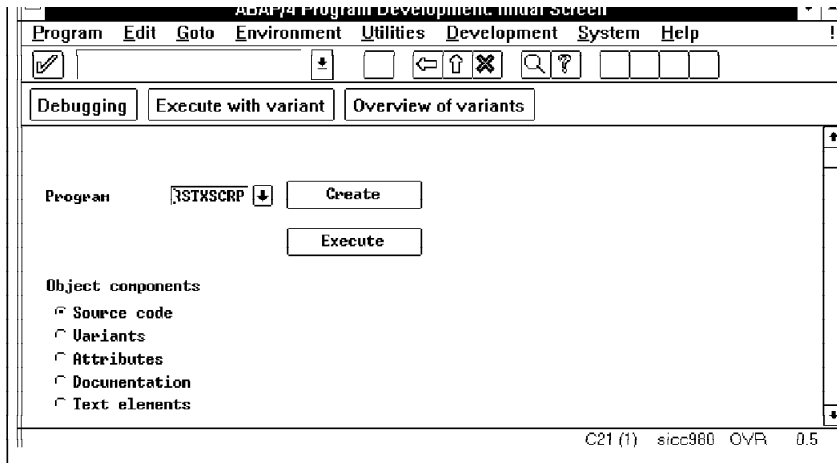
They can be ordered from SAP if an X-25 connection exists. The SAP note 8928 describes this in detail.

For those customers who do not have an X-25 connection to SAP yet, IBM has included the device type files in the SAP2AFP tape. They are in the files:

- ZIBMAFP.PRI
- ZIBMAFP3.PRI
- S9148.CPA

of the SAP2AFP feature of PSF for AIX.

To be installed the three files must be uploaded into the /tmp directory of the R/3 application server and READ permission must be set for them. Then transaction **SE38** must be called from the master menu.

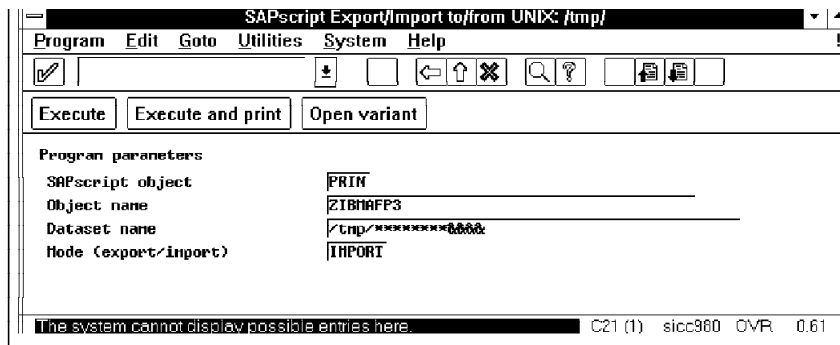


### Instructions

The program to be executed is **RSTXSCR**, and it must be executed **twice**.

The first time is for the *ZIBMAFP* device type (for 240 pel printers), and the second time for the *ZIBMAFP3* device type (for 300 pel printers).

The next screen shows the definition for *ZIBMAFP3*.

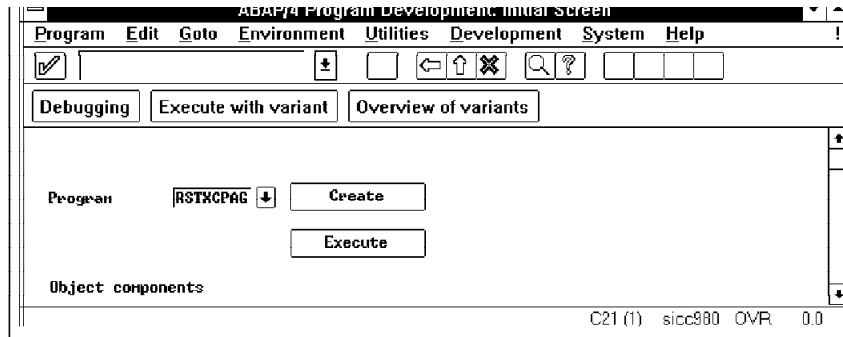


The individual parameters for each run are shown below.

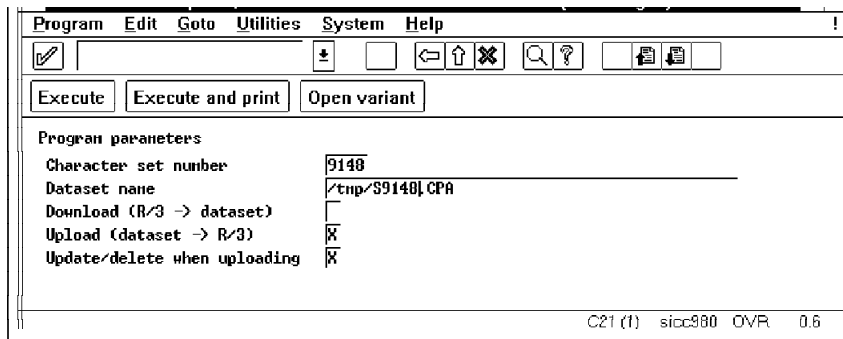
Parameters	1st Run	2nd Run
SAPscript Object	PRIN	PRIN
Objectname	ZIBMAFP	ZIBMAFP3
Dataset name	/tmp/ZIBMAFP.PRI	/tmp/ZIBMAFP3.PRI
Mode (export/import)	IMPORT	IMPORT

For further information read the SAP documentation about report RSTXSCRIP.

Then SE38 must be called again, this time with program **RSTXCPAG**.



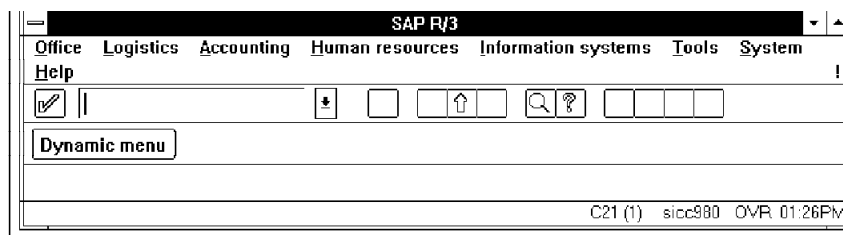
The parameters are shown on the following screen.



Now, the two AFP device types and the ISO code page are installed.

### 3.2 Activate the New 'Access Method Z'

This step has to be executed only *once*. In addition, we expect that the Access Method Z will be available automatically in future releases (3.0A?), and that this step will no longer be necessary.

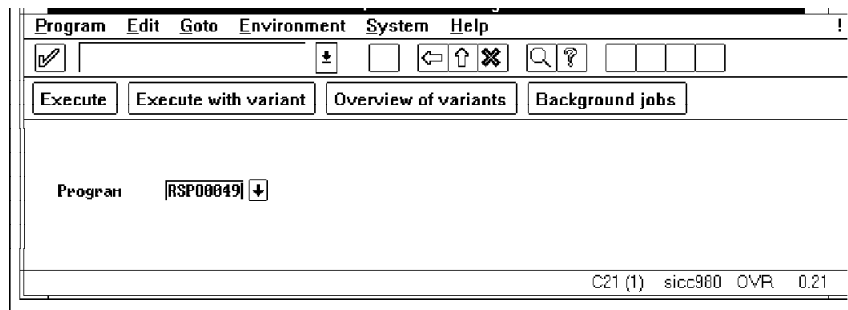


The menu driven path from the Main Menu is:

**Screen Selection Sequence**

SYSTEM, SERVICES, *REPORTING*

The next screen is shown below. It can be done as well by using the shortcut **SA38** in the ok-Code-Field.



**Screen Selection Sequence**

Program name **RSP00049**, and then **EXECUTE**

The new access method will now be available. It passes the spool data from R/3 to an external formatter.

The name of the formatter must be specified in the profile of the application server where the spool work process is running. This can be done either from inside R/3 as shown first or from the UNIX level as described later.

From **inside R/3** you must enter **db11** in the ok-Code-Field and get a list of all profiles of your R/3 system.

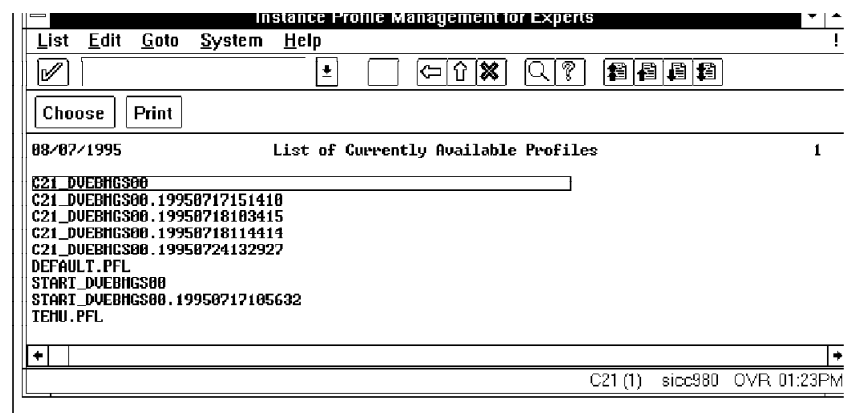


Figure 4. Instance Profile Management for Experts

Choose the appropriate profile and add the three lines at the bottom as shown below.

From the **UNIX level** the UNIX administrator can edit the profile directly using an editor, for example VI. The file name of the profile is:

```

/usr/sap/<system name>/SYS/profile/Sid_DVEBMGS00
    in our case
/usr/sap/C21/SYS/profile/C21_DVEBMGS00.

```

You must insert the three lines as shown on the screen above.

Now you must save the profile and **restart R/3**.

#### Installation Tip

It may be helpful to cut the installation of SAPZAFP into phases. If you want to make sure that the exit is really executed, but do not want the conversion process activated, you may want to rename

```

/usr/lpp/paf/sap2afp/sap2afp  into
sap2afp.org

```

and to provide with the name of 'sap2afp' a simple shell script, which copies the data provided by the exit into a file.

```

#!/bin/ksh
cp $4 /tmp/otfdata.otf

```

Once you have the data in the file, you are sure that the exit works and can reactivate the original SAPZAFP.

In addition, it may be helpful to view the original SAP spool files. They are in:

```

/usr/sap/<system name>/<profile name>/data  in our case:
/usr/sap/C21/DVEBMGS00/data

```

What we have documented here is the case where the exit and SAP2AFP run on the same host and the exit calls directly SAP2AFP. An alternative could be that the exit sends a file via LPR to a remote queue and SAP2AFP is called from there. The exit would have to call the following commands

```
rspo/host_spool/custom_print=lpr -P &S &F
rspo/host_spool/custom_query=lpr -P &S
```

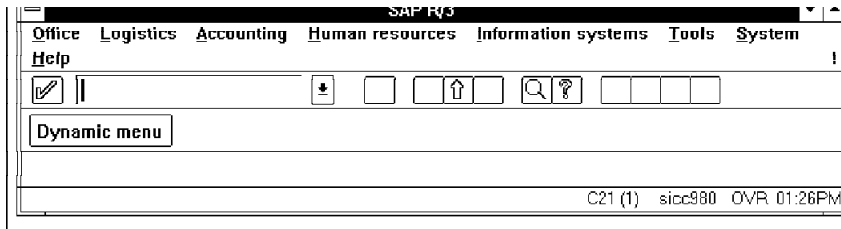
and on the receiving the queues must have been defined as discussed in 2.5, "Installations with Multiple Systems" on page 11.

### 3.3 Define an AFP Printer

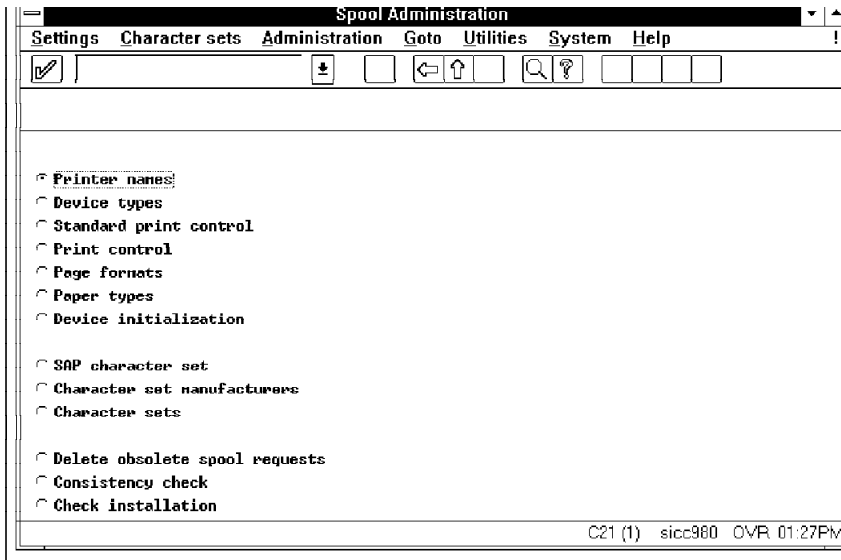
To define an AFP printer you must define a printer name and connect it with a device type. From the R/3 main menu you make the following selections:

**Screen Selection Sequence**

TOOLS, ADMINISTRATION, SPOOL, *SPOOL ADMINISTRATION*



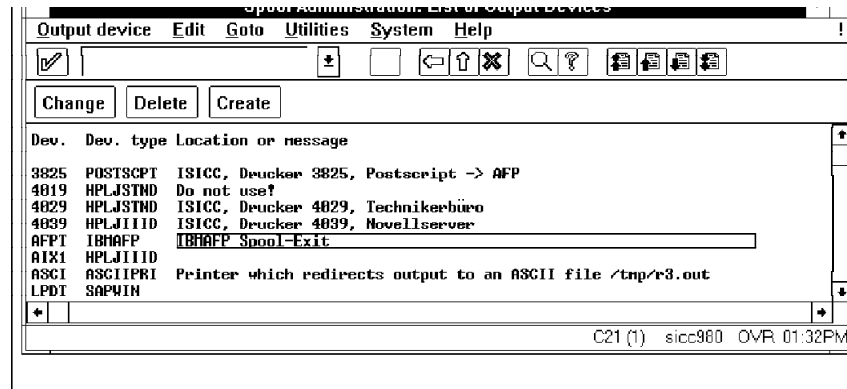
You may also take a shortcut via ok-Code-field: **SPAD** and you will get a list of all spool related menus.



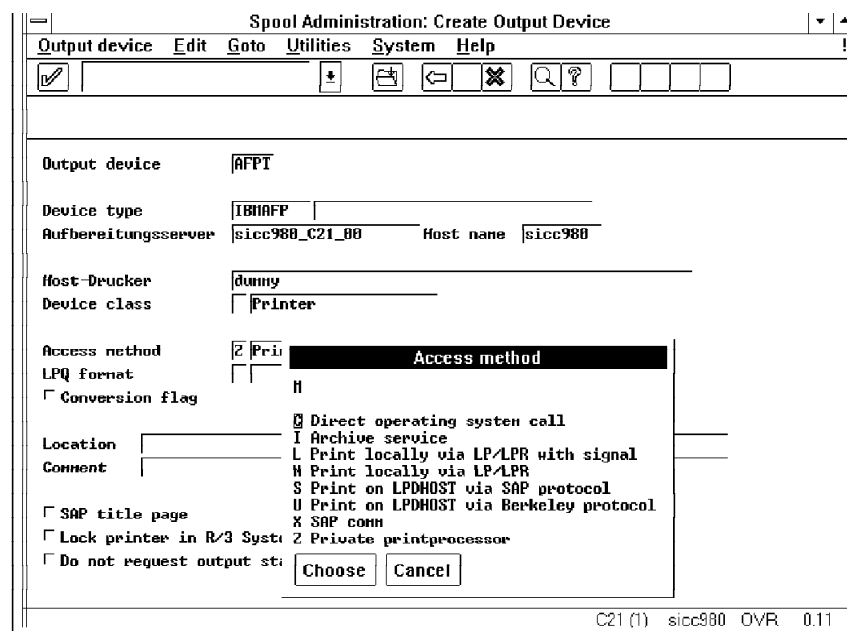
Here you select **Printer names** and get the next screen.

First you must create an entry for the new output device by selecting **CREATE**:





Then, you get the screen where you must specify the name of the printer to be created, in our case **AFPT**.



Then select a device type from the list of device types, in our case:

ZIBMAFP, *or*

ZIBMAFP3

Afterwards, select an access method, in our case **Z**.

Finally, you must select the **SAVE** folder.

**Make sure that the two input fields 'Aufbereitungsserver' (Server for the spool work process) and 'Host name' point to the right node.** The field 'Host-Drucker' (this means 'Host-Printer') is irrelevant. Now you have defined your AFP printer to R/3. Before you can use it you must make the connection to a PSF/AIX printer. This is done in the printer.tab file which comes with SAP2AFP. The filename which you must edit is:

`/usr/local/afp/printer.tab` *or*  
`/usr/lpp/psf/bin/sap2afp/printer.tab`

The record to be added would look like:

Dest=AFPT System=AIX Queue=PSF3116 Node=192.9.201.200

The **Node** parameter is used only in case of a connection to an OS/2 system. For the other systems, AIX and MVS it is not verified.

Now you can print on your AFP printer, but you cannot ask yet for specific FORMDEFs which contain the name of electronic overlays. This is shown in the next section.

### 3.4 Define Specific Device Types, Page Formats, and Paper Types

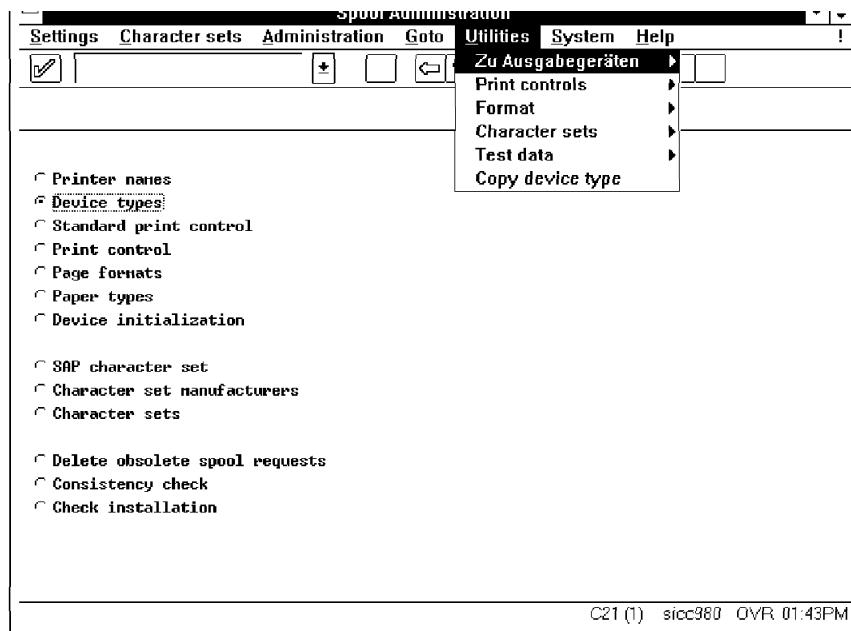
This section describes how to print with an overlay. Let us recall SAP's printing language. A page format contains the information about the medium. The paper type contains formatting information and print controls. Although the IBMAFP printer driver does not need any formatting information we must maintain the structure and provide paper types. SAP requires these modules in order to print, but the IBMAFP printer driver does not use them.

One word to SAP's naming conventions: SAP requests that all user specifications start with either **Z** or **Y**.

In SAP2AFP, only paper types starting with 'Z' or 'Y' will be mapped to user-specific FORMDEF names. Every name beginning with a different character will not be mapped to a FORMDEF name, and will be printed using the PSF defaults of the printer.

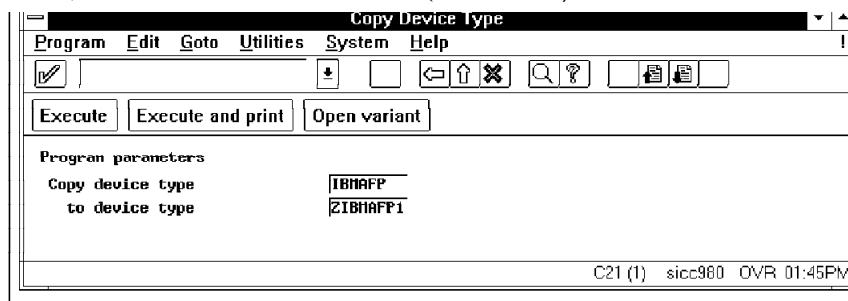
The first character of a paper type, the 'Z', will be stripped off. Only the next six characters will be used for the mapping.

First we want to define a user-specific device type. From the Spool Administration screen (shortcut *SPAD*) you must choose **Device types**.



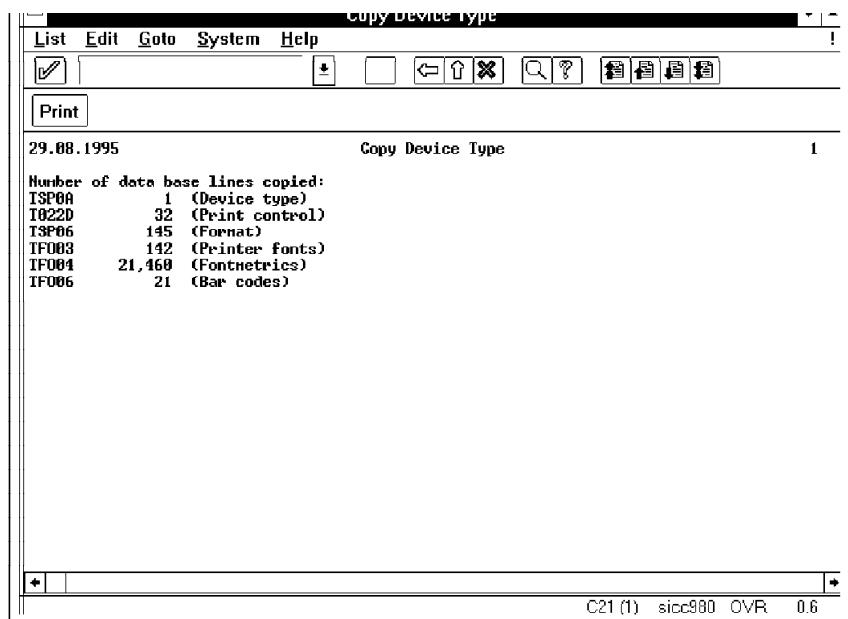
Then select **UTILITIES** followed by **COPY DEVICE TYPE** which brings you to the next screen.

There you must enter the device type, in our example IBMAFP and the new name, which must start with a 'Z' (ZIBMAFP1).



Now, press **EXECUTE**.

When finished the system will show you a list of the elements which have been copied.



Now you have created a 'user-defined' device type (ZIBMAFP1), which must be used by an existing printer. The path to do that is the same as already shown in 3.3, "Define an AFP Printer" on page 24, with the one difference that we don't want to CREATE but to CHANGE an output device.

There we must join our existing output device (if we don't prefer to create an additional one) with the new device type:

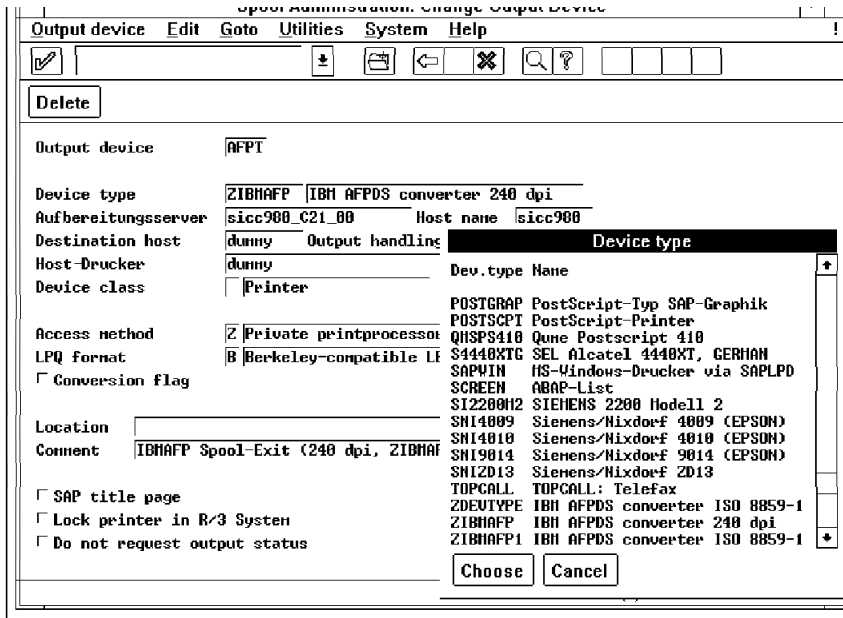
### Installation Tip

If you want to delete a device type, you should note that selecting 'Delete' does not really delete the device type. You will only get a message which indicates that the device type is reflected in several print controls. To really delete a device type you must execute:

SE38

and there the program

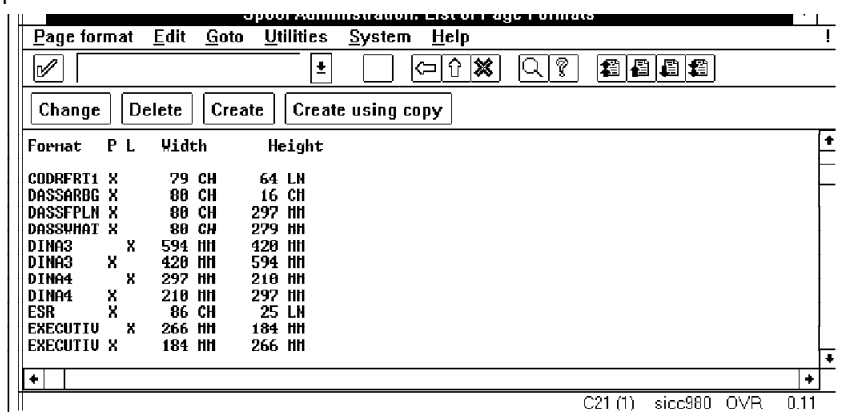
RSTXDPR1



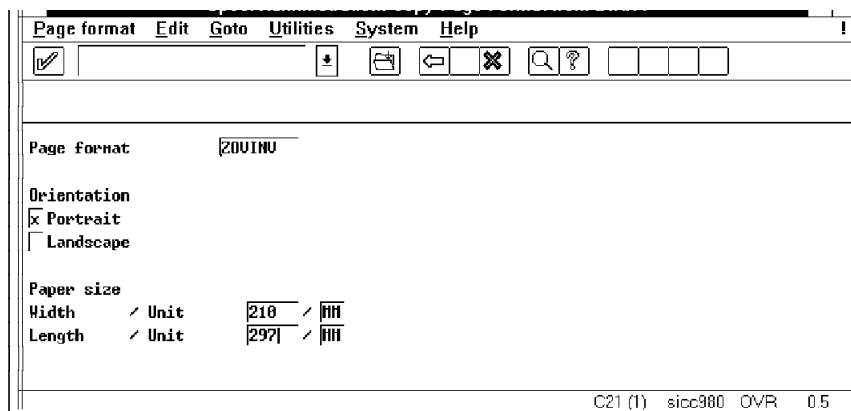
It should be noted that the two input fields 'Destination host' and 'Host-Drucker' ('Host-Printer') require input, but have no meaning for us.

The new device type can now be connected with user-specific definitions. Two items remain to be defined, the page format, and the paper type. The paper type will be mapped to the name of a FORMDEF.

Let us define a page format first. Again, from SPAD we select **Page formats** and get the following screen, where we pick a matching format, for example DINA4 portrait and select **CREATE USING COPY**.

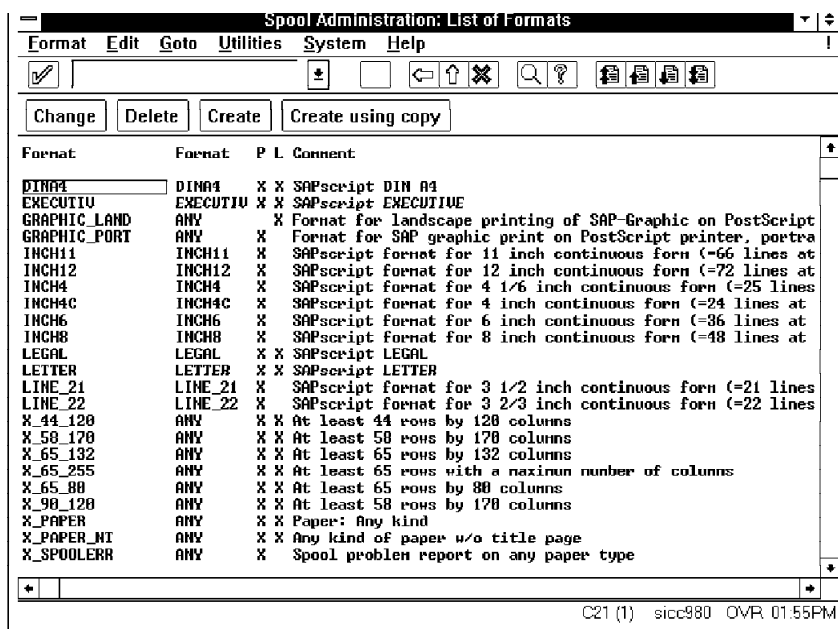


The next screen asks for the name of the new page format; it should start with 'Z' or 'Y':



Finally you select the **SAVE** folder. A page format does not have any effects for SAP2AFP but a paper type has. It should be noted that SAP's language is not very precise here, the words 'format', 'paper type', and 'page format' are sometimes interchangeable. On the next screen you can see that the word 'format' is even used for two different things. In the first column 'format' is used for a particular formatting, and in the second column to describe the dimensions of a sheet. For printer drivers other than IBMAFP these two different items have larger effects, they provide formatting information and specific print control via the paper type. In IBMAFP the print controls are empty as the formatting is done in OTF.

To maintain the structure we must create a paper type. We select SPAD again and choose **Paper types** to get the following screen, where you must pick an option.



As the formatting information is not important for SAP2AFP you may select any DINA4 formatting and select **CREATE USING COPY**

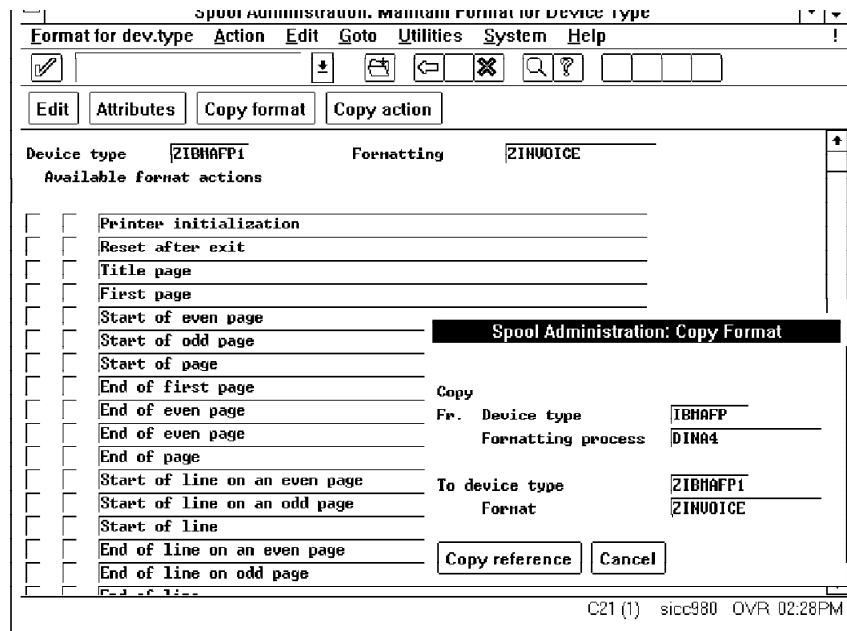
On the next screen you are asked for the names of the formatting process and the page format.

After entering the names you must press:

### **FORMAT and SAVE**

Lastly we must connect the new paper type with a device initialization. Again we start with SPAD and select **Device initialization** which shows the following screen where you must select the device type (in our example ZIBMAFP1) and the paper type (ZINVOICE).

Then you press **START** to get a list of all the device initialization parameters, which do not have any effect for us, but we must define them.



Now you must select:

#### Screen Selection Sequence

*COPY FORMAT*, and then choose an existing device type (ZIBMAFP) and formatting reference (DINA4) and select:

*COPY REFERENCE* and then press the

SAVE button.

**Do not choose non-AFP device types from which to copy.**

Now you have made all the necessary definitions and connections to print with an overlay.

### 3.5 Printing with FORMDEFs and Overlays

In AFP, the name of the overlay module must be contained in a FORMDEF module. FORMDEFs are created by means of a program product, called 'Page Printer Formatting Aid', which is available as a separately orderable feature of PSF for AIX (5765-505). FORMDEFs may be built as well on /390 hosts using PPFA or on PCs with special programs to create AFP resources, such as Forms Script, ISIS, or Elixir and then transferred to the AIX platform via FTP.

Overlays may be built on /390 hosts using the 'Overlay Generation Language/370', (5688-191), or by the same programs mentioned above, and then, again, downloaded via FTP. Both module types may be fetched from host libraries as well by using Network File System (NFS) in AIX.

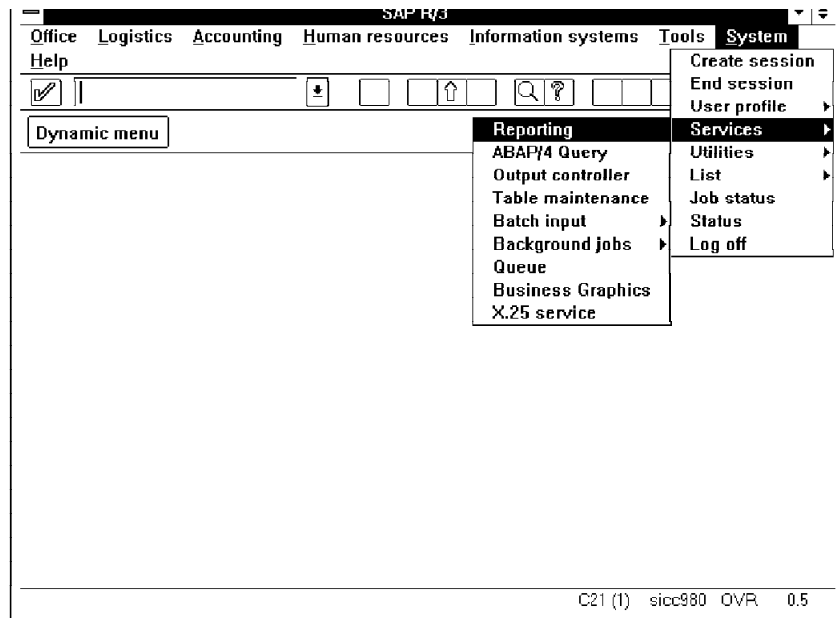
Using an overlay in R/3 has two aspects, the testing and the productive use. For testing purposes it may do to manipulate the attributes of a spool request, for productive use we must connect the paper type defined in the previous step with a layout set.

### 3.5.1 Testing by Manipulation of Spool Requests

The following shows how to manipulate the attributes of a spool request. When submitting a print request it is important that the spool file must not be deleted after the printing as the initial request will be handled with the normal setup.

Output device	AFPT IBHAPP Spool-Exit	
Number of copies	1	
Page selection		
Spool request		
Name	SCRIPT	
Title		
Authorization		
Output options		
<input type="checkbox"/> Print immediately		
<input type="checkbox"/> Delete after print		
<input type="checkbox"/> New spool request...		
Spool retention per.	8 Day(s)	
Archiving node	<input checked="" type="checkbox"/> Print only	
Cover sheet		
<input type="checkbox"/> SAP cover sheet		
Recipient		
Department		
<input type="button" value="Print preview"/> <input type="button" value="Print"/> <input type="button" value="Cancel"/>		

After selecting **PRINT**



we can find our spool requests via the R/3 main menu by selecting

**Screen Selection Sequence**

SYSTEM, SERVICES, *OUTPUT CONTROLLER*

On the next screen you must select



**Screen Selection Sequence**

SPOOL SREQUEST, OVERVIEW

to get the following screen with all the spool requests you have issued.

Now you must select a particular spool number and press **ATTRIBUTES**.

Spool Generation No.	Date	Time	Status	Size	Title
11287	08/09/95	19:27		7	SCRIPT
11285	08/09/95	19:19	in Arb.	21	SCRIPT
11289	08/09/95	16:05	Comp.	7	SCRIPT

You can now change the attributes displayed as shown on the next screen:

Spool request		Edit	Goto	Environment	System	Help
<div style="display: flex; justify-content: space-between; align-items: center;"> <span>✎</span> <span>⌵</span> <span>📄</span> <span>↶</span> <span>↷</span> <span>✖</span> <span>🔍</span> <span>?</span> </div>						
<div style="display: flex; justify-content: space-around;"> <span>Refresh</span> <span>Print</span> <span>Attributes II</span> </div>						
<b>Spool request</b>						
Number	11295					
Title						
Name	SCRIPT					
User name	DENO	Client	003			
Created at	08/09/1995	19:19	Length	21 Bytes		
<b>Spool request attributes</b>						
Output device	2AFP IBRAFP Spool-Exit					
Format	2INVOICE <span style="font-size: small;">↓ Pscrip format for 12 inch continuous form</span>					
Recipient						
Department						
Delete date	08/12/1995					
Authorization						
C21 (1) sicc980 OVR 0.6						

After you have changed the output device and the format you must not forget to **SAVE** the new spool request. Then you can print it by selecting **PRINT**.

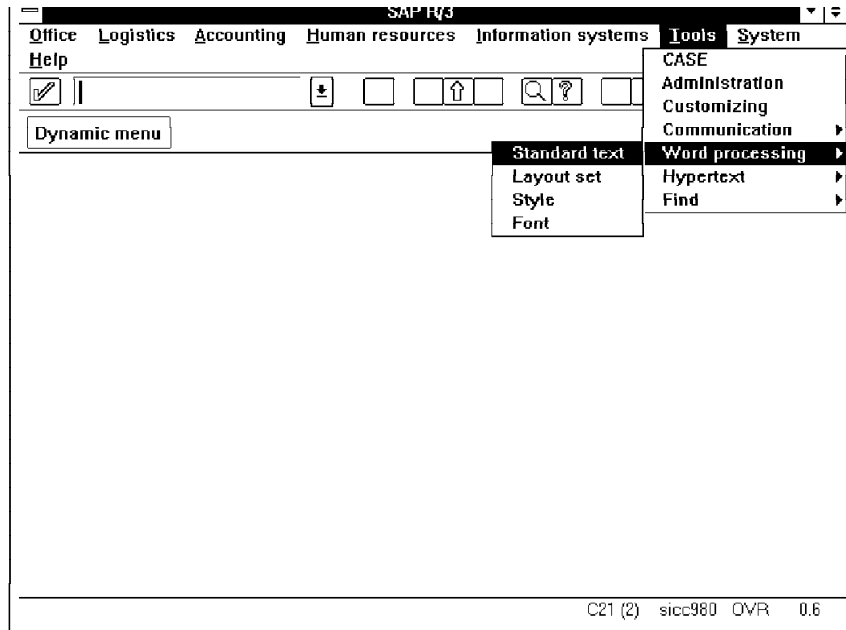
The next section describes how to make the overlay permanently available.

### 3.5.2 Bringing the Overlay into Production

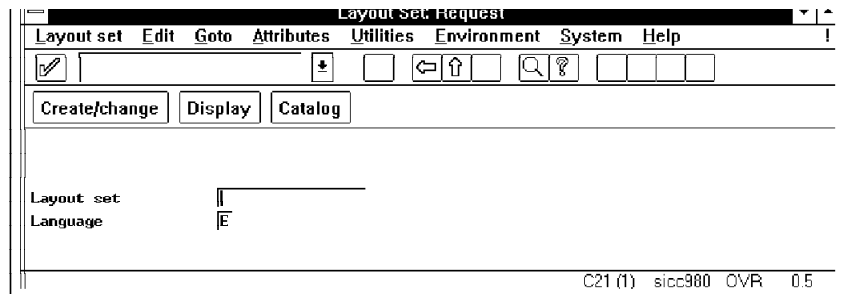
Finally, when the overlay is to be used for production printing we need a permanent connection between the layout set and the paper type. Please note that the highlighting of the screen as shown is not exactly what you must select. You should select:

**Screen Selection Sequence**

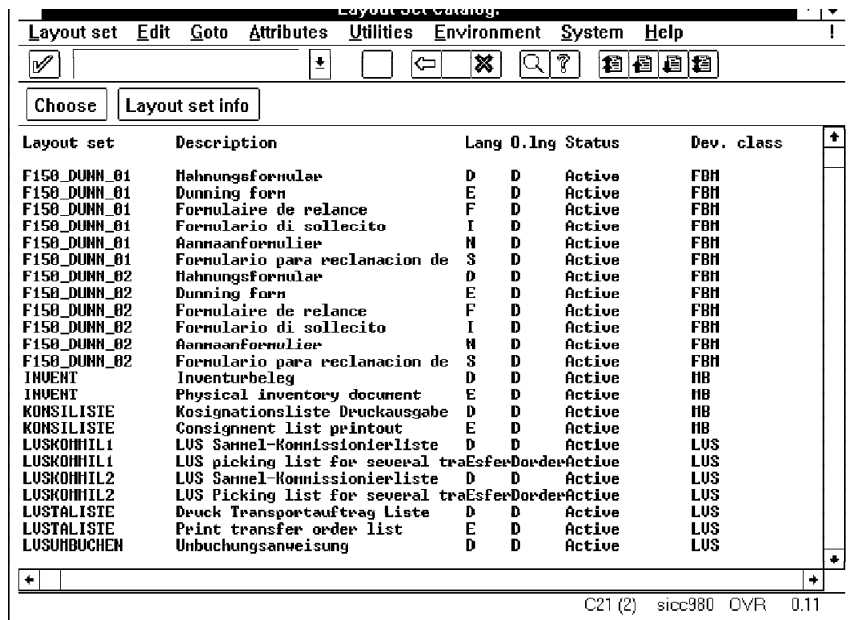
TOOLS, WORD PROCESSING, *LAYOUT SET*



and get the screen where you are asked for the name of the layout set.



Please select **CATALOG** and get a list of all layout sets. You must select your layout set and then press **CHOOSE**.



You will get another selection screen with the name of the layout set. Then you must select **CREATE/CHANGE** to see the details.

Layout set Edit Goto Attributes Utilities Environment System Help

Create/change Display Catalog

Layout set: F150\_DUNN\_01  
Language: D

C21 (1) sicc980 OVR 0.5

Here you must update the Page Format and press the **SAVE** button.

Layout set Edit Goto Attributes Utilities Environment System Help

Header

Standard attributes: Active ----- Saved

Layout set: F150\_DUNN\_01 Development class: F01  
Language: D Original system: SAP  
Original language: D  
Client number: 003

Created by: LIEBOLD Changed by: SAP\*  
Created on: 03/20/1992 Changed on: 07/18/1995  
Time: 15:40:49 Time: 15:33:54  
Release: 0.62 Release: 22E

Description: Mahnungsformulae  
First page: START  
Default paragraph: AF  
Tab stop: 1.00 CII  
Page format: ZOVINU  
Orientation: P  
Lines per inch: 6.00

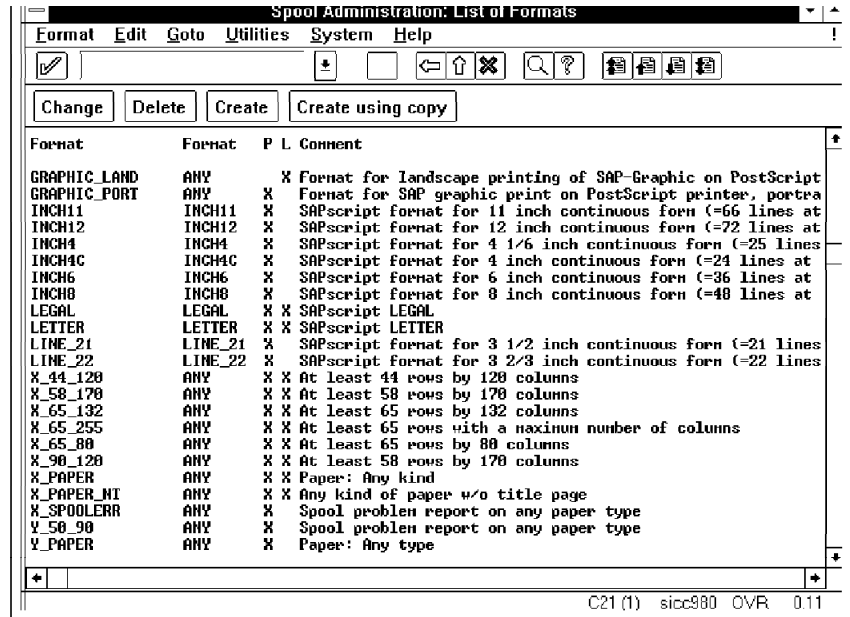
C21 (1) sicc980 OVR 0.33

Now the layout set will always be printed with the page format ZOVINU which will be mapped into the FORMDEF F1ZOVINV, which calls overlay ZOVINV.

### 3.6 Printing of Reports

ABAP reports are the second format which SAP2AFP can process. In this case we don't have the formatting with the data as in OTF but need the formatting via the paper type. All paper types are mapped to appropriate PAGEDEFs (this is done by the pagedef.tab initialization file of SAP2AFP).

If a user asks for his own formatting of a report he must provide a specific paper type, beginning with 'Z' or 'Y' and must have made a matching entry in the pagedef.tab.



For a more detailed description of the relations between device types, page formats, paper types, AFP FORMDEFs, and AFP PAGEDEFs see Chapter 2, "AFP Printing from SAP R/3" on page 3.



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## Chapter 4. SAP2AFP Administration Guide

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### 4.1 Contents of SAP2AFP

SAPZAFP is comprised of a set of executable files and a set of initialization files. All of them must be installed in one directory. In our testing environment it was:

**/usr/local/afp**

When the integration of SAPZAFP into PSF for AIX is completed it will be:

**/usr/lpp/psf/bin/sap2afp** for the executable files and  
**/usr/lpp/psf/sap2afp** for the initialization files.

The initialization files, which are described in detail later, are:

- 00000000.tab
- 40010000.tab
- 40040000.tab
- barcode.tab
- defcp.tab
- fonts.tab
- message.tab
- pagedef.tab
- printer.tab

The following files are executable:.

<b>sap2afp</b>	Executable program to convert OTF and line data into AFPDS
<b>AIXAFP</b>	Shell script for 'enq' converted OTF to AIX system
<b>AIXLD</b>	Shell script for 'enq' converted line data to AIX system
<b>AIXQUE</b>	Shell script for 'lpq' (query queue) on AIX system
<b>MVSAFP</b>	Shell script for 'enq' converted OTF to MVS system
<b>MVSLD</b>	Shell script for 'enq' converted line data to MVS system
<b>MVSQUE</b>	Shell script for 'lpq' (query queue) on MVS system
<b>OS2AFP</b>	Shell script for 'enq' converted OTF to OS/2 system
<b>OS2LD</b>	Shell script for 'enq' converted line data to OS/2 system
<b>OS2QUE</b>	Shell script for 'lpq' (query queue) on OS/2 system

There are two message files, an English and a German one. The one to be used should be renamed into 'message.tab'.

- message.eng
- message.ger

It is planned to erase these files and to use the standard AIX message catalog.

The early releases of SAP R/3 2.2E, 2.1K, and 3.0A are delivered without the SAP device types for AFP printers. Therefore IBM delivers them with SAPZAFP, even if they are SAP code and must be installed in the SAP system which runs the spool work process. There are three files:

- ZIBMAFP.PRI**    The SAP device type for 240 pel printers
- ZIBMAFP3.PRI**   The SAP device type for 300 pel printers
- S9148.CPA**        The ISO 8859-1 code page for Latin-1.

See chapter Chapter 3, "SAP2AFP User's Guide" on page 17 for instructions on how to install these files.

## 4.2 Filemode of the SAP2AFP Files

The following file permissions must be set:

```

-rw-r--r-- 1 root    system    2629 Aug 15 13:34 00000000.tab
-rw-r--r-- 1 root    system    2629 Aug 15 13:34 40010000.tab
-rw-r--r-- 1 root    system    2629 Aug 15 13:34 40040000.tab
-rwxr-xr-x 1 root    system     910 Aug 15 13:34 AIXAFP
-rwxr-xr-x 1 root    system   1126 Aug 15 13:34 AIXLD
-rwxr-xr-x 1 root    system     850 Aug 15 13:34 AIXQUE
-rwxr-xr-x 1 root    system     910 Aug 15 13:34 MVSAFP
-rwxr-xr-x 1 root    system   1126 Aug 15 13:34 MVSLD
-rwxr-xr-x 1 root    system     850 Aug 15 13:34 MVSQUE
-rwxr-xr-x 1 root    system     910 Aug 15 13:34 OS2AFP
-rwxr-xr-x 1 root    system   1126 Aug 15 13:34 OS2LD
-rwxr-xr-x 1 root    system     850 Aug 15 13:34 OS2QUE
-rw-r--r-- 1 root    system   1171 Aug 15 13:34 barcode.tab
-rw-r--r-- 1 root    system  13847 Aug 15 13:34 fonts.tab
-rw-r--r-- 1 root    system     874 Aug 15 13:34 message.eng
-rw-r--r-- 1 root    system     973 Aug 15 13:34 message.ger
-rw-r--r-- 1 root    system     973 Aug 15 13:34 message.tab
-rwxr-xr-x 1 root    system  78598 Aug 15 13:34 sap2afp
-rw-r--r-- 1 root    system     751 Aug 15 13:35 pagedef.tab
-rw-r--r-- 1 root    system     645 Aug 16 11:42 printer.tab

```

## 4.3 Executable Files

The converter is called sap2afp, it is an executable program.

### Installation Tip

To see if the converter runs and if the destinations are defined correctly in the printers.tab initialization file you may want to run it from the command level by issuing:

```
/usr/lpp/psf/sap2afp/sap2afp -d DEST -f OTFTEST.OTF
```

## 4.4 Initialization Files

External initialization files are used for printer destination, codepage conversion, barcode assignment, pagedef mapping, and error messages.

All tables may contain comments (starting with '/' in column 1) and empty lines. These lines are ignored by the SAP2AFP converter.

All entries in all tables are **case sensitive**.



#### 4.4.1 printer.tab

While most of the other initialization files are more unlikely to be modified the printer table must be maintained by every installation. It creates the connection between the SAP printer name (from the '-d' call parameter) and the AFP printer destination queue and determines the transport mechanism used to transport the converted file to the print server.

Its parameters are:

<b>Dest</b>	The OTF printer name from the call parameter.
<b>System</b>	Sets the target operating system. This is for transferring the output data from the source machine to the target system and to determine the transport protocol. Valid values are <i>MVS</i> , <i>AIX</i> or <i>OS2</i> .
<b>Queue</b>	Gives the name of the AFP printer queue on the target system. The content (8 bytes) is not verified.
<b>Node</b>	Is the IP address of the target system. The content (max 15 bytes) is not verified. Only in case of a connection to OS/2 must this parameter have a meaningful content.

Sample entries are:

```
// Printer table

// Format : Dest=SPRT System=AIX Queue=afp3900 Node=192.9.200.220

Dest=MVSP System=MVS Queue=pc14039 Node=192.9.200.220
Dest=AIXP System=AIX Queue=pc14039 Node=192.9.200.220
Dest=OS2P System=OS2 Queue=OS2AFP Node=192.9.201.40
```

#### 4.4.2 barcode.tab

This table describes the bar code assignments. SAP calls bar codes by names which must be mapped into the matching bar codes available with BCOCA. Its parameters are:

<b>BarCode</b>	Refers to the OTF bar code names (SAPBARCODE parameter of the 'BC' OTF command). The maximum length of this field is 8 bytes and can contain any value.
<b>Type</b>	Describes the AFPDS bar code type as defined in the AFPDS Reference for the 'Barcode Type' Structured Field of the 'Barcode Data Descriptor' AFP command. The content can be any numeric value between 0 and 999 and is not verified.
<b>Mode</b>	Is the modifier byte within the 'Barcode Modifier' Structured Field of the 'Barcode Data Descriptor' AFP command. Any numeric value between 0 and 999 is accepted and not verified.
<b>Flag</b>	Controls the printing of the 'HRI' (Human Readable Interface) character. A value of '0' causes the HRI character to be printed, a value of 128 causes the HRI not to be printed. Any other value may cause unpredictable results.

The administrator is responsible for the values entered in the table. Invalid values are not verified and may result in IPDS errors.

Sample entries are:

```
// Barcode table

// Format : Barcode=ARTNR Type=017 Mode=002 Flag = 000

BarCode = ARTNR      Type = 017 Mode = 002 Flag = 000
BarCode = AUFNR      Type = 017 Mode = 002 Flag = 000
BarCode = BARCLVS    Type = 001 Mode = 001 Flag = 000
BarCode = KUNAUNR    Type = 017 Mode = 002 Flag = 000
BarCode = KUNAUPS    Type = 017 Mode = 002 Flag = 000
BarCode = MBBARC     Type = 017 Mode = 002 Flag = 000
BarCode = MBBARC1    Type = 008 Mode = 000 Flag = 000
BarCode = RSNUM      Type = 017 Mode = 002 Flag = 000
BarCode = RSPOS      Type = 017 Mode = 002 Flag = 000
BarCode = RUECKNR    Type = 017 Mode = 002 Flag = 000

BarCode = BC_CD39    Type = 001 Mode = 001 Flag = 128
BarCode = BC_EAN8    Type = 008 Mode = 000 Flag = 128
BarCode = BC_EAN13   Type = 009 Mode = 000 Flag = 128
BarCode = BC_I25C    Type = 012 Mode = 002 Flag = 128
BarCode = BC_I25     Type = 012 Mode = 001 Flag = 128
BarCode = BC_CD39C   Type = 001 Mode = 002 Flag = 128
BarCode = BC_MSI     Type = 002 Mode = 001 Flag = 128
BarCode = BC_MSIC    Type = 002 Mode = 002 Flag = 128
BarCode = BC_MSIC1   Type = 002 Mode = 003 Flag = 128
BarCode = BC_MSIC2   Type = 002 Mode = 005 Flag = 128
BarCode = BC_C128B   Type = 017 Mode = 002 Flag = 128
```

The second group in the barcode.tab (following the blank line) is supported by R/3 Rel. 3.0A only.

### 4.4.3 defcp.tab

This is the **default** conversion table for the conversion of ASCII characters into EBCDIC. It is used for line data conversion or if no 'CP' OTF command is found.

```
// line data CodePage

// Format : Ascii=EbcDic

000 = 064
001 = 064
002 = 064
...
253 = 064
254 = 062
255 = 223
```

In the left column is the ASCII code, in the right column the corresponding EBCDIC value. The values are checked for a numeric value between 0 and 255.

### 4.4.4 xxxxyyyy.tab

These tables are used for the mapping of characters of an individual SAP ASCII codepage into an EBCDIC codepage. SAP uses two kinds of codepages: Input-Codepage and Output-Codepage. Three codepages are predefined by SAP: 0000, the system codepage for the R/3 system, 4001 for OCR-A fonts and

4004 for OCR-B fonts. The latter two codepages are equivalent to ISO-8859/1 plus the special characters 'hook', 'fork' and 'chair'.

```
// Codepage table

// Inp CodePage 0000
// Out CodePage 0000

// Format : Ascii=Ebodic

000 = 000
001 = 001
002 = 002
003 = 003
...
253 = 064
254 = 062
255 = 223
```

In the left column is the ASCII code, in the right column the corresponding EBCDIC value. The values are checked for a numeric value between 0 and 255.

The filenames correspond to the four-digit value of the INPUTCODEPAGE and OUTPUTCODEPAGE parameter of the 'CP' OTF command (00000000.tab, 40010000.tab and 40040000.tab).

#### 4.4.5 fonts.tab

This table maps the fonts used in the OTF datastream to AFP fonts.

The following font families are predefined with R/3: *COURIER*, *HELVE*, *LETGOTH*, *LNPRINT*, *TIMES*, *OCRA* and *OCRB*.

<b>DefCodePage</b>	Is the default codepage if no 'FC' OTF command is given or if the requested font is not found in the fonts.tab table.
<b>DefCharSet</b>	Is the default character set used if no 'FC' OTF command is given or if the requested font is not found in the fonts.tab table.
<b>Font</b>	Describes the font family (FONTFAMILY parameter of the 'FC' OTF command). Maximum size is 8 bytes and content is not verified.
<b>Size</b>	Gives the font size in 1/10 of a point (FONT SIZE parameter of the 'FC' OTF command). The value must be numeric and is not verified.
<b>Type</b>	Defines the font type (BOLD or ITALIC parameter of the 'FC' OTF command) Type=0 is Normal, Type=1 is Italic, Type=2 is Bold and Type=3 is Bold and Italic. Any other value is invalid.
<b>CodePage</b>	Specifies the code page and requires a valid AFP codepage name (8 bytes). The value is not verified, an invalid name may result in an IPDS error message.
<b>CharSet</b>	Specifies the AFP character set name. The content is not verified.

A font named 'BARCODE' must be defined for the HRI (Human Readable Interface) character of a bar code.

If no matching font is found (the *Font*, *Size* and *Type* combination) the codepage and charset from the **DefCodePage**

and **DefCharSet** keywords are used and a warning message is displayed.

The following is an example of the fonts.tab.

```
// Fonts table

// Format : Font=COURIER Size=070 Type=0 CodePage=T1V10273 CharSet=C0420070
//          DefCodePage = T1V10273
//          DefCharSet  = C0420000

DefCodePage = T1V10273
DefCharSet  = C0420000

// Courier
Font=COURIER Size=070 Type=0 CodePage=T1V10273 CharSet=C0420070
Font=COURIER Size=070 Type=1 CodePage=T1V10273 CharSet=C0430070
Font=COURIER Size=070 Type=2 CodePage=T1V10273 CharSet=C0440070
Font=COURIER Size=070 Type=3 CodePage=T1V10273 CharSet=C0450070
Font=COURIER Size=080 Type=0 CodePage=T1V10273 CharSet=C0420080
Font=COURIER Size=080 Type=1 CodePage=T1V10273 CharSet=C0430080
Font=COURIER Size=080 Type=2 CodePage=T1V10273 CharSet=C0440080
Font=COURIER Size=080 Type=3 CodePage=T1V10273 CharSet=C0450080
Font=COURIER Size=100 Type=0 CodePage=T1V10273 CharSet=C0420000
Font=COURIER Size=100 Type=1 CodePage=T1V10273 CharSet=C0430000
Font=COURIER Size=100 Type=2 CodePage=T1V10273 CharSet=C0440000
Font=COURIER Size=100 Type=3 CodePage=T1V10273 CharSet=C0450000
Font=COURIER Size=120 Type=0 CodePage=T1V10273 CharSet=C04200B0
Font=COURIER Size=120 Type=1 CodePage=T1V10273 CharSet=C04300B0
Font=COURIER Size=120 Type=2 CodePage=T1V10273 CharSet=C04400B0
Font=COURIER Size=120 Type=3 CodePage=T1V10273 CharSet=C04500B0
Font=COURIER Size=140 Type=0 CodePage=T1V10273 CharSet=C04200D0
Font=COURIER Size=140 Type=1 CodePage=T1V10273 CharSet=C04300D0
Font=COURIER Size=140 Type=2 CodePage=T1V10273 CharSet=C04400D0
Font=COURIER Size=140 Type=3 CodePage=T1V10273 CharSet=C04500D0
Font=COURIER Size=200 Type=0 CodePage=T1V10273 CharSet=C04200J0
Font=COURIER Size=200 Type=1 CodePage=T1V10273 CharSet=C04300J0
Font=COURIER Size=200 Type=2 CodePage=T1V10273 CharSet=C04400J0
Font=COURIER Size=200 Type=3 CodePage=T1V10273 CharSet=C04500J0

// LNPrint
Font=LNPRINT Size=070 Type=0 CodePage=T1V10273 CharSet=C0420070
Font=LNPRINT Size=070 Type=1 CodePage=T1V10273 CharSet=C0430070
Font=LNPRINT Size=070 Type=2 CodePage=T1V10273 CharSet=C0440070
Font=LNPRINT Size=070 Type=3 CodePage=T1V10273 CharSet=C0450070
Font=LNPRINT Size=080 Type=0 CodePage=T1V10273 CharSet=C0420080
Font=LNPRINT Size=080 Type=1 CodePage=T1V10273 CharSet=C0430080
Font=LNPRINT Size=080 Type=2 CodePage=T1V10273 CharSet=C0440080
Font=LNPRINT Size=080 Type=3 CodePage=T1V10273 CharSet=C0450080
Font=LNPRINT Size=100 Type=0 CodePage=T1V10273 CharSet=C0420000
Font=LNPRINT Size=100 Type=1 CodePage=T1V10273 CharSet=C0430000
Font=LNPRINT Size=100 Type=2 CodePage=T1V10273 CharSet=C0440000
Font=LNPRINT Size=100 Type=3 CodePage=T1V10273 CharSet=C0450000
Font=LNPRINT Size=120 Type=0 CodePage=T1V10273 CharSet=C04200B0
Font=LNPRINT Size=120 Type=1 CodePage=T1V10273 CharSet=C04300B0
Font=LNPRINT Size=120 Type=2 CodePage=T1V10273 CharSet=C04400B0
Font=LNPRINT Size=120 Type=3 CodePage=T1V10273 CharSet=C04500B0
Font=LNPRINT Size=140 Type=0 CodePage=T1V10273 CharSet=C04200D0
Font=LNPRINT Size=140 Type=1 CodePage=T1V10273 CharSet=C04300D0
Font=LNPRINT Size=140 Type=2 CodePage=T1V10273 CharSet=C04400D0
Font=LNPRINT Size=140 Type=3 CodePage=T1V10273 CharSet=C04500D0
```





```

Font=LETGOTH Size=080 Type=1 CodePage=T1V10273 CharSet=C000008C
Font=LETGOTH Size=080 Type=2 CodePage=T1V10273 CharSet=C000008B
Font=LETGOTH Size=080 Type=3 CodePage=T1V10273 CharSet=C000008D
Font=LETGOTH Size=090 Type=0 CodePage=T1V10273 CharSet=C000009A
Font=LETGOTH Size=090 Type=1 CodePage=T1V10273 CharSet=C000009C
Font=LETGOTH Size=090 Type=2 CodePage=T1V10273 CharSet=C000009B
Font=LETGOTH Size=090 Type=3 CodePage=T1V10273 CharSet=C000009D
Font=LETGOTH Size=100 Type=0 CodePage=T1V10273 CharSet=C000010A
Font=LETGOTH Size=100 Type=1 CodePage=T1V10273 CharSet=C000010C
Font=LETGOTH Size=100 Type=2 CodePage=T1V10273 CharSet=C000010B
Font=LETGOTH Size=100 Type=3 CodePage=T1V10273 CharSet=C000010D
Font=LETGOTH Size=110 Type=0 CodePage=T1V10273 CharSet=C000011A
Font=LETGOTH Size=110 Type=1 CodePage=T1V10273 CharSet=C000011C
Font=LETGOTH Size=110 Type=2 CodePage=T1V10273 CharSet=C000011B
Font=LETGOTH Size=110 Type=3 CodePage=T1V10273 CharSet=C000011D
Font=LETGOTH Size=120 Type=0 CodePage=T1V10273 CharSet=C000012A
Font=LETGOTH Size=120 Type=1 CodePage=T1V10273 CharSet=C000012C
Font=LETGOTH Size=120 Type=2 CodePage=T1V10273 CharSet=C000012B
Font=LETGOTH Size=120 Type=3 CodePage=T1V10273 CharSet=C000012D
Font=LETGOTH Size=140 Type=0 CodePage=T1V10273 CharSet=C000014A
Font=LETGOTH Size=140 Type=1 CodePage=T1V10273 CharSet=C000014C
Font=LETGOTH Size=140 Type=2 CodePage=T1V10273 CharSet=C000014B
Font=LETGOTH Size=140 Type=3 CodePage=T1V10273 CharSet=C000014D
Font=LETGOTH Size=160 Type=0 CodePage=T1V10273 CharSet=C000016A
Font=LETGOTH Size=160 Type=1 CodePage=T1V10273 CharSet=C000016C
Font=LETGOTH Size=160 Type=2 CodePage=T1V10273 CharSet=C000016B
Font=LETGOTH Size=160 Type=3 CodePage=T1V10273 CharSet=C000016D
Font=LETGOTH Size=180 Type=0 CodePage=T1V10273 CharSet=C000018A
Font=LETGOTH Size=180 Type=1 CodePage=T1V10273 CharSet=C000018C
Font=LETGOTH Size=180 Type=2 CodePage=T1V10273 CharSet=C000018B
Font=LETGOTH Size=180 Type=3 CodePage=T1V10273 CharSet=C000018D

// OCR and BarCode
Font=OCRA Size=100 Type=0 CodePage=T1L00CR2 CharSet=C0L00AON
Font=OCRA Size=120 Type=0 CodePage=T1L00CR2 CharSet=C0L00AON
Font=OCRB Size=100 Type=0 CodePage=T1L00CR2 CharSet=C0L00OAB
Font=OCRB Size=120 Type=0 CodePage=T1L00CR2 CharSet=C0L00OAB
Font=BARCODE Size=100 Type=0 CodePage=T1L00CR2 CharSet=C0L00AON

```

#### 4.4.6 pagedef.tab

The pagedef table provides the PAGEDEF and FORMDEF values used from the value of the PJPAPER infoline parameter. It also provides the fonts used for line data.

- Paper** Is the value of the OTF Infoline parameter PJPAPER. The value is not verified.
- FormDef** Name of the FORMDEF to be used for printing of both OTF and ABAP reports.
- PageDef** Name of the PAGEDEF to be used for printing of ABAP reports. The contents of both parameters are not verified and will result in an IPDS error if the FORMDEF or PAGEDEF is not found on the print server system.

The **FontNorm** and **FontBold** keywords describe the fonts used for line data printing. The value is not checked.

```

// PageDef table

// Format : Paper=X_65_132 FormDef=F1A10111 PageDef=P1H01SP1
           FontNorm = 50D0 FontBold = 50F0

// Notes:

```



```

// =====
// 1) the pagedefs apply to A4 paper. For letter size P1C09182 should be
//    replaced by P1A08682
// 2) Z_INCH12 is a sample for a user specification

Paper=X_65_132 FormDef=F1A10111 PageDef=PIV06683 FontNorm = 50D0 FontBold = 50F0
Paper=X_44_120 FormDef=F1A10111 PageDef=PIV06683 FontNorm = 50D0 FontBold = 50F0
Paper=X_58_170 FormDef=F1A10111 PageDef=PIV06683 FontNorm = 50D7 FontBold = 50F7
Paper=X_65_255 FormDef=F1A10111 PageDef=PIV06683 FontNorm = GT24 FontBold = GT24
Paper=X_65_80 FormDef=F1A10111 PageDef=P1C09182 FontNorm = 50D0 FontBold = 50F0
Paper=X_90_120 FormDef=F1A10111 PageDef=P1C09182 FontNorm = 50D8 FontBold = 50F8
Paper=X_PAPER FormDef=F1A10111 PageDef=P1C09182 FontNorm = 50D0 FontBold = 50F0

```

#### 4.4.7 message.tab

The message table contains the error and warning messages issued by the SAP2AFP converter. The file is external for National Language Support.

```

// Message table (English)

CNV000
CNV001 %1 - Error allocating %2 bytes for %3.
CNV002 Parameter %+1+ missing.
CNV003 Value for parameter %+1+ missing.
CNV004 Invalid parameter %+1+.
CNV005 Invalid OTF command %+1+ in line %2.
CNV006 Open error on file %+1+.
CNV007 Close error on file %+1+.
CNV008 Process error on file %+1+.
CNV009 Keyword %+1+ missing, line %2 in file +%3+.
CNV010 Keyword %+1+ missing in file +%2+.
CNV011 Invalid line %1 in file +%2+.
CNV012 Invalid value for %+1+, line %2 in file +%3+.
CNV013 Input line %1 in file +%2+ too long.
CNV014 No enough internal storage for %1.
CNV015 Matching font (%1 %2 %3) not found, using (%4).
CNV016 Matching barcode %+1+ not found.
CNV017 Delete error on file %+1+.
CNV018 Invalid line data command %+1+ in line %2.
CNV019 Printer destination %+1+ not found in file +%2+.
CNV020 Format %+1+ not found in file +%2+.

```

A line consists of the prefix 'CNV' followed by a three digit error number and the error text separated by a blank. The error text may contain placeholders (starting with the '%' character and a number) which are replaced with actual values.

In the final version the message table will be deleted. Messages will be sent using the standard AIX message catalog as in the rest of PSF for AIX.

---

## 4.5 Call Parameters

Call parameters are used on invocation of the SAP2AFP converter. These parameters inform the converter about the output destination (the target AFPDS printer queue), the type of input (from a file or stdin) and processing option (convert printer data or display the printer queue).

It is possible to call the SAP2AFP converter from the SAP R/3 exit and by calling from the commandline. There is no difference in processing either way.

The following parameters are accepted by the SAP2AFP converter:

- d xxxx** This parameter tells the SAP2AFP converter to send the AFPDS output to the given destination. The value 'xxxx' is converted to a printer destination queue and an IP address (found in the printer table) to which the data is send.
- f filename** The filename given is the OTF input file to be converted. This file is erased after successful conversion.
- i** OTF input comes from stdin. A temporary file (sap2afp.tmp) is created, processed as with the '-f' parameter, and then erased.
- q** This parameter displays the printer queue of the device. This is done by the 'lpq' command.
- t** Using the '-t' parameter causes the SAP2AFP converter to trace program execution.

The '-d' parameter and the printer destination value are always necessary and must be the first parameter. Exactly one of the '-f, -i or -q' parameters and values must be given. The '-t' parameter is 'not official' and may be added.

If a parameter or its value is missing or invalid an error message is displayed. After successful conversion and enqueueing of the output data the message 'Job Id is ..... ' is issued. This output is interpreted by the SAP R/3 exit. Any other output to stdout will be interpreted as an unsuccessful execution and appears in the error report of the SAP R/3 spool.

Examples:

```
sap2afp -d 3825 -f FONTSHP.OTF
```

It converts the file FONTSHP.OTF and enqueues the AFP datastream for the destination called 3825. After conversion the input file FONTSHP.OTF is erased.

```
sap2afp -d LPRT -i < LINEDATA.OTF
```

Redirects the file LINEDATA.OTF to stdin which is read by the SAP2AFP converter. The input from stdin is placed in the file sap2afp.trc which is processed by the converter and then erased. AFPDS output is sent to the destination LPRT.

```
sap2afp -d OS2P -q
```

The content of the queue behind the destination called OS2P is displayed.

```
sap2afp -d MVS1 -f ANYFILE.OTF -t
```

The file ANYFILE.OTF is converted and output is sent to the destination MVS1. Additionally a trace of the execution can be found in the file called OTF.Trc.

---

## 4.6 Transport Layer

Transport of the output data to the target system is done via a call to a shell script (AIX) or a command file (OS/2). The files must reside in a directory pointed to by the environment variable *SAP2AFP\_PATH*.

A maximum of four parameters can be passed to the shell script/command file for OTF data:

- Queue name
- Node name

- File name
- Form definition name

The FORMDEF name is just passed if a FORMDEF is used (the PJPAPER value does not start with a 'Z').

There are seven parameters passed to the shell script/command file for line data:

- Queue name
- Node name
- File name
- Font for normal printing
- Font for bold printing
- Page definition name
- Form definition name

If the value of the PJPAPER inforline starts with 'Z' the values for a FORMDEF and a PAGEDEF are taken from the pagedef.tab. To the shell scripts/command files for querying the printer queue just the *Queue name* parameter is passed.

The name of the called shell script/command file depends on the target system (AIX, MVS, OS/2) and the type of output data (AFP or line data). The name is composed from the value of the *System* keyword in the *Printer* table (AIX, MVS, OS2) and the suffix *AFP* for AFP data, *LD* for line data, or *QUE* for querying.

The following shell scripts for AIX are predefined:

<b>AIXAFP</b>	to transport the AFP datastream to an AIX system
<b>AIXLD</b>	to transport line data to an AIX system
<b>AIXQUE</b>	to query the printer queue on an AIX system
<b>MVSAFP</b>	to transport the AFP datastream to an MVS system
<b>MVSLD</b>	to transport line data to an MVS system
<b>MVSQUE</b>	to query the printer queue on an MVS system
<b>OS2AFP</b>	to transport the AFP datastream to an OS/2 system
<b>OS2LD</b>	to transport line data to an OS/2 system
<b>OS2QUE</b>	to query the printer queue on an OS/2 system

```

#|/bin/ksh
##-----*#
##  AIXAFP      :  Enqueue SAP2AFP printfile for AIX system      ##
##                                                     ##
##           Arg : Queue, Node, Filename, Copies, [Formdef]    ##
##                                                     ##
##           Req :  -                                           ##
##-----*#
#
if [[ -z $5 ]]; then
    enq -c -P$1 -ocopies=$4 $3
else
    enq -c -P$1 -ocopies=$4 -ofordef=$5 $3
fi
rtc=${ERRNO}
#
rm -f $3
#
return ${rtc}

```

Figure 5. An Example of the AIXAFP Shell Script

An example of the AIXLD shell script:

```

#|/bin/ksh
##-----*#
##  AIXLD      :  Enqueue SAP2AFP Linedata-file for AIX system  ##
##                                                     ##
##           Arg : Queue, Node, Filename, NormFont, BoldFont,  ##
##                 PageDef, Copies, [FormDef]                  ##
##                                                     ##
##           Req :  -                                           ##
##-----*#
#
if [[ -z $8 ]]; then
    enq -c -P$1 -odatatype=line -occ=yes -occtype=a -otrc=yes
        -ochars=$4,$5 -opagedef=$6 -ocopies=$7 $3
else
    enq -c -P$1 -odatatype=line -occ=yes -occtype=a -otrc=yes
        -ochars=$4,$5 -opagedef=$6 -ocopies=$7 -ofordef=$8 $3
fi
rtc=${ERRNO}
#
rm -f $3
#
return ${rtc}

```

Figure 6. AIXLD Shell Script Illustration

An example of the AIXQUE shell script:

```
#!/bin/ksh
#*-----*#
#*  AIXQUE    :  Get content of Printer queue for AIX system    *#
#*                                                    *#
#*           Arg : Queue, Node                                *#
#*                                                    *#
#*           Req : -                                           *#
#*-----*#
#
lpq -l -P$1
#
return ${ERRNO}
```

Figure 7. AIXQUE Shell Script Illustration



---

## Chapter 5. AFP Printing from SAP R/2

'Regular' printing from SAP R/2 is done using the normal IMS/CICS terminal queues where each user prints to a particular terminal. To utilize AFP printing two technical prerequisites must be met:

- SAP must deliver the print data to the system spool and
- The AFP print options which are usually specified in the OUTPUT statement must be specifiable within the transaction.

The technique where an SAP transaction submits a regular MVS job via the internal reader is not discussed here. For large print files the overhead for job scheduling may be acceptable, for small print files however, the direct path to the system spool is appropriate.

---

### 5.1 Prerequisites

With the following releases the support for AFP printing is available.

#### 5.1.1 SAP

Component 043 contains the exits to support external spool systems in R/2. It is available for MVS and VSE. It contains an initialization routine (SAPSPEI) and the actual exit routine (SAPSPEX) which passes the data and the print options to JES.

At initialization time the transaction determines the way of spooling, if SAP spooling or JES. This is done using the terminal table T022D which brings together logical and physical destinations. At OPEN time the print options, such as FORMDEF, PAGEDEF, number of copies must be provided as output descriptors in the parameter list of the OPEN macro. The data is then written to the spool using WRITE macros and made available for printing after the CLOSE macro. All that means AFP-specific programming is required in the R/2 transactions and that may be an explanation why the penetration of R/2 with AFP is relatively moderate.

For bar code support Release 5.0C is required.

#### 5.1.2 IBM

The following release levels are prerequisite for AFP printing from SAP R/2:

- IMS/ESA 3.1 or CICS/ESA 3.1
- MVS/JES2 3.1.3 or MVS/JES3 4.2.1
- VSE/ESA 1.1.1

For bar code support the 'IBM Bar Code Fonts and Subroutine', 5688-021 is required.

---

## 5.2 Functional Capabilities

The functional capabilities offered in R/2 are comparable to the support for a 3800-3 in line mode. Up to four print operations can be done for one line, each using a different font via table reference characters.

In addition, all functions offered in a PAGEDEF can be used.

- The whole page can be rotated.
- PRINTLINES can be positioned individually and printed with individual fonts.
- Print lines can be split up into FIELDS which can be positioned individually, and rotated, and printed with individual fonts.
- Up to 64 different fonts can be used per page.

Also all functions offered via FORMDEF can be used.

- Electronic overlays
- Duplex printing
- Paper from different input bins
- N\_UP support

There is one serious restriction for AFP in R/2: R/2 does not allow for a printer code of X'5A'. That means that no structured fields can be sent within a print file. However, switching of the formatting scheme (Invoke Data Map structured field) and switching overlays (Invoke Media Map structured field) can be accomplished by conditional processing in the PAGEDEF as well, but variable positioning of page segments and overlays (via IPS and IPO structured fields) is not possible in R/2.

---

## 5.3 Samples of the SAP Tables

The terminal table T022B triggers, where to spool the data. A terminal which begins with 'IPDS' is considered as an AFP printer and will receive a line mode data stream from the transaction program. Its format is:



Dest	R	DCT	022D-Typ	Prolog	Epilog	LF	UPC	FFB	FFA
AP01	R	AP01							
AP06	R	AP06							
AP07	R	AP07							
IPDSBTCH									
IPDSDR01	R	DR01							
IPDSDR02	R	DR02							
.									
.									
.									

The table for forms descriptions T022I contains the AFP parameters. It is read at OPEN time and provides the AFP parameters for the output descriptors. Its format is:

LIIST03/Layout	Formdef	Pagedef	CHAR0	CHAR1	CHAR3	CHAR4
ABRVBIGA	0101PD	V04863	GT10	GB10		
ABRVFISC	GNMILO	GNMILO				
F0010	A10111	C09182	GT12	GB12	AOA	BC05
STD	A10110	C09182				
SAPCPY	SAPCPY	SAPCPY				
.						
.						
.						

## 5.4 Specifics for Bar Codes

There are two ways to print bar codes from R/2:

- Create a BCOCA module directly in the transaction. This requires that the printer has a control unit which supports BCOCA. See *Printer Information*, if this is the case for **all** printers in your installation.
- When this solution was created in 1992 the majority of the AFP printers did not support BCOCA. Hence, as general support the IBM Bar Code Subroutine and Fonts program product, 5688-021 is used.

### 5.4.1 Calling from CICS

Calling from CICS or calling PL/I from COBOL requires a special linkage convention which is realized as shown below.

```

/*****/
/*
/*          1. Description
/*
/* The IBM Barcode Subroutine (5688-021) creates appropriate
/* EBCDIC-Combinations which result in a valid barcode when being
/* printed using the barcode font.
/*
/* It can be executed in a batch environment or in a CICS/PL/I
/* environment. If the subroutine is called in CICS from a
/* Non-PL/I-program (e.g. COBOL, Assembler) via CALL, this can
/* lead to security violations and even to CICS breakdowns.
/*

```

```

/*                                                                    */
/* The following program takes care of that. It is written in          */
/* PL/I and calls the subroutine via CICS LINK. The parameters        */
/* required are passed through the COMMAREA.                          */
/*                                                                    */
/* Logic:                                                              */
/*                                                                    */
/* 1. The application program (e.g. COBOL or Assembler) defines     */
/*    a COMMAREA (length 171).                                        */
/* 2. The application program puts the parameters for the barcode    */
/*    into the COMMAREA.                                            */
/* 3. The application program passes contro; via CICS LINK to       */
/*    the PL/I-program ¢BARCODE¢.                                    */
/* 4. The program ¢BARCODE¢ checks the length of the COMMAREA       */
/*    (abend code ¢BCD1¢ in case of errors).                          */
/* 5. The program ¢BARCODE¢ reads the COMMAREA and calls the       */
/*    barcode subroutine via CALL.                                    */
/* 6. The program ¢BARCODE¢ receives the results of the barcode     */
/*    subroutine and puts them into the COMMAREA.                    */
/* 7. The program ¢BARCODE¢ returns control to the application      */
/*    program.                                                       */
/* 8. The application program reads the COMMAREA and checks for     */
/*    errors in the subroutine (e.g. wrong data, wrong lengths).    */
/*                                                                    */
/*                                                                    */
/*                2. BARCODE Program                                  */
/*                                                                    */
/* The first two statements are options for the CICS precompiler.    */
/*                                                                    */
* PROCESS M,NC(E),WORKFILE(DISK),S,CICS(NOSOURCE),NIS;              */
* PROCESS F(I),NGS,OFFSET,NEST,DECK,NOLINK;                          */
/*****                                                                    */
/* BARCODE PROGRAM:                                                */
/* CALLS THE IBM BARCODE-SUBROUTINE IN CICS.                        */
/*****                                                                    */

```

**Note:** The complete interface to call the BARCODE subroutine from CICS or COBOL can be obtained from IBMMAIL(DEIBMGQQ) or SPIMUE@VNET.IBM.COM.

## 5.4.2 Calling from IMS

To be called from IMS the bar code subroutine must be at least reusable. This can be accomplished by modifying the initialization statements as shown below.

```

/***** @SRK */
/* TO MAKE THE MODULE REUSEABLE (CUSTOMERS REQUEST * @SRK */
/* FOR USING THE MODULE IN AN IMS APPLICATION) THE * @SRK */
/* FOLLOWING ¢DYNAMIC¢ INITIALIZATION STATEMENTS HAVE * @SRK */
/* BEEN INSERTED. * @SRK */
/* * @SRK */
/* ***** @SRK */
/* ***** @SRK */
/* ** ** @SRK */
/* ** RESTRICTIONS : ** @SRK */
/* ** ** @SRK */
/* ** THIS CODE IS PROVIDED AS AN EXAMPLE OF ** @SRK */
/* ** MAKING THIS MODULE REUSABLE. THIS CODE IS ** @SRK */
/* ** NOT CONSIDERED TYPE 1 SUPPORTED CODE OF IBM. ** @SRK */
/* ** ANY PROBLEMS ENCOUNTERED IN THE USE OF THIS ** @SRK */

```



```

MSIN          =      1          ;          /* @$RK */
MSIW          =      3          ;          /* @$RK */
/* @$RK */
/***** @$RK */
/* END OF INSERTING INITIALIZATION STATEMENTS @$RK */
/***** @$RK */
/* @$RK */

```

**Note:** The complete source for the reusable BARCODE subroutine can be obtained from IBMAIL(DEIBMGQQ) or SPIMUE@VNET.IBM.COM.

---

## 5.5 An Alternative: PSF/MVS NetSpool

As of June 1995 PSF/MVS Version 2.2.0 has an extension called NetSpool which is orderable as a separate feature. Using the NetSpool feature, you can send output from VTAM applications (such as R/2 output that is usually printed on SNA network printers) to the JES spool for printing or distribution using JES or PSF/MVS, without modifying the application code. In NetSpool the output for specific VTAM LUs, which are defined in an LU mapping table is intercepted and written to the JES spool instead of the terminal.

The data stream supported is the 3270 data stream and the SCS print data stream. NetSpool converts the data into S/370 line data format. MVS output parameters can be specified for the data sets NetSpool creates. These parameters can be specified for each logical printer in the print characteristics data set and in OUTPUT JCL statements. The data set parameters include:

- JES selection criteria, such as class and destination, which route the output data sets created by NetSpool to different printers and locations.
- Distribution information, such as name and address, which can be printed on output header pages.
- Advanced Function Presentation (AFP) options, such as the name of a page definition to format the S/370 line data, or a font name, or the name of a FORMDEF, which calls out an overlay.

For details about NetSpool see *Print Services Facility/MVS, NetSpool Guide*.

---

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Runtime values:

Document fileid .....	SG244629 SCRIPT
Document type .....	USERDOC
Document style .....	IBMXAGD
Profile .....	EDFPRF30
Service Level .....	0029
SCRIPT/VS Release .....	4.0.0
Date .....	95.12.01
Time .....	02:36:42
Device .....	3820A
Number of Passes .....	4
Index .....	YES
SYSVAR D .....	YES
SYSVAR G .....	INLINE
SYSVAR S .....	OFFSET
SYSVAR V .....	ITSCEVAL

Formatting values used:

Annotation .....	NO
Cross reference listing .....	YES
Cross reference head prefix only .....	NO
Dialog .....	LABEL
Duplex .....	YES
DVCF conditions file .....	(none)
DVCF value 1 .....	(none)
DVCF value 2 .....	(none)
DVCF value 3 .....	(none)
DVCF value 4 .....	(none)
DVCF value 5 .....	(none)
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DVCF value 7 .....	(none)
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Print example id's .....	NO
Print cross reference page numbers .....	YES
Process value .....	(none)
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