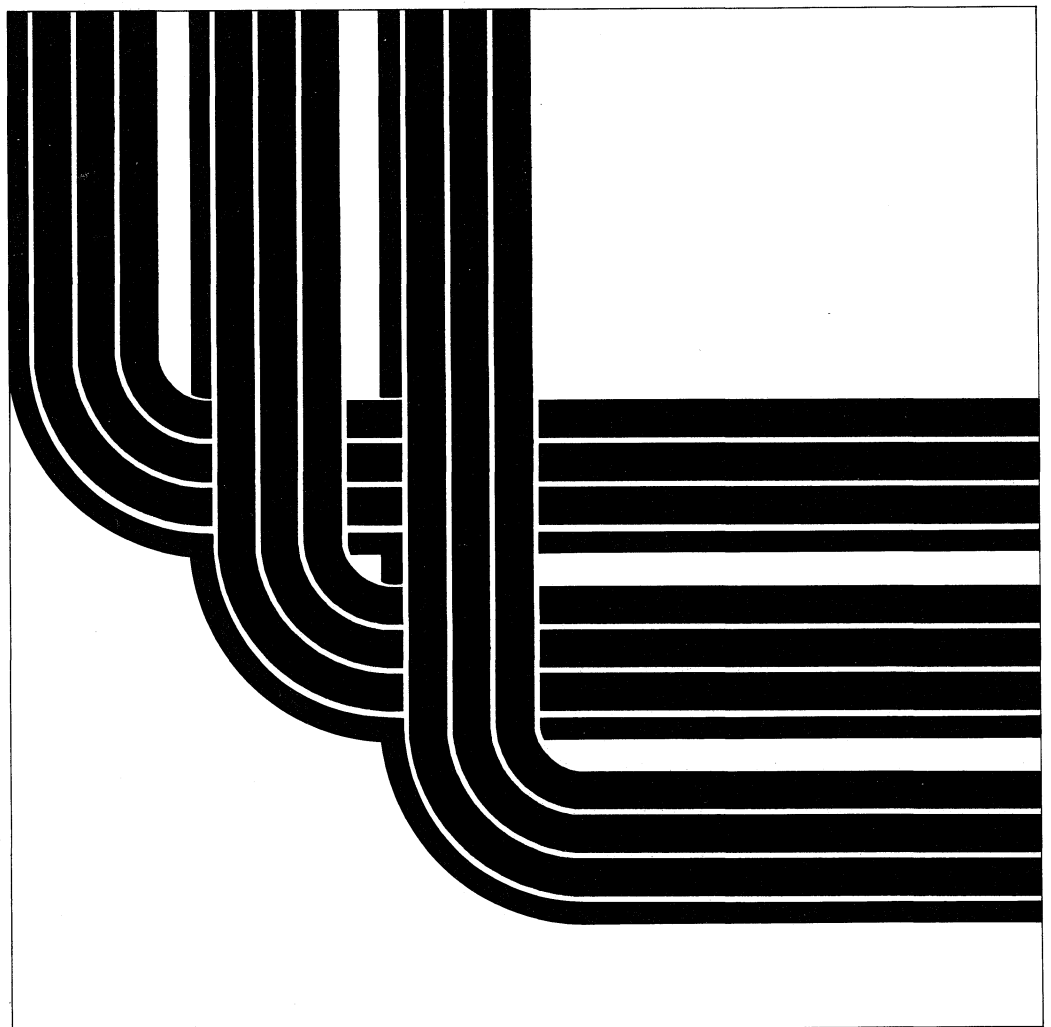


IBM Application System/400™

SC09-1361-00

**Application Development Tools:
Advanced Printer Function Guide**

Version 2



Application Development



IBM Application System/400™

SC09-1361-00

**Application Development Tools:
Advanced Printer Function Guide**

Version 2

Note!

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

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About This Manual

This book provides information and examples to help you learn how to use the Advanced Printer Function (APF).

APF provides you with a set of functions that you use with a 5224 and 5225 dot matrix printer to create, design, print, and merge information into changed-to-tailor forms.

This manual does not describe all of the functions of APF.

You may need to refer to other IBM manuals for more specific information about a particular topic. The *Publications Guide*, GC41-9678, provides information on all the manuals in the Application System/400 (AS/400) library.

For a list of related publications, see the "Bibliography" on page 95.

Who Should Use This Manual

This book is intended to be used by system and application programmers to design changed-to-tailor forms.

To use this manual effectively, you need:

- Working knowledge about how to use your workstation with a 5224 or 5225 dot matrix printer
- General knowledge of the AS/400 system
- Working knowledge of control program concepts.

If the AS/400 system is new to you, and you have no knowledge of how it works, refer to the *System Operator's Guide*, SC41-8082.

If you are not familiar with your workstation or dot matrix printer, refer to the books that come with it.

The user (described as *you* in this manual) refers to the programmer creating, designing, or printing the forms.

Chapter 1. Introduction

The Advanced Printer Function (APF) allows you to create and maintain changed-to-tailor forms by using special print capabilities available on the 5224 Models 1 and 2 and 5225 Models 1, 2, 3, and 4 **dot matrix** printers. Dot matrix printers use a pattern of dots to create the printed characters. APF can create the background information needed to make it appear as though you are using a preprinted form or a printer with a variety of special fonts.

This chapter describes the functions of APF, discusses how to reach the APF displays, and provides a brief overview of using APF.

Functions of APF

APF provides support to allow you to:

- Design the layout of a form.
- Specify **fields** on a form that will contain special features. (A field is a group of related characters (such as a name or an amount) that are treated as a unit on a record.)
- Design special features for a form.
- Produce blank copies of a form.
- Merge spooled data with a predefined form.

The special features you can design with APF include:

- Logos, special symbols, or large characters
- Bar codes¹
- Bar charts
- Constant fields, such as column headings
- Vertical and horizontal lines that can be used to form boxes
- Highlighted fields
- Underlined fields.

Using Dot Matrix Printers

APF uses the 5224 and 5225 dot matrix printers to print the symbols and forms you create. The dot matrix printers can print a dot almost anywhere on a page. The dots are printed by the **print head**. Individual wires in the print head strike the paper and leave a dot. All dots from one strike of the print head are called a **print position**. A print position consists of 72 dots arranged in eight horizontal rows, with nine dots in each row (forming nine vertical columns), as shown in Figure 1 on page 2.

¹ A **bar code** is a pattern of bars of various widths that contain data that is to be interpreted by a scanning device. The bar codes that APF prints are representations of Code 3 of 9, EAN (8 digit and 13 digit), modified PLESSEY (MSI), and UPC (versions A and E) bar codes. Test all bar codes you print on the 5224 Printer or 5225 Printer to make sure the wand or scanning devices you use can read the codes created. Nonglossy paper is recommended.

.....
.....
.....
.....
.....
.....
.....
.....
.....

Figure 1. One Print Position

The dots appear separated in this example, which is enlarged so you can see each dot in the print position. The separation is not apparent when the dots are printed on a 5224 or 5225 dot matrix printer.

Printing Symbols

A **symbol** is simply a pattern of dots you define and store. When you request the printer to print a symbol, the printer selects and prints only the dots defined for that symbol. For example, if you request an E, the printer only prints the dots identified by an asterisk in Figure 2.

.....
.*.*.*.*
*.....
*.....
.*.*.*.*
*.....
*.....
.*.*.*.*

Figure 2. The Letter E

If you select all dots in the matrix, the entire print position is darkened.

The 5224 and 5225 dot matrix printers can handle almost any print pattern. However, when using extremely dark dot patterns, keep in mind that they:

- Require more frequent ribbon replacement
- Require more passes by the printer and reduce its speed
- Can lead to ribbon snags, paper tears, and missing dots.

Warning: Do not try to print a dense dot pattern for a whole page as it may damage your printer.

Storing Symbols in Symbol Sets

Symbols are stored in a **symbol set**, which is a group of symbols stored as a member of a symbol set file. APF is shipped with three sample symbol sets, each of which contain 184 characters in the standard multinational character set. These sample sets are stored in the symbol set file QAAPFILE. These character sets provide you with the ability to enlarge characters when you install APF. They also give you character sets you can use as a base to create your own changed-to-tailor symbols.

APF provides the following symbol sets:

- QAAPF1X1, which contains letters that are one print position wide and 8 rows tall

- QAAPF1X2, which contains letters that are one print position wide and 16 rows tall
- QAAPF2X2, which contains letters that are two print positions wide and 16 rows tall.

Examples of each symbol set are shown in Appendix A, "Examples of Symbol Sets and Features."

Using Advanced Printer Function

The following steps describe how to use Advanced Printer Function (APF) in an application:

1. **Design symbol sets.** The symbols for your form (logos, special characters) create the special effects. Design the symbols and store them in symbol sets. See Chapter 2, "Designing Symbols" for more information.
2. **Design the layout of your form.** In APF, the **form description** controls the layout of the form. You design a form description and store it in a **form description file**. Form descriptions are stored as members of form description files. See Chapter 3, "Designing a Form."
3. **Print a blank form.** Print a copy of the form to see how it actually appears. See Chapter 4, "Printing Copies of a Form" for more information.
4. **Create a spooled file.** The spooled file positions the data correctly on the form. Use a programming language or another system utility to create the spooled file.
5. **Merge your spooled file with the form description.** Merge the data in the file with the form description to create and print a completed form. See Chapter 5, "Merging Spooled Data into a Form" for more information.

APF provides several displays to help you design and use symbols and forms.

Using the Function Keys

APF provides function keys for each display. The definition of the function keys varies depending on your selections on the initial APF display. Table 1 lists the function keys that are common across most displays.

Table 1. Definition of Function Keys

Function Key	Name of Function Key	Description
F3	Exit	Returns the Advanced Printer Function display or the last screen you were using.
F12	Previous	Returns the previous display.
	Help	Provides several displays of online help information.
	Page Down	Moves the display up one display length.
	Page Up	Moves the display down one display length.
	Print	Prints the current display.

Some APF displays use other function keys. These function keys are described with the appropriate display. For more information on how to use an Application System/400* AS/400* display station and for a description of the keyboard, see the *Operator's Guide*.

Requesting APF

To request APF, you must sign on at a display station by responding to the sign-on prompt. You request it using the Start Advanced Printer Function (STRAPF) command.

Using the Start Advanced Printer Function Interactively

Use the Start Advanced Printer Function (STRAPF) command (without any **parameters**) to start APF interactively and present the Advanced Printer Function display. Parameters are values that are supplied to the command as input or are supplied to control the action of the command.

Figure 3 shows the syntax of the Start APF (STRAPF) command.

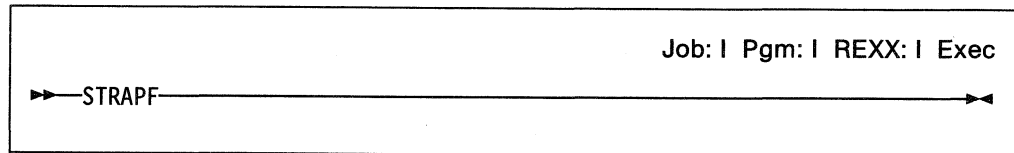


Figure 3. Start APF (STRAPF) Command

Type the command in one of the following ways:

- Type STRAPF on the Command Entry display, and press Enter.
- Select option 5 (Execute command) from the Programmer menu, type STRAPF, and press Enter.
- Select option 2 (STRAPF) from the CMDAPF menu and press Enter.

There may be additional ways to type the STRAPF command on your computer system. For additional information about typing commands, refer to the *Operator's Guide*.

You must have authorization to use the STRAPF command and any files needed for the functions you request. Your security officer can provide you with the necessary authorization.

Using the Advanced Printer Function Display

The Advanced Printer Function display is the initial APF display. From this display, you can select APF functions to design symbols (logos or alternate character sets), design form descriptions, print copies of a form description, or merge spooled data with form descriptions. APF presents a series of displays to complete the function you select.

You can select the following options from the Advanced Printer Function display:

- **Option 1 (Work with symbol sets).** Create or maintain a symbol or alternate character set. APF presents the Work with Symbol Sets display (see "Using the Work with Symbol Set Display" on page 7 for more information).
- **Option 2 (Work with form descriptions).** Create or maintain a form description. APF presents the Work with Form Descriptions display (see "Using the Work with Form Description Display" on page 21 for more information).
- **Option 3 (Print form descriptions).** Print copies of your form description. APF presents the Print Blank Forms display (see "Using the Print Blank Form Display" on page 41 for more information).

- **Option 4 (Merge spooled data with a form description).** Merges spooled data with your form description. APF presents the Merge Form Description display (see “Using the Merge Form Description Display” on page 43).
- **Command line.** Type command language (CL) commands in one of the following ways:
 - Type the command and its parameter, and press Enter.
 - Type the command and press F4 (Prompt) to request a prompt for the command parameters.

Chapter 2. Designing Symbols

To give forms (invoices, bills, reports) a changed-to-tailor appearance, you can use different sizes and styles of lettering and special symbols. This chapter describes how to design a symbol using the following steps:

- Select a symbol set or create a new symbol set
- Select a symbol or create a new symbol
- Change an existing symbol or design a new symbol.

Selecting a Symbol Set

Select a symbol set to create, change, copy, or delete using the Work with Symbol Set display. To see a list of current symbol sets and select a set, use the Work with Symbol Sets display.

Using the Work with Symbol Set Display

You reach the Work with Symbol Set display by selecting option 1 (Work with symbol set) from the Advanced Printer Function display.

You can select the following options from the Work with Symbol Sets display:

- **Option 1 (Create).** Create a new symbol set. Type the names of the symbol set, the symbol set file, and the **library**. (Your library is an object that acts as a directory to other related objects.) APF presents the Create Symbol Set display (see “Using the Create Symbol Set Display” on page 9).
- **Option 2 (Change).** Change an existing symbol set. Type the names of the symbol set, the symbol set file, and the library. APF presents the Work with Symbols display (see “Using the Work with Symbols Display” on page 11).
- **Option 3 (Copy).** Copy an existing symbol set. Type the names of the symbol set you want to copy, the symbol set file, and the library. APF presents the Copy Symbol Set display (see “Using the Copy Symbol Set Display” on page 9).
- **Option 4 (Delete).** Delete the symbol set file. You must have authority to use the Delete File (DLTF) command.
- **Option 6 (Print).** Print all symbols in the symbol set using the **printer device file** QPAPFPRT.

The printer device file contains a description of how data is to be presented from a program to the printer or how data is to be presented from the printer to the program.

To use the Work with Symbol Set display, type the following information:

- **File.** Type the name of the file that contains the symbol set. To obtain a list of symbol set files, type the library name, position the cursor in the *File* prompt, and press F4. When you press F4, the option field is ignored.

Note: If the symbol set or symbol set file does not exist, APF presents the Create Symbol Set display. You must create all symbol set files through APF.

- **Library.** Type the name of the library that contains the symbol set.

- **Symbol set.** Type the name of the symbol set you want to work with. To get a list of symbol sets, type the names of the symbol set file and library, position the cursor in the *Symbol set* prompt, and press F4 (List). APF presents the Work with Symbol Sets display. (APF ignores any options selected in the *Opt* prompt when you press F4.)

When you finish typing this information, press Enter. If you are creating a new symbol set, APF presents the Create Symbol Set display. If you are not creating a new symbol set, APF presents the Work with Symbols display.

Using the Work with Symbol Sets Display

You reach the Work with Symbol Sets display by positioning the cursor in the *Symbol set* field on the Work with Symbol Set display, and pressing F4 (List). APF presents a display similar to the one shown in Figure 4.

```

Work with Symbol Sets
File . . . . . : MYFILE      Library . . . . . : MYLIB
Type option, press Enter.
  3=Copy      4=Delete      5=Work with symbols      6=Print

Opt Symbol set      ID      Entries      Text
-   CHRSET2X2      2      26      2 x 2 letters upper case
-   CHRSET3X3      1      95      3 x 3 alphabet and digits
-   INVCLGOS      10      20      Logos for invoices
-   ITALICS      1      52      1 x 1 letters in italics
-   XYZLOGOS      10      100      Logos for form XYZ

F3=Exit      F5=Refresh      F6=Create      F12=Previous

```

Figure 4. Work with Symbol Sets Display

You can select the following options from the Work with Symbol Sets display:

- **Option 3 (Copy).** Copy the symbol set and its symbols. Position the cursor beside the symbol set you want to copy, type 3, and press Enter. APF presents the Copy Symbol Set display.

Note: If you shorten the size of the character ID (from 10 to 2 or 1, or from 2 to 1), APF may truncate the character identifiers associated with each character pattern.

- **Option 4 (Delete).** Delete the symbol set and its symbols. You must have authority to use the Remove Member (RMVM) command.

- **Option 5 (Work with symbols).** Show a list of symbols in the symbol set.
- **Option 6 (Print).** Print the symbol set and its symbols using the printer device file QPAPFPRT.

To create a new symbol set, press F6. APF presents the Create Symbol Set display.

Creating a Symbol Set

You can create a new symbol set using the Create Symbol Set display. You can also create a set by copying an existing set using the Copy Symbol Set display.

To create a new symbol set file, you must have authority to use the Create Physical File (CRTPF) and Create Logical File (CRTLF) commands. To create a new symbol set, you must have authority to use the Add Physical File Member (ADDPFM) and Add Logical File Member (ADDLFM) commands.

Check with the security officer at your computer system before using any of these commands.

Using the Create Symbol Set Display

To reach the Create Symbol Set display, select option 1 (Create) from the Work with Symbol Set display. You can also type a new symbol set name on the Work with Symbol Sets display and press Enter.

To use the Create Symbol Set display, type the following information:

- *Symbol set.* Type the name of the symbol set you want to create. If you typed the name of a symbol set on the Work with Symbol Set display, APF places the name you specified in this prompt.

If the file containing the symbol set does not exist, the system sends a message indicating that a file is created for you when you press Enter. You must create all symbol set files through APF.

- *Character ID length.* Type the length (number of characters) of the symbol ID codes for the symbol (see “Specifying Symbol ID Code Lengths” on page 11 for more information).
- *Text.* Type in text that describes the symbol set you are creating.

When you finish typing this information, press Enter. APF presents the Work with Symbols display. No symbols are shown on the display since you are creating a new symbol set.

Using the Copy Symbol Set Display

Use the Copy Symbol Set display to copy an existing symbol set and all its symbols. You reach the display by selecting option 3 (Copy) from either the Work with Symbol Set display or from the Work with Symbol Sets display.

To use the Copy Symbol Set display, type the following information:

- *To symbol set.* Type the new name of the symbol set you want to copy. If the file containing the symbol set does not exist, APF creates the file when you press Enter. You must create all symbol set files through APF.

- *To file.* Type the new name of the symbol set file. APF shows the name of the symbol set file from which you are copying. You can leave this prompt unchanged, or type the name of another symbol set file to copy your symbol set into.
- *To library.* Type the name of the library containing the file. APF shows the name of the library containing the symbol set from which you are copying. You can leave this prompt unchanged, or type the name of another symbol set library to copy your symbol set into.
- *Character ID length.* Type the length (number of characters) of the symbol ID codes for the symbols contained in your symbol set. APF shows the length of the symbol set you are copying. You can leave this prompt as it is, or type another length for your character ID length.

Note: If you shorten the size of the character ID (from 10 to 2 or 1, or from 2 to 1), APF may truncate the character identifiers associated with each character pattern.
- *Text.* Type in text that describes the symbol set you are creating.

When you finish typing this information, press Enter. APF presents the Work with Symbols display. No symbols are shown on the display since you are creating a new symbol set.

Storing and Using Symbol Sets

APF stores each symbol set in a system data base **logical file** that it creates and maintains. The logical file describes how input data are to be presented to a program or how output data are to be received from a program but does not contain any actual data. APF creates the logical file over three physical files that it also creates and maintains. In contrast to the logical file, the physical file describes how input data are to be presented to or received from a program as well a description of how data are actually stored in the data base. The physical file contains one record format and one or more members.

Specifying Symbol IDs

To print a symbol instead of standard data, specify a symbol ID on the form where you have specified a symbol set. APF takes the ID, retrieves the symbol (dot pattern) associated with it, and prints the symbol instead of the standard data.

For example, specify the symbol ID A (defined as a large italic A) on a form. Direct APF to use a symbol set on that area of the form. When you print the form, APF uses the italic symbol A rather than the standard letter A.

APF extracts the symbol ID from one of two places:

- Your spooled file
- Your form description (**constant data**, that is, information that is to appear on each form).

Specifying Symbol ID Code Lengths

You must specify the length of your symbol IDs so APF knows how many characters (bytes of data) to retrieve from your data and use to retrieve dot patterns.

For example, to make a symbol set consisting of letters that are three times the standard size, you can specify each symbol ID as 1 character (byte) long. For this symbol set, you can associate a symbol ID of A with the pattern of dots needed to print a triple-sized A. When you specify the triple-sized letter symbol set on a form description, APF uses 1 byte from your data to identify each symbol.

You can also use symbol IDs longer than 1 byte. APF provides two options for selecting the length of symbol IDs:

- **2-byte symbol IDs.** When you use 2-byte IDs, APF uses 2 bytes from your data to identify symbols. For example, if you create a large letter D, you can call the letter BD to remind you it is a big D.

The number of symbols you can store in a symbol set increases when you use 2-byte symbol IDs. If you use 1-byte codes, the maximum number of symbols in a symbol set is limited to the number of different characters you can type on your keyboard. For many users, this number is 94. With 2-byte codes, however, this number increases to 94 by 94, or 8836.

When you use 2-byte symbol IDs, the symbols you create must be 2 bytes (print positions) wide.

- **1- to 10-byte symbol IDs.** This option allows you to use symbol IDs that vary in length. Some IDs can be 1 byte long while others can be 10 bytes long. IDs with fewer than 10-bytes end with blank. For example, you can call a letter D that is 11 print positions wide BIGD, and call a D that is 20 print positions wide VERYBIGD.

This option gives you the advantage of an almost unlimited supply of names.

When you use 1- to 10-byte symbol IDs, the width of your symbol must be at least one more than the number of bytes in your symbol ID.

You cannot use leading or **embedded blanks** (spaces that occur between characters within a unit of data) in any symbol IDs.

Selecting a Symbol

You can look at the current symbols in a set using the Work with Symbols display. You can select a symbol to change, copy, delete, or print, or you can create a new symbol from this display.

Using the Work with Symbols Display

You can reach the Work with Symbols display three ways:

- Type the names of an existing symbol set, file, and library on the Work with Symbol Set display.
- Select a symbol set on the Work with Symbol Sets display.
- Type the name of a new symbol set on the Create Symbol Set display.

To work on a symbol that already exists, use Page Down and Page Up to find the symbol you want on the list. If a large symbol set exists, you can reposition the list to show the symbol you want to work with. Type the name of the symbol where you want the display list to start, and press Enter. If the symbol exists in the symbol set,

APF shows the ID of the symbol on the Work with Symbols display. Use the values *TOP and *BOT to position the display to the beginning or end of the list. If the symbol ID is shown, position the cursor in the *Option* prompt to the left of the symbol ID and type one of the following:

- **Option 2 (Change).** Change the design of a symbol. APF presents the Design Symbol display (see “Using the Design Symbol Display” on page 13).
- **Option 3 (Copy).** Copy an existing symbol. APF presents the Copy Symbol display (see “Using the Copy Symbol Display”).
- **Option 4 (Delete).** Delete the symbol. The delete option permanently removes a symbol from the symbol set.
- **Option 6 (Print).** Print the symbol using the printer file QPAPFPRT.

To create a new symbol, press F6. APF presents the Create a Symbol display.

Creating a New Symbol

You can specify the parameters (width, length) for a symbol you will design using the Create a Symbol display. You can also create a symbol by copying an existing symbol with the Copy Symbol display.

Using the Create a Symbol Display

You reach the Create a Symbol display by typing a new symbol name on the Work with Symbols display and pressing Enter.

Type the following information in the Create a Symbol display:

- *Symbol.* Specify the symbol name associated with the symbol you are creating.
 - For 1-byte symbol names, use any nonblank character on your keyboard.
 - For 2-byte symbol names, use any 2 nonblank characters on your keyboard.
 - For 1- to 10-byte symbol names, use any 1 to 10 nonblank characters on your keyboard.

APF sends an error message if it detects leading or embedded blanks in a symbol name. Trailing blanks are ignored.

- *Width.* Specify the width of the new symbol. The width of a symbol can be from 1 to 20 standard characters (print positions). Twenty characters are 2 inches wide at 10 characters per inch. Eighteen rows are 2 inches long at 9 rows per inch. If your symbol is more than 1 row tall, print your file at 9 rows per inch to avoid horizontal gaps in the symbol.
- *Length.* Specify the length of the new symbol. The length can be from 1 to 18 rows.
- *Text.* Type up to 50 bytes of text describing the new symbol.

Using the Copy Symbol Display

You reach the Copy Symbol display by selecting option 3 (Copy) from the Work with Symbols display.

To copy the symbol exactly, type the name of the new symbol and change the symbol ID length and text data, if necessary.

You can also specify new lengths or widths for the copied symbol. If you leave these prompts empty, APF uses the length and width of the existing symbol.

If new symbols are based on existing ones, APF copies the old asterisk pattern into the new symbol. For example, if you have a large E and you want to create a large F, you can create an F by changing the bottom horizontal line on the E. However, if the symbol is smaller than the base symbol, APF truncates the new symbol.

Changing an Existing Symbol

You can change the dot pattern for an existing symbol using the Design Symbol display. For an existing symbol, you reach the Design Symbol display by selecting option 2 (Change) from the Work with Symbols display. APF presents the display with the current dot pattern and feature information.

Designing a New Symbol

You can design a dot pattern for a new symbol using the Design Symbol display. For a new symbol, you reach the display by completing the Create a Symbol display.

Using the Design Symbol Display

To use the Design Symbol display, select the dots you want to print for each symbol. Select a dot by typing an asterisk in the corresponding position of the display. The numbers across the top of the Design Symbol display correspond to the print positions for your symbol. The numbers along the left-hand side correspond to row numbers.

For example, type asterisks as shown on the Design Symbol display in Figure 5:

```

                                Design Symbol
Symbol ID . . . . : DEMOSET           Width . . : 20   Length . . . : 2
Control . . . . . : _____
1.....2.....3.....4.....5.....6.....7.....8.....
01      ***          *****          ***
.       ***          *****          ****
.       ***          *****          *** ***
.       ***          *****          ***  ***
.       ***          *****          ***  ***
.       ***          *****          ***  ***
.       ***          *****          ***  ***
.       *****          *****          ***  ***
02 *****          *****          ***
. *****          *****          ***
.       ***          *****          ***
.       ***          *****          ***
.       ***          *****          ***
.       ***          *****          *** *
.       ***          *****          *** **
.       ***          *****          ****

F3=Exit   F9=Expand symbol   F12=Previous   F15=Print symbol

```

Figure 5. Design Symbol Display with Sample Data

Press F15 (Print symbol) to print the symbol, and it appears as shown in Figure 6 on page 14.



Figure 6. The Printed Symbol

The print positions appear more rectangular on the display than they really are. Use the symbol layout grids provided in Appendix F, “Example Scale and Layout Grids for Form Design” on page 87, to design your symbol. The grids give a better perception of how the symbol appears when printed.

Using the Function Keys

You can use the function keys shown in Table 2 on the Design Symbol display.

Table 2. Definition of Function Keys

Function Key	Name of Function Key	Description
F3	Exit	Exits from the Design Symbol display and saves the symbol.
F9	Expand symbol	Presents the Symbol Expansion display and allows you to expand a symbol by a specified amount. (For more information, see “Expanding the Size of a Symbol” on page 19.)
F11	Save	Saves the current display and allows you to continue work on the same symbol.
F12	Previous	Returns to the previous display and saves the symbol. On the Design Symbol display, the F3 (Exit) and F12 (Previous) work the same way.
F13	Extend horizontally	Extends asterisks horizontally on the display. (For more information, see “Extending Lines Horizontally” on page 16.)
F14	Extend vertically	Extends asterisks vertically on the display. (For more information, see “Extending Lines Vertically” on page 17.)
F15	Print symbol	Prints the symbol.
F19		Moves the display one column to the left of the print position.
F20		Moves the display right one column of the print position. Returns to the previous display.
Page Down		Moves the display up one row of the print position.
Page Up		Moves the display down one row of the print position.
Help		Shows online help information.
Print		Prints the current display.

Using the Control Prompt

If the symbol is too large to show on the display, APF places a **window** on the symbol. You can move the window in all directions to examine each part of the symbol. You move the window by typing one of the following options in the *Control* prompt:

Option	Meaning
W or w	Show data one display width to the right.
W-	Show data one display width to the left.
W+n	Show data that begins <i>n</i> positions to the right.
W-n	Show data that begins <i>n</i> positions to the left.
Wn	Show data beginning in position <i>n</i> .
+n	Show data that is <i>n</i> rows beyond the first row shown.
-n	Show data that is <i>n</i> rows before the first row shown.
n	Show row <i>n</i> as the first row on the display.
T	Show data at the top of the file.
B	Show data at the bottom of the file.

When using the *Control* prompt, each column corresponds to one column of dots within the 8-by-9-dot print position. A single position is 8 rows or the height of one print position, or 9 columns or the width of one print position. See “Using Dot Matrix Printers” on page 1 for additional clarification.

For example, type W+ 1 in the *Control* prompt while working on the arrow shown in Figure 6 on page 14. Press Enter. APF shifts the display one position to the right, as shown in the display in Figure 7.

```

                                Design Symbol
Symbol ID . . . . : DEMOSET      Width . . : 20   Length . . . : 2
Control . . . . . : _____
 1.....2.....3.....4.....5.....6.....7.....8.....
01 **                *****                ***
  *                *****                *****
 .                *****                *** ***
 .                *****                *** ***
 .                *****                *** ***
 .                *****                *** ***
 .                *****                *** ***
 .                *****                *** ***
 .                *****                *** ***
 .                *****                *** ***
02 *****                *****                ***
 . *****                *****                ***
 .                *****                ***
 .                *****                ***
 .                *****                ***
 .                *****                *** *
 .                *****                *** **
 . *                *****                *****

F3=Exit   F9=Expand symbol   F12=Previous   F15=Print symbol

```

Figure 7. Design Symbol Display Shifted One Position to the Right

Type W+4 in the *Control* prompt while working on the the arrow shown in the above display. Press Enter. APF moves the display four more positions to the right, as shown in the display in Figure 8 on page 16.

```

                                Design Symbol
Symbol ID . . . . : DEMOSET           Width . . . : 20   Length . . . : 2
Control . . . . . : _____
1.....2.....3.....4.....5.....6.....7.....8.....
01      ***
      .   *****
      .   *** ***
      .   ***   ***
      .   ***   ***
      .   ***   ***
      .   ***   ***
      .   ***   ***
      .   ***   ***
02      .           ***
      .           .   ***
      .           .   .   ***
      .           .   .   .   ***
      .           .   .   .   .   ***
      .           .   .   .   .   .   *
      .           .   .   .   .   .   **
      .           .   .   .   .   .   *****
F3=Exit   F9=Expand symbol   F12=Previous   F15=Print symbol

```

Figure 8. Design Symbol Display Shifted Four Positions to the Right

Note: APF does not automatically clear the *Control* prompt when you press Enter.

Extending Lines of Asterisks

Some symbols require several thousand dots, which would require you to type several thousand asterisks. APF provides two function keys to reduce the number of asterisks you must type: F13 (Extend horizontally) and F14 (Extend vertically).

Extending Lines Horizontally

To extend lines horizontally, type either a plus sign (+) or an equal sign (=), and press F13 (Extend horizontally). APF takes the same action for both signs, but the plus sign operates on the width of the display and the equal sign operates on the width of the symbol. For both signs, APF replaces the sign with an asterisk, replaces all blanks following the sign with asterisks, and replaces all asterisks following the sign with blanks.

For example, type plus signs as shown in the display in Figure 9 on page 17.


```

                                Design Symbol
Symbol ID . . . . : DEMOSET      Width . . . : 20   Length . . . : 2
Control . . . . .
  1.....2.....3.....4.....5.....6.....7.....8.....
01                                     +
.                                     +
.                                     +
.                                     +
.                                     +
.                                     +
.                                     +
.                                     +
02
.
.
.
.
.
.
.
.
F3=Exit   F9=Expand symbol   F12=Previous   F15=Print symbol

```

Figure 9. Design Symbol Display with Plus Signs for Horizontal Extension

Press F13 (Extend horizontally). APF extends the lines with asterisks, as shown in the display in Figure 10.

```

                                Design Symbol
Symbol ID . . . . : DEMOSET      Width . . . : 10   Length . . . : 10
Control . . . . .
  1.....2.....3.....4.....5.....6.....7.....8.....
01                                     *****
.                                     *****
.                                     *****
.                                     *****
.                                     *****
.                                     *****
.                                     *****
.                                     *****
02
.
.
.
.
.
.
.
.
F3=Exit   F9=Expand symbol   F12=Previous   F15=Print symbol

```

Figure 10. Horizontally Extended Design Symbol Display

Extending Lines Vertically

To extend lines vertically, type either a plus sign (+) or an equal sign (=), and press F14 (Extend vertically). APF takes the same action for both signs, but the plus sign operates on the width of the display and the equal sign operates on the width of the symbol. For both signs, APF replaces the sign with an asterisk, replaces all

blanks following the sign with asterisks, and replaces all asterisks following the sign with blanks.

For example, type plus signs as shown in the display in Figure 11.

```

                                Design Symbol
Symbol ID . . . . : DEMOSET           Width . . . : 10   Length . . . :
Control . . . . . : _____
1.....2.....3.....4.....5.....6.....7.....8.....
01  ++++++++          +          *****+***+*****
.                                     *****
.                                     *****
.                                     *****
.                                     *****
.                                     *****
.                                     *****
.                                     *****
.                                     *****
.                                     *****
02
.
.
.
.
.
.
.
.
.
.
F3=Exit   F9=Expand symbol   F12=Previous   F15=Print symbol

```

Figure 11. Design Symbol Display with Plus Signs for Vertical Extension

Press F14 (Extend vertically). APF extends the lines with asterisks, and replaces the asterisks under the plus sign near position 7 with blanks, as shown in the display in Figure 12.

```

                                Design Symbol
Symbol ID . . . . : DEMOSET           Width . . . : 10   Length . . . : 10
Control . . . . . : _____
1.....2.....3.....4.....5.....6.....7.....8.....
01  *****          *          *****
.       *****          **         *****
.       *****          ***         *****
.       *****          ****        *****
.       *****          ****        *****
.       *****          ****        *****
.       *****          ****        *****
.       *****          ****        *****
.       *****          ****        *****
02  *****          ****          *****
.       *****          ****          *****
.       *****          ****          *****
.       *****          ****          *****
.       *****          ****          *****
.       *****          ****          *****
.       *****          ****          *****
.       *****          ****          *****
.       *****          ****          *****
.       *****          ****          *****
F3=Exit   F9=Expand symbol   F12=Previous   F15=Print symbol

```

Figure 12. Vertically Extended Design Symbol Display

Expanding the Size of a Symbol

APF allows you to make small symbols larger without typing all the asterisks. If you press F9 (Expand symbol), APF presents the Symbol Expansion display. From the display, you can expand a symbol to the original specification. APF expands from left to right and top to bottom. Blanks are also expanded.

Specify the following factors on the Symbol Expansion display:

- *Height expansion factor.* Type a number that expands the character vertically. For example, if you type a 3, each asterisk appears as three asterisks in a vertical column.
- *Width expansion factor.* Type a number that expands the character horizontally. For example, if you type a 3, each asterisk appears as three asterisks in a horizontal row.

Note: If you specify an enlargement value that would expand beyond the original size, APF may truncate your symbol. If you make a mistake and expand a symbol unnecessarily, press F3 (Exit) to exit the Design Symbol display without automatically saving the symbol.

For example, type a symbol as shown in the display in Figure 13.

```
Design Symbol
Symbol ID . . . . : DEMOSET      Width . . . : 20  Length . . . . : 18
Control . . . . .
1.....2.....3.....4.....5.....6.....7.....8.....
01 *****
.  *
.  * * * *
.  *   *   *
.  * * * * *
.  * ***** *
.  *           *
.  *****
02
.
.
.
.
.
.
.
F3=Exit   F9=Expand symbol   F12=Previous   F15=Print symbol
```

Figure 13. Design Symbol Display with Sample Data to be Expanded

Press F9 (Expand). APF presents the Symbol Expansion display. On this display, type a 2 for both the *Height expansion factor* and *Width expansion factor* prompts. Press Enter. The Design Symbol display appears as shown in Figure 14 on page 20.

Chapter 3. Designing a Form

When you finish creating your symbol set, you need to define the layout of a form. Form descriptions are stored in the logical data base system file created and maintained by APF. This chapter describes how to design a form using the following steps:

- Select a form description or create a new form description.
- Change an existing form description or design a new form description.

Selecting a Form Description

You can select a form description to create, change, copy, delete, or print using the Work with Form Description display. You can also specify a new form description you will create. To see the current list of form descriptions, use the Work with Form Descriptions display.

Using the Work with Form Description Display

You reach the Work with Form Description display by selecting option 2 (Work with form descriptions) from the Advanced Printer Function display.

You can select the following options from the Work with Form Description display:

- **Option 1 (Create).** Create a new form description. Type the names of the form description, the form description file, and the library. APF presents the Create Form Description display (see “Creating a New Form Description” on page 22).
- **Option 2 (Change).** Change an existing form description. Type the names of the form description, the form description file, and the library. APF presents the Design Form Description display (see “Using the Design Form Description Display” on page 24).
- **Option 3 (Copy).** Copy an existing form description. Type the names of the form description you want to copy, the form description file, and the library. APF presents the Copy Form Description display (see “Using the Copy Form Description Display” on page 23).
- **Option 4 (Delete).** Delete the form description. You must have authority for the Delete File (DLTF) command.
- **Option 6 (Print).** Print the form description using the printer device file QPAPFPRT.

Type the following information on the Work with Form Description display:

- *File.* Type the name of the form description file.

To obtain a list of form descriptions in a file, type the names of the file and library containing the form descriptions, position the cursor in the *Form description* prompt, and press F4.

When you press F4, the *Option* prompt is ignored.

- *Library.* Type the name of the library containing the form description file.
- *Form description.* Type the name of the form description.

To see a list of form description files, type the name of the library containing the form description files, position the cursor in the *Library* prompt, and press F4 (List). APF presents the Work with Form Descriptions display. (APF ignores any requests in the *Opt* prompt when you press F4.)

Using the Work with Form Descriptions Display

The Work with Form Descriptions display presents a list of all current form descriptions. The names of the file and library containing the form descriptions are shown at the top of the display. Select a form description from the list to change, copy, or delete, or create a new form description.

To reach this display, type the names of a form description file and library on the Work with Form Description display, and press F4 (List).

You can select the following options from the Work with Form Descriptions display:

- **Option 2 (Change).** Change an existing form description. APF presents the Design Form Description display.
- **Option 3 (Copy).** Copy an existing form description. APF presents the Copy Form Description display.
- **Option 4 (Delete).** Delete the form description. You must have authority to use the Remove Member (RMVM) command.
- **Option 6 (Print).** Print a form description using the printer device file QPAPFPRT.

To create a new form description, press F6. APF presents the Create Form Description display.

Creating a New Form Description

You can specify the parameters (characters per inch, lines per form) for a new form description using the Create Form Description display. You can also create a form description by copying an existing description with the Copy Form Description display.

To create a new form description file, you must have authority for the Create Physical File (CRTPF) command. To create a new form description, you must have authority for the Add Physical File Member (ADDPFM) command. Use the Grant Object Authority (GRTOBAUT) and the Revoke Object Authority (RVKOB AUT) commands to change authorities for the data base files that make up a form description file.

Check with the security officer at your computer system before using any of these commands.

Using the Create Form Description Display

To reach the Create Form Description display, select option 1 (Create) from the Work with Form Description display. You can also specify a new form description on the Work with Form Descriptions display.

Type the following information on the Create Form Description display:

- *Form description.* Type the name of the form description. If you typed the name of a form description on the Work with Form Description display, APF places the name you specified in this prompt.

If the file containing the form description does not exist, APF sends a message indicating that a file is created for you when you press Enter.

- *Characters per inch.* Type the characters-per-inch (cpi) setting. Valid settings are 10 and 15.
- *Lines per inch.* Type the lines-per-inch (lpi) setting. Valid settings are 4, 6, 8, and 9.

Note: If symbols or special features (such as bar codes) are more than one line tall, use nine lines per inch or a horizontal gap appears at the end of each print line in the symbol.

- *Page width.* Type the page width in print positions. Valid entries are 2 through 198 print positions. If you select a print position greater than 132, then you must specify 15 characters per inch to print all the data.
- *Page length.* Type the page length in lines per page. Valid entries are 2 through 127. This parameter, along with lines per inch, determines the physical length of your form.
- *Text.* Type in text describing the form description.

When you finish typing this information, press Enter. APF presents the Design Form Description display.

Using the Copy Form Description Display

To reach the Copy Form Description display, select option 3 (Copy) from either the Work with Form Description display or the Work with Form Descriptions display.

Type the following information on the Copy Form Description display:

- *To form description.* Type the new name of the form description you want to copy.
- *Text.* Type in text describing the new form description.

The existing values for other parameters (such as lines per inch) show the current values from the form description being copied.

When you finish typing this information, press Enter. APF presents the Design Form Description display.

Changing an Existing Form Description

You can change an existing form description using the Design Form Description display. For an existing form description, you reach this display by selecting option 2 (Change) from the Work with Form Description display.

Designing a New Form Description

You can design a new form description using the Design Form Description display. For a new form description, you reach this display by completing the Create Form Descriptions display.

Using the Design Form Description Display

You can use the Design Form Description display to change or create a form description. For an existing description, the display appears with the current dot pattern. For a new description, the display contains no data.

The Design Form Description display is divided into two parts. You specify constant data on the top part of the display and special print features in the bottom part of the display.

Using the Function Keys

Use the following function keys on the Design Form Description display:

Table 3. Definition of Function Keys

Function Key	Name of Function Key	Description
F3	Exit	Exits from the Design Form Description display and saves the form.
F9	Box characters	Presents the Box Characters display and allows you to select the characters you will use to create boxes (see "Boxes" on page 37 for more information).
F12	Previous	Returns to the previous display and saves the form description. From the Design Form Description display, the F3 (Exit) and F12 (Previous) work the same.
F19		Moves the display left one display width.
F20		Moves the display right one display width.
Page Down		Moves the display up 10 lines.
Page Up		Moves the display down 10 lines.
Help		Shows online help information
Print		Prints the current display.

Specifying Constant Data on a Form

You specify the fields you want to appear as constants on the form in the top part of the display. Column numbers across the top of the display correspond to the column number on the form. Line numbers along the left side correspond to the lines on the page.

Positioning the Display

If the form is too large to show on the display at one time, you can position the display over portions of the form using the *Control* prompt and page keys.

The *Control* prompt is in the top left corner of the Design Form Description display. Use this prompt to look at different portions of a form description. (For more information, see "Using the Control Prompt" on page 15.)

Use Page Down, Page Up, F7, and F8 to display features that apply to a particular line. Position the cursor in the *Opt* prompt on the Design Form Description display and press any of these keys.

Page Down moves the display up 9 lines from the top line. If the cursor is on one of the three lines used to define features and a plus sign (+) appears in the lower right portion of the display, the features roll up 3 lines. If the cursor is on the last line of the display, messages roll. If the cursor is elsewhere on the display, the form layout rolls.

Page Up moves the display down 9 lines from the top row. If the cursor is on one of the three lines used to define features, the features roll down 3 lines. If the cursor is on the last line of the display, messages roll. If the cursor is elsewhere on the display, the form layout rolls.

Specifying Features on a Form

You can specify **features** for prompts on the form using the second part of the Design Form Description display. APF supports the following features:

- Symbol sets
- Bar codes
- Characters-per-inch settings of 10 and 15
- Highlighting
- Underlining
- Bar charts
- Boxes.

When you type a feature in this area, the feature is always applied to the top line on the current display.

Symbol Sets

Use symbol sets to print large characters, logos, and other dot patterns. To use a symbol set, select option 1 (Symbol set) from the display. This selection indicates to APF that you are using a symbol set. Place symbol IDs in the correct positions in the form description. APF looks for symbol IDs in the area of the form you specify, and replaces the IDs with the correct symbol. You can use up to 20 symbol sets in one form description.

Specifying Symbol Sets: Use the following procedure to specify that a symbol set is to be used:

1. Position the line containing the symbol IDs at the top of the display.
2. Type a 1 in the *Opt* prompt to select option 1 (Symbol set). The words Features for 1 line: 1 just above the features section mean that the feature you type is applied to line 1.
3. Type the following information:
 - *Column*. The starting column number.
 - *Width*. The width (in print positions) of the symbol set field.
 - *Parm 1*. The symbol set name.
 - *Parm 2*. The file name.
 - *Parm 3*. The library name.

Positioning Symbol IDs: By selecting option 1 (Symbol set), APF knows that certain parts of the form contain symbol IDs. There are two ways to provide symbol IDs:

- Insert symbol IDs as constants. Position the cursor on the correct line and column number, and type the symbol ID.

- Put symbol IDs in a spooled file, and merge the spooled file with the form description. (Merging is discussed in Chapter 5, “Merging Spooled Data into a Form.”)

When you set up your form description so a symbol set applies to a specific position (for example, to line 3 and column 4 with a width of 10 positions), you must ensure that the spooled file contains the appropriate symbol IDs at that position.

Spacing Symbol IDs: APF looks for symbol IDs in the column number specified by the symbol set. If there is no symbol ID, APF scans the next nonblank character within the width of the feature. Once a nonblank character or characters is found, APF checks for the symbol ID in the specified symbol set. If the symbol is in the set, APF replaces it with the correct symbol for the printed form. APF then looks for the next symbol ID at the point at which processing ends.

Example: Assume you have created a symbol set named BIGLETTERS, in file SYMBOLDEMO and library DEMOLIB. Type this information in the *Parm 1*, *Parm 2*, and *Parm 3* prompts on the display. Type a 1 in the *Opt* prompt. Type symbol IDs for the letters A, B and C on the display as you want the symbols to print. The display in Figure 16 shows this data typed in.

```

                                Design Form Description
Form . . . . : DEMOFORM      Length . . . : 33      Width . . . : 100
Control . . . : _____
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001  A  B  C
002
003
004
005
006
007
008
009
_____+
                                Features for Line 1
Type options for top line currently being displayed, press Enter.
1=Symbol set  2=Bar code  3=CPI
4=Highlight  5=Underline  6=Chart
Opt   Column   Width   Parm 1   Parm 2   Parm 3
1     1        20     BIGLETTERS SYMBOLDEMO DEMOLIB
F3=Exit  F9=Define box characters  F12=Previous

```

Figure 16. Design Form Description Display with Symbols from Symbol Set BIGLETTERS

In this example, you defined A to start in column 1 and be 20 positions wide. APF starts looking for a symbol ID in column 1, but does not find a symbol ID until column 4. In this situation, the symbol ID is A. Because A is a valid symbol ID and is contained in the symbol set BIGLETTERS, APF performs the necessary processing and starts looking for the next symbol ID. Since the symbol with a symbol ID of A is three print positions wide, APF starts looking for the next symbol ID at the location of the start of the previous symbol ID (4 in this case) plus the width of the previous symbol (3). As a result, APF starts looking for the next symbol ID in position 7 (4 + 3). If no symbol ID is found at that position, APF scans until the next nonblank character is found. This process continues until one of the following occurs:

- The entire width of the feature is processed.

- A symbol ID is found that is not in the symbol set. (In this case, APF sends a message indicating the symbol ID was not found at its location.)

Figure 17 shows how the symbols look when printed.



Figure 17. Printed Symbols from Symbol Set BIGLETTERS

Bar Codes

Bar codes are a series of wide and narrow vertical bars used to put into code data that is decoded by an optical scanning device. APF creates the following bar codes:

- Code 39
- PLESSEY (MSI) modified
- Universal Product Code (UPC) version A
- Universal Product Code (UPC) version E
- European Article Number (EAN) 8 digit
- European Article Number (EAN) 13 digit.

Using Bar Codes: To use bar codes, select option 2 (Bar code) from the Design Form Description display, and type the following information:

- *Column.* Type the starting column number.
- *Width.* Type the number of digits for the bar code.
- *Parm 1.* Type the type of bar code. Valid entries are CODE39, UPCA, UPCE, EAN8, EAN13, or PLESSEY.
- *Parm 2.* Type the height of the bar code in lines. Valid entries are 4, 5, 6, 7, 8, or 9. The default value is 4 lines.

Use these guidelines to develop an application using bar codes:

- Test bar codes in conjunction with the scanning device.
- Use nonglossy paper.
- Make sure the printer ribbon is not excessively worn.
- Use 15 characters per inch.

Make sure data that follows the bar code is placed so that it does not fall within fields specified as 15 characters per inch. If this occurs, the data is set to blanks before the bar code is inserted.

- Use 9 lines per inch.
- Do not print other symbols, charts, or boxes on the same line.
- Do not use overprinting, highlighting, or underlining on the same line.

Specifying Code 3 of 9 Bar Codes: Code 3 of 9 bar codes vary in width. APF allows you to use up to 32 characters to create a Code 3 of 9 bar code. APF recognizes the following as valid entries:

- 0 through 9
- A through Z

- -, ., \$, /, +, %, and blank space.

APF processes Code 3 of 9 bar codes until it reaches the specified width parameter or until it finds a character it does not recognize.

An alternative way to specify a variable length bar code is to place an asterisk (*) before the first digit and an asterisk after the last. For example, *1234* requests a 4-digit bar code. When the first character of a bar code field is an asterisk, APF ignores the width parameter.

To obtain a space between the bottom of the variable-length Code 3 of 9 bar code and the numbers printed, type an S in the *Parm 2* prompt. If the *Parm 2* prompt is empty, APF does not insert space between the bottom of the Code 3 of 9 bar code and the numbers printed.

Use the following algorithm to determine the width of a Code 3 of 9 bar code in print positions at 15 characters per inch:

$$\text{Code 3 of 9 width} = [(\text{Number of characters} + 2) * 28] / 9$$

Add 1 to the result if there is a remainder after the division.

For example, suppose you use 10 digits for your Code 3 of 9 bar code. The printed width, with a remainder, is then:

$$[(10 + 2) * 28] / 9 = 37$$

Since there is a remainder, add 1 to the result. The printed width is 38 print positions at 15 characters per inch.

Example: The Design Form Description display in Figure 18 shows how to specify a Code 3 of 9 bar code.

Design Form Description

Form : BARCODES Length . . . : 33 Width : 10
Control : _____

*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001 1234567890
002
003
004
005
006
007
008
009

Features for Line 1

Type options for top line currently being displayed, press Enter.
1=Symbol set 2=Bar code 3=CPI
4=Highlight 5=Underline 6=Chart

Opt	Column	Width	Parm 1	Parm 2	Parm 3
2	1	10	CODE39	_____	_____

F3=Exit F9=Define box characters F12=Previous

Figure 18. Design Form Description Display Specifying Code 3 of 9 Bar Code

Figure 19 on page 29 shows a printed Code 3 of 9 bar code.



Figure 19. Code 3 of 9 Bar Code

Specifying PLESSEY Bar Codes: Modified PLESSEY (MSI) bar codes vary in width. APF allows you to use up to 15 characters to create a PLESSEY bar code. Valid entries are the digits 0 through 9. APF creates two modulus 10 check digits for PLESSEY bar codes.

APF processes PLESSEY bar codes until it reaches the specified width parameter or until it finds a character it does not recognize.

Use the following algorithm to determine the width of a PLESSEY bar code in print positions at 15 characters per inch:

$$\text{PLESSEY width} = \{[(\text{Number of digits} + 2) * 28] + 13\} / 9$$

Add 1 to the result if there is a remainder after the division.

For example, suppose you use 10 digits for your PLESSEY bar code. The printed width, with a remainder, is then:

$$\{[(10 + 2) * 28] + 13\} / 9 = 38$$

Because there is a remainder, add 1 to the result. The printed width is 39 print positions at 15 characters per inch.

Example: The Design Form Description display in Figure 20 shows how to specify a PLESSEY bar code.

```

                                Design Form Description
Form . . . . . : BARCODES      Length . . . . . : 33      Width . . . . . : 100
Control . . . . : _____
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001 1234567890
002
003
004
005
006
007
008
009
_____ +
                                Features for Line 1
Type options for top line currently being displayed, press Enter.
  1=Symbol set   2=Bar code   3=CPI
  4=Highlight    5=Underline  6=Chart
Opt   Column    Width   Parm 1   Parm 2   Parm 3
  2     1        10     PLESSEY  _____
F3=Exit   F9=Define box characters  F12=Previous
  
```

Figure 20. Design Form Description Specifying PLESSEY Bar Code

Figure 21 on page 30 shows a printed PLESSEY bar code.



HRSLF004-0

Figure 21. PLESSEY Bar Code

Specifying UPC Bar Codes: Universal Product Code (UPC) bar codes are widely used for labeling grocery items and come in several versions. APF supports two of these versions: UPC A and UPC E. UPC bar codes are a standard length. For both versions, valid entries are digits 0 through 9. No other characters are valid in UPC bar codes.

The differences between the UPC A and UPC E bar codes are:

- UPC A bar codes have 1 digit identifying the number system, 10 data digits, and 1 check digit. APF automatically creates the check digit. You supply the number system and the data digits. Since you supply 11 digits, type 11 for the width parameter.
 UPC E bar codes have 6 data digits. UPC E bar codes created by APF implicitly have a number system of 0. Since you supply 6 digits, type 6 for the width parameter.
- UPC A bar codes require 23 print positions at 15 characters per inch.
 UPC E bar codes require 13 print positions at 15 characters per inch.

Example: The Design Form Description display in Figure 22 shows how to specify a UPC A and UPC E bar code.

```

Design Form Description
Form . . . . . : BARCODES      Length . . . . . : 33      Width . . . . . : 10
Control . . . . : _____
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001 1234567890                123456
002
003
004
005
006
007
008
009
_____ +
Features for Line 1
Type options for top line currently being displayed, press Enter.
1=Symbol set      2=Bar code      3=CPI
4=Highlight       5=Underline     6=Chart
Opt   Column      Width   Parm 1   Parm 2   Parm 3
2     1           11     UPCA    _____
2     35          6      UPCE    _____
F3=Exit      F9=Define box characters  F12=Previous
  
```

Figure 22. Design Form Description Display Specifying UPC A and UPC E Bar Codes

Figure 23 on page 31 shows printed UPC A and UPC E bar codes.



Figure 23. UPC A and UPC E Bar Codes

Specifying EAN Bar Codes: European Article Number (EAN) bar codes are similar in design and function to UPC bar codes. EAN codes are a standard length.

APF supports two versions of EAN codes: EAN 13 and EAN 8. For both versions, valid entries are the digits 0 through 9.

The differences between the EAN 13 and EAN 8 bar codes are:

- EAN 13 bar codes have 12 digits you provide and 1 check digit. APF creates the check digit automatically. Since you supply 12 digits, type 12 for the width parameter.
- EAN 8 bar codes have 7 digits you provide and 1 check digit. APF creates the check digit automatically. Since you supply 7 digits, type 7 for the width parameter.
- EAN 13 bar codes require 25 print positions at 15 characters per inch.
- EAN 8 bar codes require 17 print positions at 15 characters per inch.

Example: The Design Form Description display in Figure 24 shows how to specify EAN bar codes.

```

Design Form Description
Form . . . . . : BARCODES      Length . . . . . : 33      Width . . . . . : 100
control . . . . : _____
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001 12345678901                0123456
002
003
004
005
006
007
008
009
-----+
Features for Line 1
Type options for top line currently being displayed, press Enter.
1=Symbol set      2=Bar code      3=CPI
4=Highlight      5=Underline    6=Chart
Opt  Column      Width      Parm 1      Parm 2      Parm 3
2    1           12        EAN13      _____
2    35          7         EAN8       _____
F3=Exit      F9=Define box characters      F12=Previous

```

Figure 24. Design Form Description Display Specifying EAN 13 and EAN 8 Bar Codes

Figure 25 on page 32 shows printed EAN 13 and EAN 8 bar codes.

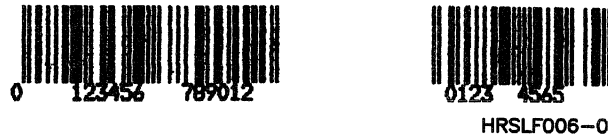


Figure 25. EAN 13 and EAN 8 Bar Codes

Characters Per Inch

With APF, you can print some fields at 10 characters per inch (CPI) and print others at 15 characters per inch within the same line.

If you select option 3 (CPI) to print a certain field at an alternative characters-per-inch setting, indicate the following:

- *Column.* Type the starting column number.
- *Width.* Type the width (in print positions) of the field.
- *Parm 1.* Type the actual setting being used. Valid entries are 10 and 15.

Column numbers do not line up between 10 characters per inch and 15 characters per inch. For example, column 30 at 15 characters per inch is 2 inches from the left edge of the form; at 10 characters per inch, column 20 is 2 inches from the left edge of the form. In some cases, it is not possible to find a corresponding column number. For example, column 2 at 15 characters per inch is column 1-1/3 at 10 characters per inch, but the printers cannot move fractions of a column.

To avoid confusion, the column numbers displayed along the top of the Design Form Description display are the column numbers that relate to the characters per inch setting you specified for your form description.

Specifying the Characters per Inch: Keep the following in mind when you use the characters per inch feature:

- To make your data print in the correct position, APF calculates the new scale based on the original scale of the column numbers. For example, suppose you create a file and specify 10 characters per inch on the Create Form Description display. Then you specify a field to print at 15 characters per inch beginning in column 20. The column number you specify is the column that relates to 10 characters per inch. APF must adjust the scale of this column to 15 characters per inch. APF uses the following algorithms to adjust the scale of column numbers:

- If your form description is at 10 characters per inch and your field is at 15 characters per inch:

$$\text{Mapped column} = (\text{Column specified at 10 cpi} * 3) / 2$$

APF truncates the result to the nearest integer.

For example:

$$\text{Column 2 specified at 10 cpi} = (2 * 3) / 2 = 3 \text{ at 15 cpi}$$

- If your form description is at 15 characters per inch and your field is at 10 characters per inch, the algorithm is a bit more complicated to avoid a result of 0:

$$\text{Mapped column} = (((\text{Column specified at 15}) - 1) * 2) / 3 + 1$$

APF truncates the result to the nearest integer.

For example:

Column 2 specified at 15 cpi = $[(2 - 1) / 3] + 1 = 1$ at 10 cpi

- You can specify fields to overlap if your form description is set at 15 characters per inch and you specify a field to print at 10 characters per inch. To avoid overprinting, remember a character at 10 characters per inch is 1 – 1/2 times as wide as a character at 15 characters per inch. Design your form description accordingly.

Example: The Design Form Description display in Figure 26 shows how to use the characters-per-inch feature.

```
Design Form Description
Form . . . . : DEMOCPI      Length . . . : 33      Width . . . : 100
Control . . . : _____
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001 Data at 10 CPI Data at 15 CPI Data at 10 CPI Data at 15 CPI
002
003
004
005
006
007
008
009
_____ +
                          Features for Line 1
Type options for top line currently being displayed, press Enter.
 1=Symbol set   2=Bar code   3=CPI
 4=Highlight    5=Underline  6=Chart
Opt  Column    Width    Parm 1    Parm 2    Parm 3
 3     16       14       15       _____
 3     46       14       15       _____
F3=Exit    F9=Define box characters    F12=Previous
```

Figure 26. Design Form Description Display Using the Characters per Inch Feature

Figure 27 shows data from the previous display printed at 10 characters per inch and 15 characters per inch.

```
Data at 10 CPI Data at 15 CPI      Data at 10 CPI Data at 15 CPI
HRSLF007-0
```

Figure 27. Data Printed at 10 Characters Per Inch and 15 Characters Per Inch

Highlighting

APF highlights fields by printing them darker than other fields. Highlighting is done by printing a field three times.

Select option 4 (Highlight) from the Design Form Description display to highlight a field. Type the following information:

- *Column.* The starting column number.
- *Width.* The width (in print positions) of the highlighted field.

Do not highlight fields that specify symbol sets, charts, boxes, bar codes, or spooled data that overprints.

Underlining

APF supports two types of underlining. You can underline all data in a field, including blanks, or underline only nonblank data. Select option 5 (Underline) from the Design Form Description display to underline a field. Type the following information:

- **Column.** Type the starting column number.
- **Width.** Type the width (in print positions) of the underlined field.
- **Parm 1.** Specify the type of underlining to perform:
 - ALL underlines all data, including blanks. This is the default value.
 - NONBLANK underlines only nonblank data fields.

Do not underline fields that specify symbol sets, charts, boxes, bar codes, or spooled data that overprints.

Example: The Design Form Description display in Figure 28 shows how to use the highlighting and underlining features.

Design Form Description

```

Form . . . . : DEMOFORM      Length . . . : 33      Width . . . : 100
Control . . .
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001 Highlighted  Underline ALL and Highlight  Underline NONBLANK only
002
003
004
005
006
007
008
009

```

Features for Line 1

Type options for top line currently being displayed, press Enter.

1=Symbol set 2=Bar code 3=CPI
4=Highlight 5=Underline 6=Chart

Opt	Column	Width	Parm 1	Parm 2	Parm 3
4	5	41	_____	_____	_____
5	15	27	ALL	_____	_____

F3=Exit F9=Define box characters F12=Previous

Figure 28. Design Form Description Display for Highlighting and Underlining

More features can be added on this display by using Page Down. Pressing Page Down presents two new lines for feature entries. On the following Design Form Description display, a third feature entry is shown.

Features for Line 1

Type options for top line currently being displayed, press Enter.

1=Symbol set 2=Bar code 3=CPI
4=Highlight 5=Underline 6=Chart

Opt	Column	Width	Parm 1	Parm 2	Parm 3
5	45	23	NONBLANK	_____	_____

F3=Exit 9=Define box characters F12=Previous







Figure 29 on page 35 shows printed data from the previous display that is highlighted and underlined.

Figure 29. Highlighted and Underlined Fields

Bar Charts

You can use APF to create **bar charts**. In APF, bar charts are a series of vertical bars used to represent data. Bar charts are effective ways to present data in a visual form. The APF bar chart feature is similar to the symbol set feature. Both features use symbol IDs to indicate the dot pattern to be printed. Unlike symbol sets, bar chart symbols are defined internally and are not part of a symbol set.

Bar Chart Symbols: Figure 30 shows the bar chart symbols you use with APF to specify a bar chart.

Symbol ID	Description
1	 Darken the entire print position
2	 Darken the bottom half of a print position
3	 Use the symbol which looks like a box with an X inside
4	 Use half of the bar chart symbol described above
5	 Use the symbol which looks like a box
6	 Use half of the symbol described above

HRSLF010-0

Figure 30. Bar Chart Symbols

You provide APF with a symbol ID corresponding to the symbol you want to appear in the chart. Place the bar chart symbol ID as a constant in your form description or insert the symbol ID in a spooled file to be merged with APF. APF ensures the correct symbol appears on the printed form.

Use symbols 2, 4, and 6 to plot each print line as two units. If you select the EXTEND option and specify half symbols (2, 4, or 6) at the top of a bar, APF fills the remaining portion with whole symbols (1, 3, or 5).

Specifying Bar Charts: Type the following to specify a bar chart:

- *Column.* Type the starting column number.
- *Width.* Type the width (in print positions) of the region where the bar chart is to appear.
- *Parm 1.* Select the bar chart option:
 - SINGLE performs a one-to-one replacement of bar chart symbol IDs with bar chart dot patterns. This is the default value.

- EXTEND scans down a column until a bar chart symbol ID is found. APF then replaces that ID with the corresponding dot pattern and moves down to the next line in the column. If the character in this position is a blank, APF substitutes the same dot pattern used before. If the character is the ID for a different bar chart symbol, the dot pattern for that symbol is used. If APF encounters any other characters, it assumes that a horizontal axis has been reached, moves on to the next column and starts the procedure again.

When you have defined the region where your bar chart is to appear, APF scans the region for bar chart symbol IDs. Scanning starts in the first column in the bar chart region. APF processes column by column, left to right, until the entire region is scanned. The bottom of a bar chart is established by the characters you provide that mark the horizontal axis. You can use APF box characters to mark the vertical and horizontal axis, but this is not a requirement (see “Boxes” on page 37 for further details). Unless you provide a horizontal axis, APF scans to the bottom of the form for bar chart symbols.

If you use bar charts, specify 9 lines per inch or a horizontal gap appears at the end of each line.

Example: The Design Form Description display in Figure 31 shows how to specify a bar chart.

```

                                Design Form Description
Form . . . . . : BARCHART      Length . . . . . : 33      Width . . . . . : 100
Control . . . .
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001 Sample bar charts |      4  5 |
002                   |      3  5 |
003                   |  2 36 63 |           3
004                   |  1 4 35 53 |           4 4  6
005                   |  1 3 35 53 |           3  5  5
006                   |  1 3 35653 |           2  6  3
007                   | 113335551 |           1
008                   | 2113335551 |           1
009                   +-----+
+-----+
                                Features for Line 1
Type options for top line currently being displayed, press Enter.
  1=Symbol set    2=Bar code    3=CPI
  4=Highlight     5=Underline   6=Chart
Opt   Column      Width      Parm 1    Parm 2    Parm 3
  6    23          11         SINGLE   _____
  6    50          10         EXTEND   _____
F3=Exit   F9=Define box characters   F12=Previous

```

Figure 31. Design Form Description Display Specifying a Sample Bar Chart

Figure 32 on page 37 shows the bar charts from the previous display.

Sample bar charts

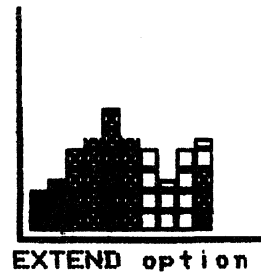
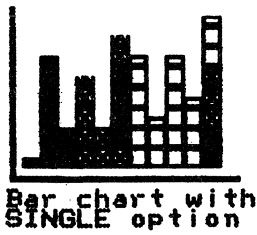


Figure 32. Bar Charts

Boxes

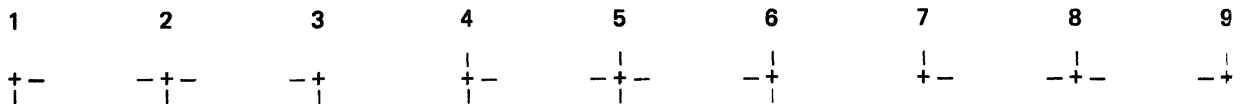
You can draw boxes on forms using APF. Use the boxes to provide the axis on a bar chart, lay out the columns on an invoice, or provide a map of an office. You supply the characters where you want vertical and horizontal lines and corners. APF substitutes the appropriate characters to draw a box.

Specifying Boxes: To specify the characters you use to draw a box, press F9 (Box characters) on the Design Form Description display. APF presents the Define Box Characters display. Type the following information on the Define Box Characters display:

- *Character for corners and intersections.* The character to be used to identify two intersecting lines or a corner.
- *Character for horizontal lines.* The character to be used to identify the horizontal lines in a box.
- *Character for vertical lines.* The character to be used to identify the vertical lines in a box.
- *Scan for box characters.* Type Y and APF scans the data for box characters. Type N and APF does not scan for box characters. You can improve performance slightly by typing the default setting of N (do not scan).

Designing Boxes: Follow these rules when designing boxes:

- Use 9 lines per inch.
- Use only the following nine types of corners shown in Figure 33.



HRSLF011-0

Figure 33. Valid Corners for Boxes

For each corner shown, a corner symbol can take the place of a vertical or horizontal line. For example, corner number 1 could also be represented as shown in Figure 34 on page 38.

```

++
+
HRSLF012-0

```

Figure 34. Another Example of Corner #1

- Each horizontal line (-) on a line containing a valid corner is replaced with a solid horizontal bar.
- Each vertical line (|) in a column containing a valid corner is replaced with a solid vertical bar.

The rules just listed and the following example applies to boxes that are formed using the following characters:

- † (hex 4E) for all corners and line intersections
- - (hex 60) for all horizontal lines
- | (hex 4F) for all vertical lines

Example: The Design Form Description display in Figure 35 shows examples of boxes that are created using the above characters.

```

                                Design Form Description
Form . . . . . : BOXDEMO          Length . . . . : 33      Width . . . . : 100
Control . . . . : _____
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001 +-----+
002 |         |                   +-----+-----+
003 |         +---+               |         |         |
004 +-----+ |                   |         |         |
005          ++++++ |||||         +---+---+---+---+---+
006          ++++++ |||||+-----+ |         |         |
007          ++++++ |||||+-----+ |         |         |
008          | |         ||+-----+ |         |         |
009  ---+---+---         |+-----+ |         |         |
                                +-----+
                                Features for Line 1
Type options for top line currently being displayed, press Enter.
  1=Symbol set    2=Bar code    3=CPI
  4=Highlight     5=Underline   6=Chart
Opt  Column      Width        Parm 1    Parm 2    Parm 3
-    -          -            -          -          -
F3=Exit  F9=Define box characters  F12=Previous

```

Figure 35. Design Form Description Display Specifying Sample Boxes

Figure 36 on page 39 shows the boxes when printed.

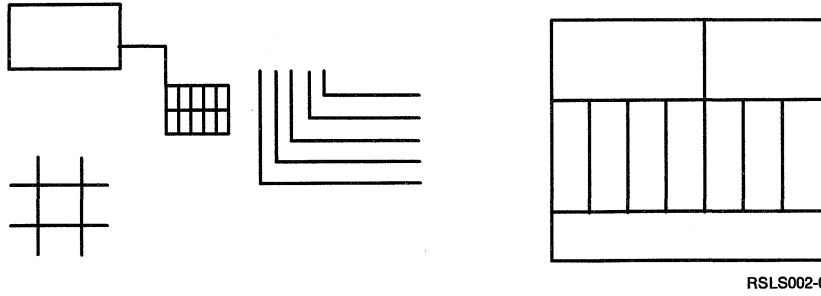


Figure 36. Boxes

Deleting Features on a Form

To delete a feature, remove the information in the *Opt* prompt and press Enter.

Chapter 4. Printing Copies of a Form

This chapter describes how to print blank copies of your form description.

Selecting a Form Description to Print

You select a form description to print from the Print Blank Form display. To see a list of the current form descriptions, use the Print Blank Forms display.

Using the Print Blank Form Display

You reach the Print Blank Form display by selecting option 3 (Print form descriptions) from the Advanced Printer Function display.

Type the following information on the Print Blank Form display:

- *File.* Type the name of the form description file.
- *Library.* Type the name of the library that contains the form description file.
- *Form description.* Type the name of the form description you want to print.

To see a list of forms in a form description file, position the cursor in the *File* prompt, type the names of a form description file and library, and press F4 (List). APF presents the Print Blank Forms display.

Using the Print Blank Forms Display

You reach this display by typing the names of a form description file and library and pressing F4 (List).

Selecting option 6 (Print) for a specific form description, prints that form description. APF presents the Print Options (Page 1 of 2) display.

Selecting Options for Printing the Form

You can select several options for printing the form, including the number of copies to print, which printer to use, and whether to spool data. Select these options from the Print Options (Page 1 of 2) display and the Print Options (Page 2 of 2) display.

Using the Print Options (Page 1 of 2) Display

You reach this display by typing the names of an existing form description and form file on the Print Blank Form display. You can also reach this display by selecting option 6 (Print) for a form description on the Print Blank Forms display.

The form description and file names on the Print Blank Forms display are set to values typed on previous displays. For example, if you type the name of a form description on the Print Blank Form display, the name carries over to the corresponding prompt on the Print Blank Forms display. Other prompts have default values shown. *FILE means that APF uses the value specified in the printer device file QPAPFPRT.

To see a list of valid values for a particular parameter, position the cursor in the prompt for which you want to see the list, and press F4 (List). After you select a value from the list, APF returns you to the prompt display.

Type the following on the Print Options (Page 1 of 2) display:

- *Form description.* The name of the form description you want to print.
- *File.* The name of the form description file.
- *Library.* The name of the library that contains the form description.
- *Printer.* The name of the printer. *FILE uses the device specified in the printer device file QPAPFPRT.
- *Number of copies.* The number of copies you want printed. This value only applies for spooled files. Valid entries are 1 to 255. The default value is 1.

To see additional, less frequently used parameters, press Page Down on the Print Options (Page 1 of 2) display. APF presents the Print Options (Page 2 of 2) display.

Using the Print Options (Page 2 of 2) Display

You reach this display by pressing Page Down on the Print Options (Page 1 of 2) display.

Each parameter on this display has a common default value.

Type the following information on the Print Options (Page 2 of 2) display:

- *Spool the data.* Type *YES to spool the data to an output file. Type *NO if you want APF to send your output data directly to a device. The default is *YES.
- *Output queue.* Type the name and library of the output queue. The default is *FILE, which uses the output queue specified in the printer device file QPAPFPRT.
- *Library.* Type the name of the library that contains the output queue.
- *Form type.* Type the name of the form type you want to spool to the output file. The default is *FILE.
- *Spooled file.* Type the name of the form on the spool queue. The default value is *FRMD, which uses the form description name as the output file name.
- *Schedule.* Select when the data is to be made available to the spooled writer:
 - *FILE uses the value specified in the printer device file QPAPFPRT. This is the default value.
 - *FILEEND makes the output file available when the end of the file is reached.
 - *JOBEND makes the output file available when the job is completed.
 - *IMMED makes the the output file available immediately.
- *Job description.* Type the name of the **job description**. (A job description is a system object that defines how a job is to be processed. The name of this system object is *JOBD.) Type *NONE to indicate that printing is done under the current job description. QBATCH is the default.
- *Library.* Type the name of the library that contains the job description.

Chapter 5. Merging Spooled Data into a Form

You have used APF to design all the elements of your form. This chapter describes how to merge data from a spooled output data file with your form description. You can use APF interactively or you can access APF using the MRGFORMD (Merge Form Description) command.

Selecting a Form Description to Merge

You can select a form description to merge using the Merge Form Description display. To see a list of the current form descriptions, use the Merge Form Descriptions display.

Using the Merge Form Description Display

You reach the Merge Form Description display when you select option 4 (Merge spooled data with a form description) from the Advanced Printer Function display.

Type the following information on the Merge Form Description display:

- *File.* Type the name of the form description file.
- *Library.* Type the name of the library that contains the form description file.
- *Form description.* Type the names of the form description you want to merge.

Note: Make sure the layout of the data matches the layout of the form description, or results that cannot be predicted may occur.

To see a list of forms in a form description display, type the name of a form description file and library, and press F4 (List). APF presents the Merge Form Descriptions display.

Using the Merge Form Descriptions Display

You reach the Merge Form Descriptions display by typing a file and library name and pressing F4 (List) on the Merge Form Description display.

On the Merge Form Descriptions display, select option 6 (Merge) for a specific form description, and press Enter. APF presents the Print Option (Page 1 of 2) display.

Selecting Options for Merging

You can select options for the merge phase, including the number of copies to merge and print, which printer to use, and whether to spool data. You can select these options from the Print Options (Page 1 of 2) display and the Print Options (Page 2 of 2) display.

Using the Print Options (Page 1 of 2) Display

You reach this display by typing the names of an existing form description and form file on the Merge Form Description display and pressing Enter. You can also reach this display by selecting option 6 (Merge) for a form description from the Merge Form Descriptions display.

The form description and file names on the Print Options (Page 1 of 2) display are set to values typed on previous displays. For example, if you typed the name of a form description on the Advanced Printer Function display, the name carries over to

the corresponding prompt on the Print Options (Page 1 of 2) display. Other prompts have the default values shown. *FILE means that APF uses the value specified in the printer file QPAPFPRT.

To see a list of valid values for a particular parameter, position the cursor in the prompt for which you want to see the list, and press F4 (List). After you select a value from the list, APF returns you to the prompt display.

Select the following options from the Print Options (Page 1 of 2) display:

- *Form description.* Type the name of the form description you want to merge with spooled data.
 - *File.* Type the name of the form description file.
 - *Library.* Type the name of the library that contains the form description file.
 - *Spooled file.* Type the name of the spooled file you want to merge with the form description.
 - *Job name.* Type the job name of the spooled file.
 - *User.* Type the user name for the spooled file.
 - *Number.* Type the job sequence number for the spooled file.
 - *Spooled file number.* Type the spooled file number:
 - *LAST specifies the highest numbered spooled output file with that specific name to be copied. This is the default value.
 - *ONLY specifies that only one file in this job has this name.
- If you specify *ONLY and more than one spooled output file has the specified name, APF sends an error message.
- *Printer.* Type the name of the printer. *FILE uses the device specified in the printer device file QPAPFPRT.
 - *Number of copies.* (This value applies only to spooled files.) Type the number of copies you want merged and printed. Valid entries are 1 to 255. The default is 1.

To see additional, less frequently used parameters, press Page Down. APF presents the Print Options (Page 2 of 2) display.

Using the Print Options (Page 2 of 2) Display

You reach this display by pressing Page Down on the Print Options (page 1 of 2) display.

Each parameter on the secondary display has a common default value.

Type the following information on the Print Options (Page 2 of 2) display:

- *Spool the data.* Type *YES to spool output. Type *NO if you want APF to send the output file directly to a device. The default is *YES.
- *Output queue.* Type the name of the output queue. The default is *FILE, which uses the output queue in the printer device file QPAPFPRT.
- *Library.* Type the name of the library that contains the output queue.
- *Form type.* Type the name of the form type. The default is *FILE.

- *Spool output file.* Type the name of the printed form on the spool queue. The default value is *FRMD, which directs APF to use the form description name as the output file name.
- *Schedule.* Select this option when the spooled output file is made available to the spool writer.
 - *FILE uses the value specified in the printer device file QPAPFPRT. This is the default value.
 - *FILEEND makes the spooled output available when the end of the file is reached.
 - *JOBEND makes the spooled output available when the job is completed.
 - *IMMED makes the spooled output available immediately.
- *Job description name.* Type the name and library of the job description. Type *NONE to indicate that printing is done under the current job description. QBATCH is the default.

When you finish typing these values, press Enter to begin merging the requested report or form. Press F3 (Exit) to return to the Advanced Printer Function display without printing the report or form.

Using the Merge Phase with a Batch Job

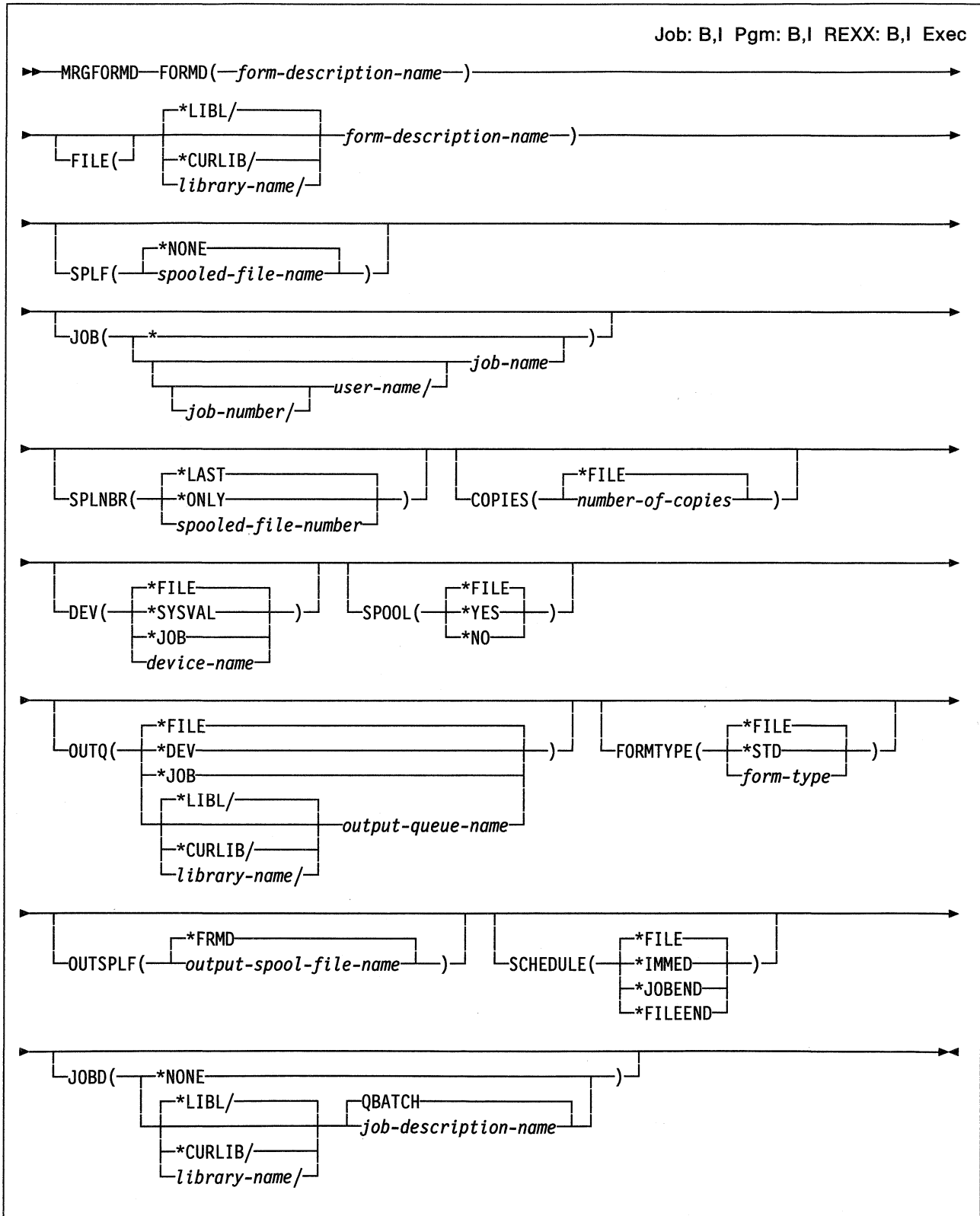
APF allows you to merge spooled files with a form description from a **batch job** (a predefined group of processing actions that are performed by the system with little or no interaction between you and the system).

Before running APF with a batch job, you must:

- Create the necessary symbol sets.
- Create your form description.
- Produce spooled output files.

You can use the Merge Form Description (MRGFORMD) command to merge or copy form descriptions from a batch job. Refer to “Using the MRGFORMD (Merge Form Description) Command” on page 46 for more information about this command.

Using the MRGFORMD (Merge Form Description) Command



Purpose

The Merge Form Description (MRGFORMD) command merges a spooled output data file with a database file containing a form description. The form description, which is designed using the Start Advanced Printer Function (STRAPF) command, contains the headings and labels that organize the data from the spooled output file. The output can be spooled for later printing, or can be directed immediately to a printer.

Parameters

FORMD

Specifies the name of the form description used to print a form or used in the merge operation.

FILE

Specifies the qualified name of the file that contains the form description.

The possible library name values are:

***LIBL:** The library list is used to locate the file.

***CURLIB:** The current library for the job is used to locate the file. If no library is specified as the current library for the job, the QGPL library is used.

library-name: Specify the name of the library where the file is located.

form-description-name: Specify the name of the file that contains the form description.

SPLF

Specifies the name of the spooled output file that contains the data to be merged with the form description.

***NONE:** No spooled output file is specified.

spooled-file-name: Specify the name of the spooled output file that contains the data to be merged with the form description.

JOB

Specifies the name of the job that contains the spooled output file to be merged with the form description. If no job name is given, all jobs currently in the system are searched for the simple job name.

A job identifier is a special value or a qualified name with up to three elements. For example:

```
*  
job-name  
user-name/job-name  
job-number/user-name/job-name
```

*N may be used in place of an element that follows the values being specified to maintain the position in the parameter value sequence. For example, 123456/*N/*N specifies just the job number 123456, regardless of the job and user names. Without the *N's, 123456 would have been interpreted as the job name, not the job number.

For an expanded description of this parameter and duplicate job names, refer to "Expanding the Size of a Symbol" on page 19.

***:** Specifies that the current job contains the spooled file.

job-name: Specify the name of the job that created the spooled file to be merged.

user-name: Specify the name of the user of the job that created the spooled file to be merged.

job-number: Specify the number of the job that created the spooled file to be merged.

SPLNBR

Specifies the number of the spooled output file to be merged with the form description.

***LAST:** The last spooled file with the specified name is merged with the forms description.

***ONLY:** Only one spooled file has the name specified in the SPLF parameter.

spooled-file-number: Specify the number of the spooled output file to be merged with the form description.

COPIES

Specifies the number of copies of the merged spooled output file that are printed.

***FILE:** The number of copies to print is taken from the COPIES value specified for the printer device file (QPAPFPRT).

number-of-copies: Specify the number of copies of the merged spooled output file to be printed.

DEV

Specifies the name of the printer device used to print the form or merged output.

***FILE:** The printer device is the same as that specified in the DEV parameter in the printer device file (QPAPFPRT).

***SYSVAL:** The printer device is specified through system value QSYSVRT.

***JOB:** The printer device is specified through the job's device file.

device-name: Specify the name of the printer device to be used to print the form or merged output when the output is not spooled.

SPOOL

Specifies whether the data is spooled.

***FILE:** The spooled file attribute is the same as that used in the printer device file (QPAPFPRT).

***YES:** The data is spooled.

***NO:** The data is not spooled.

OUTQ

***FILE:** The output queue name is the same as that specified in the printer device file (QPAPFPRT).

***DEV:** The default output queue value associated with the printer specified on the DEV parameter is used.

***JOB:** The output queue specified in the job description associated with the job for the spooled output is used.

The possible library name values are:

***LIBL:** The library list is used to locate the output queue.

***CURLIB:** The current library for the job is used to locate the output queue. If no library is specified as the current library for the job, the QGPL library is used.

library-name: Specify the name of the library where the output queue is located.

output-queue-name: Specify the name of the output queue that contains the spooled database output file.

FORMTYPE

***FILE:** The merged spooled output file is printed on the form type specified in the printer device file QPAPFPRT.

***STD:** The merged spooled output file is printed on the standard form type used at your installation.

form-type: Specify the name of the form type on which the spooled output file is printed.

OUTSPLF

Specifies the name of the merged spooled output file on the output queue.

***FRMD:** The forms description name is used as the name of the merged spooled output file on the output queue.

output-spool-file-name: Specify the name (up to 10 characters) of the merged spooled output file on the output queue.

SCHEDULE

Specifies when the merged spooled output file is available to a spool writer.

***FILE:** The merged spooled output file is available to a spool writer as specified in the SCHEDULE parameter in the printer device file (QPAPFPRT).

***IMMED:** The merged spooled output file is available to a spool writer immediately.

***JOBEND:** The merged spooled output file is available to a spool writer when the current job finishes.

***FILEEND:** The merged spooled output file is available to a spool writer when the end of the current file is reached.

JOB

***NONE:** The printing is done under the current job description.

The possible library name values are:

***LIBL:** The library list is used to locate the job description.

***CURLIB:** The current library for the job is used to locate the job description. If no library is specified as the current library for the job, the QGPL library is used.

library-name: Specify the name of the library where the job description is located.

***QBATCH:** The job description is submitted by *QBATCH.

job-description-name: Specify the name of the job description used to submit the job.

Example

```
MRGFORMD  FORMD(MLOGO)  FILE(DSNFILE3/BILL)  
          SPLF(QSYSPRT)  SPOOL(*NO)  DEV(WSPR01)
```

This command merges a form description named MLOGO in file DSNFILE3, in library BILL, with the last spooled file named QSYSPRT from the current job. There is only one copy; it is not spooled, but prints immediately on the printer WSPR01.

Chapter 6. Performance Guidelines

Use the following guidelines to design applications that provide the best results and performance:

- When merging spooled data with a form description, use a large spooled file rather than several small spooled files. To print a single page, APF requires time to open files, set variables, and create work spaces. This overhead is reflected in the time required to produce the first page. For subsequent pages, however, there is a smaller amount of overhead, and APF produces the subsequent pages faster.
- When possible, run merges in batch mode, and spool the data to an output file.
- Larger symbols slow the performance.
- Do not use overprinting in a spooled file that is used as input to an APF merge.
- If you use data description specifications to create spooled data, make sure the output file is in the order it appears on the page.
- Avoid using extraneous features.
- Do not use bar codes on the same line as other features.
- Use bar codes on forms specified as 15 characters per inch. Do not use bar codes on forms specified for 10 characters per inch or performance is degraded.
- Avoid dense dot patterns in symbols. If you need very large symbols, consider using an outline of the symbols as shown in Figure 37.

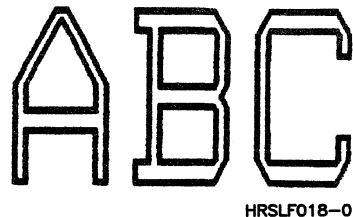


Figure 37. Outlined Letters

- APF is designed to give the best performance to those features you use most often. Symbol sets and bar codes are given special consideration so their performance is better than that of other features.
- Make sure the spooled file contains the same form length and width as your form description.
- If your form description will not use box support, do not request APF to scan for box characters or performance is degraded.

Chapter 7. Problem Analysis Procedures

If a problem occurs when using APF, the cause might not be apparent. The problem could be caused by an error in your application, in the system operation, or in APF. The problem analysis procedures in this chapter help you isolate the cause of a problem and tell you how to solve it. If you need to call for service in order to solve the problem, this procedure tells you what information to collect for the service representative.

Using the Problem Analysis Procedure

This section lists possible problems you might encounter and actions you can use to correct the problems. Follow the Problem Analysis Map until you find a problem that seems appropriate to your situation and follow the steps suggested to correct the problem. If you do not find the problem in the list or if the suggested actions do not solve the problem, see "Calling for Help" on page 58 for further information.

MAP 0100: Problem Analysis Map

001

Did you receive an unexpected message (for example, file not found, STRAPF command not found), or has an error occurred on a device?

Yes No

002

— Go to Step 004.

003

Do the following:

- Read the online help information for the message to see if any actions are recommended. To get the online help information, press F7, position the cursor under the message, and press Help.
- Read the other messages referred to in the online help information. The information in these messages can help you solve your problem.

004

Has the system stopped responding?

Yes No

005

— Go to Step 007 on page 54.

006

— Call the system operator and describe the problem. Have the system operator use the procedures in the *Operator's Guide*.

007

Is an application no longer functioning as expected?

Yes No

008

– Go to Step 010.

009

– You have a system problem. Call the system operator, describe the problem and have the operator use the procedures described in the *Operator's Guide*.

010

Did the input inhibited light stay on longer than expected?

Yes No

011

– Go to Step 013 on page 55.

012

– Do the following:

- Reset your workstation. Press Error Reset. If the input inhibited light turns off, this was the problem.
- Check the status of your job by doing one of the following:
 - Press System Request. When the System Request menu appears, select option 1 to sign on to a second **interactive job** (a job started from a workstation).
 - Go to another workstation and sign on to create a second interactive job.
- Find the job name where the problem is occurring by doing one of the following:
 - Type the Work Active Job (WRKACTJOB) command. On the display presented by this command, look for a job entry that has the same job name as the work station with the problem. If two entries are shown, look at both. Record these names.
 - Type the Work Subsystems (WRKSBS) command to request the subsystems display. On that display, look for a job entry that has the same job name as the work station with the problem. If two entries are shown, look at both. Record these names.
- If your job entry indicates a status of HELD, type 6 in the input field beside the job name to release the job.
- If your job does not have a status of HELD, determine whether you have a loop or wait condition. Type the Work Job (WRKJOB) command, selecting the *PRINT option (for example, WRKJOB JOB(008299/QUSER/WS1) OUTPUT(*PRINT)). Type the command and press Enter. Information about the job is printed. Part of the information contains the program stack for the failing job.

The program stack tells you which instruction the program or application is

currently on. Compare this information with the original computer printout, and determine why the loop or wait occurred.

Cancel the job, by typing the Cancel Job (ENDJOB) command (for example, ENDJOB JOB(008299/QUSER/WS1)).

Check with the system operator to see if the **job log** for the failing job printed. The job log is a record of each program action and messages that result from these program actions.

Note: The job log should print if you use the default value for the Log Limit (LOGLMT) parameter on the CNLJOB command. However, if your job description specifies a zero for the message level in the LOG parameter, no job log will print. Examine your job log, invocation stack, and program computer printout to determine the reason the problem occurred.

013

Are symbols missing from the output or are they not printing as expected?

Yes No

014

– Go to Step 016 on page 56.

015

– Do the following:

- Make sure you are using the correct form description, file, and library names.
- Examine the form description to ensure you specified the symbol set name, file, and library names correctly. Make sure that:
 - The symbol set feature is applied to the correct line on the form.
 - The starting column and width for the feature are specified correctly.
 - No other features overlay your data.
 - Your symbol does not extend beyond the form width.
 - You have 9 lines per inch specified if the symbol is more than 1 line long.
- Examine the job log to see whether any messages indicate what the problem might be.
- If a spooled file is being used, make sure that:
 - The correct spooled file name is being specified.
 - The position of the data in the spooled file is correct for the form description being used.
 - Symbol IDs are contained in the first pass if the spooled file contains over-printed data.
- Make sure that the appropriate libraries are on your **library search list**.
The library search list indicates which libraries are to be searched and the order in which they are to be searched. The system identifier for a library list is *LIBL.
- Select option 1 (Work with symbol sets) from the Advanced Printer Function display to ensure that your symbol is contained in the symbol set and is designed correctly.

(Step **015** continues)

015 (continued)

- Make sure your symbol ID is correct. A lowercase symbol ID is not the same as an uppercase symbol ID.
-

016

Are bar codes missing from the output or are they not printing as expected?

Yes No

017

- Go to Step 019.

018

– Do the following:

- Make sure you are using the correct form description, file, and library names.
 - Examine your form description to ensure that you have specified the bar code name, position, and height correctly. Also make sure that no other features overlay your data and that 9 lines per inch and 15 characters per inch are specified.
 - If a spooled file is being used, make sure that:
 - The correct spooled file name is being specified.
 - The position of the data in the spooled file is correct for the form description being used.
 - Data to be used for the bar code is contained in the first pass if the spooled file contains overprinted data.
 - Examine the job log to see whether any messages indicate what the problem might be.
 - Make sure there are no box characters, bar charts, or symbols on the same line as a bar chart.
-

019

Are bar codes not being read properly by your scanning device?

Yes No

020

- Got to Step 022 on page 57.

021

– Do the following:

- Make sure you are using 15 characters per inch and 9 lines per inch.
- Examine your form description to ensure that you have specified the bar code name, position, and height correctly.
- Make sure there are no box characters, bar charts, or symbols on the same line as a bar code.

(Step 021 continues)

021 (continued)

- Make sure your scanning device is functioning properly.
 - Make sure you are using nonglossy paper.
 - Make sure your ribbon is not excessively worn.
-

022

Are bar charts missing or are they not printing as expected?

Yes No

023

- Go to Step 025.

024

- Do the following:
 - Make sure you are using the correct form description, file, and library names.
 - Examine your form description to ensure that you have specified the bar chart position correctly.
 - Make sure no other features are overlaying your data.
 - Make sure that you have specified 9 lines per inch.
 - If you selected the EXTEND option, make sure that you have provided a horizontal axis unless you want to have the bar chart extend down to the end of the page.
 - If a spooled file is being used, make sure that:
 - The correct spooled file name is being specified.
 - The position of the data in the spooled file is correct for the form description being used.
 - Data to be used for the bar code is contained in the first pass if the spooled file contains overprinted data.
 - Examine the job log to see whether any messages indicate what the problem might be.
-

025

Are boxes missing or are they not printing as expected?

Yes No

026

- Go to Step 028 on page 58.

027

- Do the following:
 - Make sure you are using the correct form description, file, and library names.

Appendix A. Examples of Symbol Sets and Features

This appendix contains examples of the three sample symbol sets APF provides. It also contains examples of several APF features.

Examples of Symbol Sets

To help you start using APF, three sample symbol sets are shipped with the product. Each set contains 184 characters in the standard multinational character set. These sample sets are stored in the symbol set file QAAPFILE and include:

- QAAPF1X1, which contains letters that are one print position wide and one print position tall
- QAAPF2X2, which contains letters that are one print position wide and two print positions tall
- QAAPF2X2, which contains letters that are two print positions wide and two print positions tall.

One-Position-Wide by One-Position-Tall Characters

Figure 38 shows the QAAPF1X1 symbol set available with APF.

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				6	-	ø	ø	°	µ	€	(	)	\		0
1				é	/	é	á	¡	~	£	À	Á	À		1
2				â	â	â	â	b	k	s	¥	B	K	S	2
3				ä	ä	Ä	Ä	c	l	t	℞	C	L	T	3
4				à	è	À	È	d	m	u	ƒ	D	M	U	4
5				á	í	Á	Í	e	n	v	§	E	N	V	5
6				ä	î	Ä	Ï	f	o	w	¶	F	O	W	6
7				ä	ï	Ä	Ï	g	p	x		G	P	X	7
8				ç	l	Ç	Ł	h	q	γ		H	Q	Y	8
9				ñ	ß	Ñ	˘	i	r	x		I	R	Z	9
A				[	]	|	‡	«	»	¡	¬	-	|	²	³
B				•	\$	,	•	»	¿	¿	|	ó	ó	ó	ó
C				<	*	%	©	d	z	Đ	-	ö	ü	ö	ü
D				<	)	-	’	ý	ı	Ÿ	“	ö	ö	ö	ö
E				+	;	>	=	¿	Æ	İ	’	ó	ó	ó	ó
F				!	^	?	"	±	¤		=	ö	ý	ö	

HRSLF019-0

Figure 38. One-Position-Wide by One-Position-Tall Characters

One-Position-Wide by Two-Positions-Tall Characters

Figure 39 shows the QAAPF1X2 symbol set available with APF.

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				à	á	â	ã	ä	å	æ	ç	è	é	ê	ë
1				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
2				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
3				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
4				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
5				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
6				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
7				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
8				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
9				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
A				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
B				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
C				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
D				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
E				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë
F				â	á	â	ã	ä	å	æ	ç	è	é	ê	ë

HRSLF020-0

Figure 39. One-Position-Wide by Two-Positions-Tall Characters

Two Positions-Wide by Two-Positions-Tall Characters

Figure 40 shows the QAAPF2X2 symbol set available with APF.

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				À	Á	Â	Ã	Ä	Å	Æ	Ç	Ð	Ñ	Ò	Ó
1				à	á	â	ã	ä	å	æ	ç	ð	ñ	ò	ó
2				â	ê	â	ë	ä	å	æ	ç	ð	ñ	ò	ó
3				ä	ë	Ä	Ë	ä	å	æ	ç	ð	ñ	ò	ó
4				à	é	À	É	ä	å	æ	ç	ð	ñ	ò	ó
5				á	í	Á	Í	ä	å	æ	ç	ð	ñ	ò	ó
6				ä	î	Ä	Ï	ä	å	æ	ç	ð	ñ	ò	ó
7				ä	ï	Ä	Ï	ä	å	æ	ç	ð	ñ	ò	ó
8				ç	ì	Ç	Ì	ä	å	æ	ç	ð	ñ	ò	ó
9				ñ	í	Ñ	Ì	ä	å	æ	ç	ð	ñ	ò	ó
A				[	]	!	:	<<	â	¡	¡	¡	¡	¡	¡
B				•	\$	,	#	>>	â	¿	¿	¿	¿	¿	¿
C				<	*	%	@	â	æ	æ	æ	æ	æ	æ	æ
D				(	)	_	'	â	ÿ	ÿ	ÿ	ÿ	ÿ	ÿ	ÿ
E				+	;	>	=	â	þ	þ	þ	þ	þ	þ	þ
F				!	^	?	"	â	±	±	±	±	±	±	±

HRSLF021-0

Figure 40. Two-Positions-Wide by Two-Positions-Tall Characters

Examples of Features

Figure 41 on page 63 shows some of the features available with APF.

EGG PRODUCTION

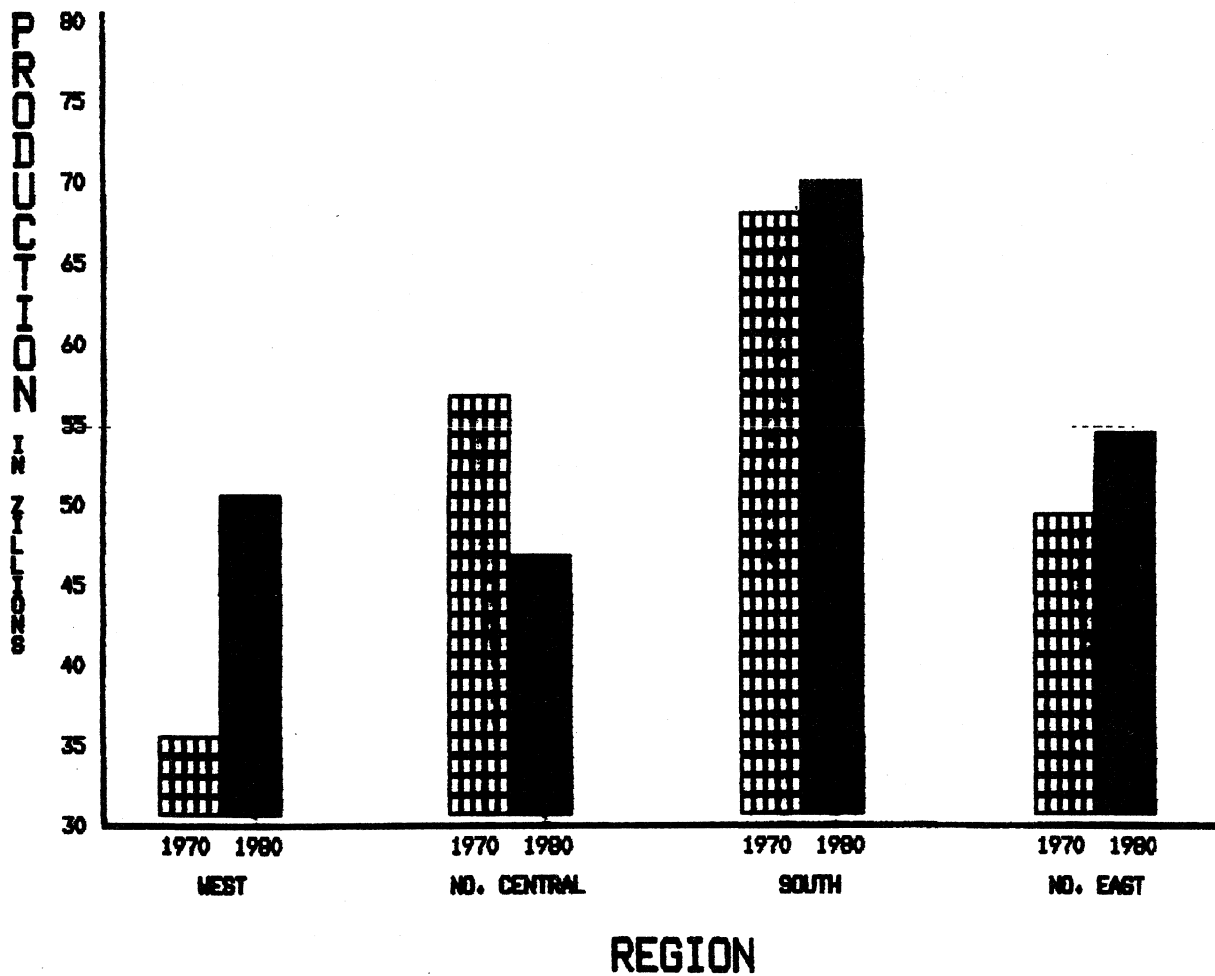
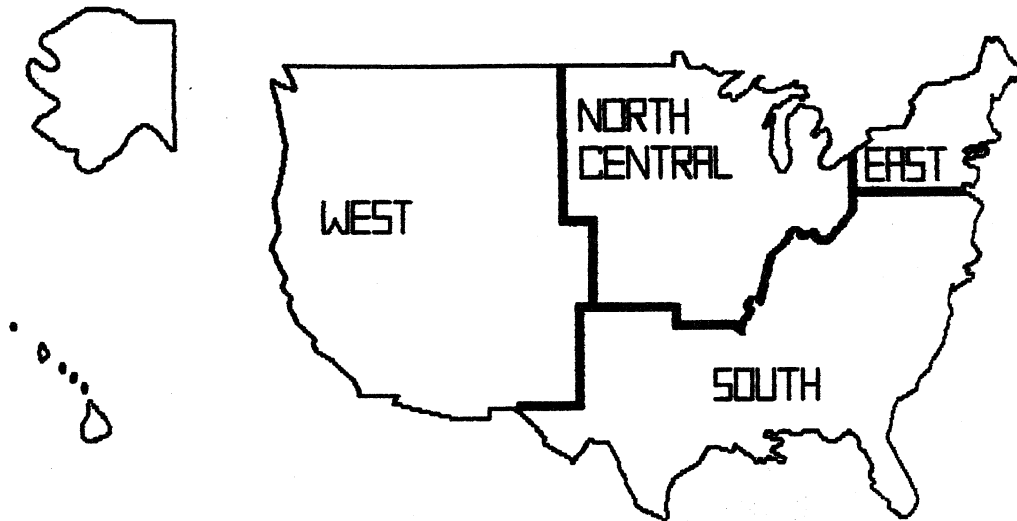


Figure 41 (Part 1 of 2). Examples of APF Features

HRSLF022-0

VIDEO INC.



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J K TAKALA
VIDEO INC. manager
OLD WABASHA ROAD
PELICAN LAKE, MN

Re: Proposed bar codes for our video products

Dear JOHN:

It has been brought to my attention that the use of bar codes to label our products would greatly increase our productivity in the manufacturing and warehouse areas of our company. Several types of bar codes are presently being studied by a special team from our Rochester site. The following is an example of the 6 bar code types being studied - this example is for the subassembly widget number '654321':

Type = EAN8



Type = EAN13



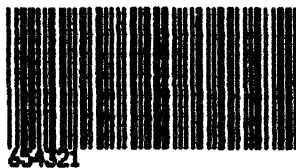
Type = UPCA



Type = UPCE



Type = CODE39



Type = PLESSEY



We hope to conclude the study by March 3, 1983. Since the results of the study will mean great change to our present inventory procedures, we plan to hold an area meeting on January 2, 1983.

Sincerely,

D L Casey

APF/TEXT

HRSLF023-0

Figure 41 (Part 2 of 2). Examples of APF Features

Appendix B. Using OCR-A Characters

This appendix discusses how to use the optical character recognition font A (OCR-A) characters with APF, and provides examples of the OCR-A characters.

Printing and Reading OCR-A Characters with APF

The IBM* OCR-A characters (1234567890ACDMNPRUXY\$.>/) are derived from, but are not identical to, the designs described in the USA SCS OCR standard of the American National Standards Institute. Thus, it is not represented that the IBM OCR-A font is the same as the standard OCR-A font. You must test both the 5224 and 5225 OCR printing and the OCR reader in the application to ensure that the codes can be read successfully.

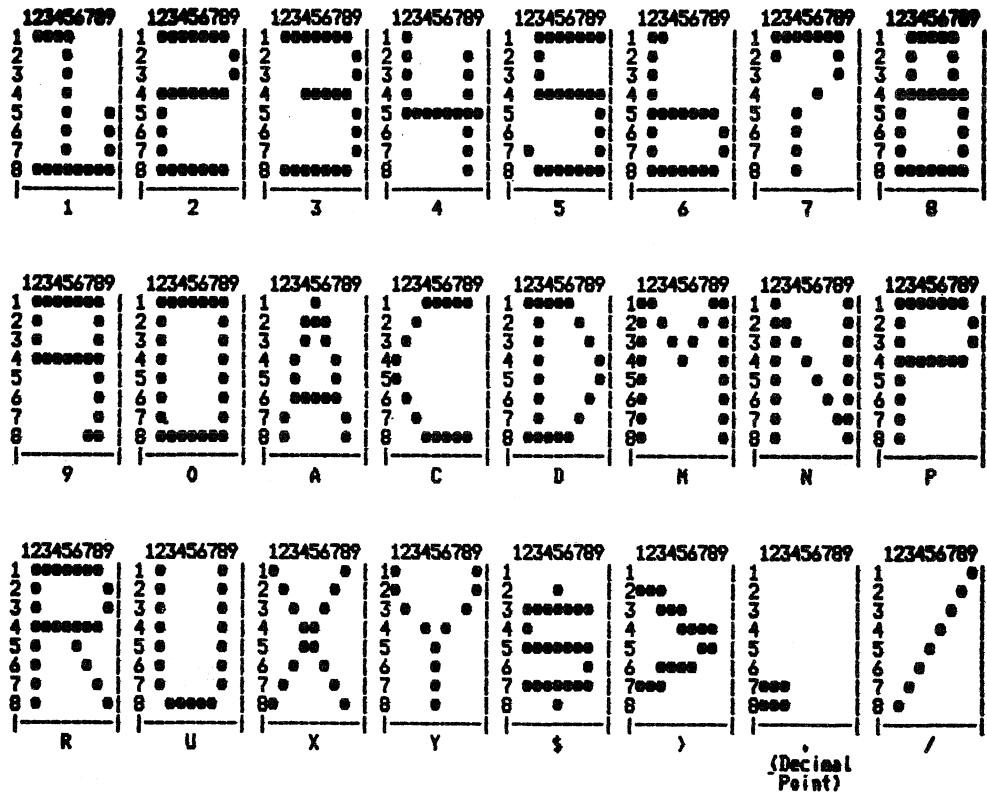
If you have only one character set file in a form that contains the 24 one-by-one characters, type the letter O on any attribute line in the APF display. APF loads that set of character definitions into the printer. This improves both formatting and printing performance. If two character set files are provided, the letter O is ignored.

Notes:

1. If the character set file containing the OCR-A characters has more than the 24 OCR-A, and if any of the non-OCR-A characters are referred to, the OCR-A character set is destroyed and results occur that cannot be predicted.
2. The letter O and bar codes are mutually exclusive.

Examples of OCR-A Characters

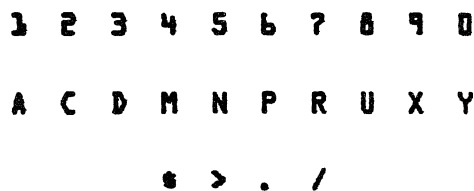
Figure 42 on page 66 shows an example of the OCR-A National Retail Merchant Association (NRMA) Subset. For OCR-A characters, the vertical portion of the numeric 1 should be repositioned from the sixth column to the fifth column for increased readability.



HRSLF025-0

Figure 42. OCR-A National Retail Merchant Association (NRMA) Subset

The characters in Figure 43 print every other position, every other line, and at 15 characters per inch. The decimal point should be placed without a space before a number, for example, \$1 2.4 5.



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Figure 43. OCR-A Characters, Normal Size

Figure 44 on page 67 shows various examples of OCR-A printing.

*973.02 P5/68442
>*44.39 R5/86998
>>*4.26 U5/28426
>>>*01

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Figure 44. Examples of OCR-A Printing

Appendix C. Printer Output from APF

This appendix provides information on the types of processed data you can receive from APF.

Using Printer File QPAPFPRT

APF processed data prints using a printer device file named QPAPFPRT. This device file is shipped with APF and is necessary for APF to function.

To print individual symbols or lists of symbols as described in Chapter 3, "Designing a Form," use the Override Print File (OVRPRTF) or Change Print File (CHGPRTF) command to adjust QPAPFPRT to fit your requirements.

When printing symbols, use one of various methods available. Use a form width of at least 80 characters and a form length of at least 30 lines. These parameters can be set using the OVRPRTF or CHGPRTF commands.

For symbols more than one line tall, use 9 lines per inch to avoid a horizontal gap in the symbols. This parameter can be set using the OVRPRTF or CHGPRTF commands.

Creating Output

When you create output using the Merge Form Description (MRGFORMD) command or by selecting option 3 or 4 from the Advanced Printer Function display, APF does not allow you to choose any file other than QPAPFPRT. You can specify the parameters on the Merge Form Description (MRGFORMD) command, the Print Blank Form display, or the Merge Form Description display.

Displaying Spooled Files

When you display the spooled file that results from selecting option 3 or 4 from the Advanced Printer Function display or the Merge Form Description (MRFFORMD) command, APF cannot display the file because it contains special characters that are not valid on your display station.

Sending APF Output to Other Devices

To print a file created by APF on a device other than a 5224 dot matrix or 5225 dot matrix printer, use the Operating System/400* OS/400* system to remove any special feature you request. In some cases, no data is printed. In other cases, certain parts of data prints but does not appear as you expect.

Appendix D. Save, Restore, and Recovery Considerations

This appendix provides information on saving and restoring APF files, and recovering from system failures.

Save and Restore Considerations

With all save, restore, recovery, or copy issues, remember that APF files must be created by APF. If you use the Create Physical File (CRTPF) command to create your own physical file, APF does not recognize the file as a valid APF function.

Saving and Restoring Symbol Sets

Symbol sets are stored as logical files built over three physical files. The four data base files must be saved or restored together. The easiest way to determine the names of the physical files under the logical file is to use the Display File Description (DSPFD) command on the logical file.

Saving and Restoring Form Descriptions

Form descriptions are stored as members of the form description physical files. Use normal save and restore functions with form description files.

Recovery Considerations

For a system failure, be aware of the following recovery considerations.

Recovering Symbol Sets

If an error occurs while you edit a symbol and the record containing the symbol cannot write back to the data base, APF sends an error message indicating that the changes made during the edit session have not been saved.

Recovering Form Descriptions

If an error occurs while you edit a form description and the record containing the form description cannot write back to the data base, APF sends an error message indicating that the changes made during the edit session have not been saved.

Recovering from Merging and Printing Form Descriptions

The following errors are possible when APF merges or prints a form description:

- **Errors with spooled input files.** If APF cannot reach the specified spool input file, it sends a message to the user indicating that the merge cannot be done.
- **Errors with form descriptions.** If APF cannot reach the specified form description, it sends a message to the user indicating that the merge cannot be done.
- **Errors with symbol sets.** If APF cannot reach a symbol set file or symbol set, it ignores the feature requiring the symbol set file or symbol set and send a message to the user. The merge continues.
- **Errors with symbols.** If a form description indicates certain parts of the form contain symbol IDs and these valid IDs are not found, APF skips any unproc-

essed portion of the symbol set feature and sends a message to the user. If no IDs are found, the merge continues and no messages are sent.

- **Errors with bar codes.** If a form description indicates that certain parts of the form contain data to use in the making of a bar code and APF determines the data is not correct, it does not make the bar code and sends a message to the user. The merge continues.
- **Errors on the printer or while attempting to spool the data.** These errors are handled exactly as they are with the OS/400 system. No special restrictions or requirements apply to APF.
- **System failures during a merge.** If the system fails during a merge, the spooled output may not be complete. Run your job from the beginning to ensure that the data prints correctly.

Appendix E. Example: Using APF

This section gives a detailed example of how to use APF. The example shows you how to design a small form (a name tag), how to set up a spooled file so the fields match the form, and how to merge the spooled data with the form description.

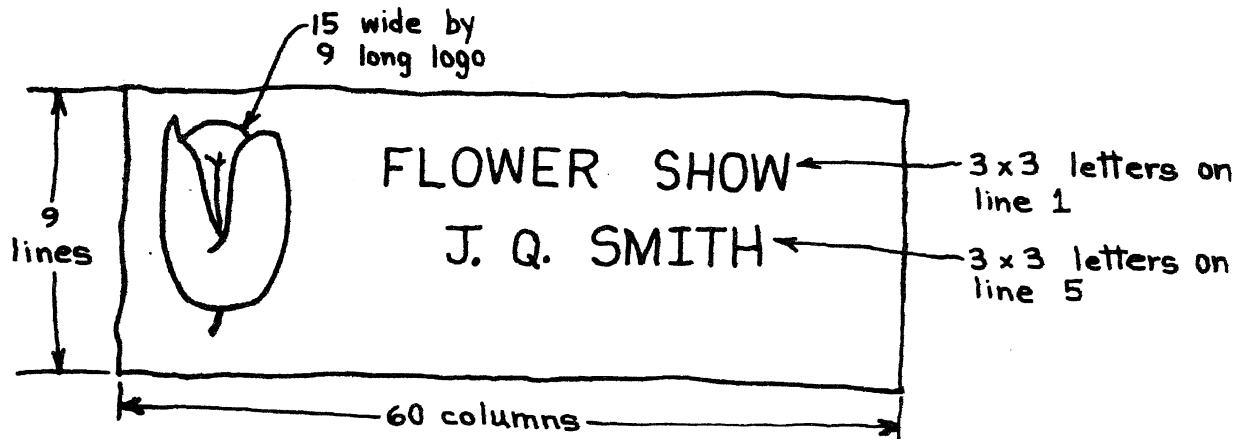
Before you use APF, make sure the QPDA library installed on the system contains the library search list. Also make sure you have the proper authorization to use these APF functions.

Designing a Name Tag

To design a form, decide what special print features you want to use. This example uses a logo and a set of triple-sized characters.

The sample form is four inches wide and one inch long. For symbols that are more than one line long, use 9 lines per inch to avoid getting a horizontal gap in the middle of a symbol. The example also uses 15 characters per inch, as it provides better resolution for the symbols than 10 characters per inch.

To help you design your form, make a rough sketch of what it will look like. Figure 45 shows the sketch for the name tag.



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Figure 45. Sketch of a Name Tag

Two symbol sets are needed for this example: one for the logo and another for the triple-sized letters. Assume that both symbol sets have already been created:

- The logo is in the symbol set LOGOS, which is in the symbol set file MYSYMBOLS in library MYLIB.
- The triple-sized letters are in the symbol set SET3X3, which is in the symbol set file MYSYMBOLS in library MYLIB.

Now you are ready to begin designing the name tag. Type the Start Advanced Printer Function (STRAPF) command to reach the Advanced Printer Function display as shown in Figure 46 on page 74.

```

Advanced Printer Function

Select one of the following:

1. Work with symbol set
2. Work with form description
3. Print form description
4. Merge spooled data with a form description

Selection or command
===> _____

F3=Exit   F4=Prompt   F12=Previous
(C) COPYRIGHT IBM CORP. 1988, 1991

```

Figure 46. Advanced Printer Function Display

To create a form description for the NAMETAG example, select option 2 (Work with form description) from the Advanced Printer Function display. APF presents the Work with Form Description display as shown in Figure 47.

```

Work with Form Description

Type choices, press Enter.

Option . . . . . _          1=Create, 2=Change,
                             3=Copy,  4=Delete,
                             6=Print

File . . . . . MYFILE      Name
Library . . . . . *LIBL    *LIBL, *CURLIB, name
Form description . . . . . NAMETAG  Name, F4 for list

F3=Exit   F4=List   F12=Previous

```

Figure 47. Work with Form Description Display

Type the following information on the Work with Form Description display:

- *File.* Type MYFILE for the name of the form description file.
- *Library.* Type MYLIB for the name of the library containing the file.
- *Form Description.* Type NAMETAG for the name of the form description.

Press Enter. APF presents the Create Form Description display as shown in Figure 48 on page 75.

```
                                Create Form Description
File . . . . . : MYFILE          Library . . . . . : MYLIB

Type choices, press Enter.

Form description . . . . . NAMETAG      Name
Characters per inch . . . . . 15         10, 15
Lines per inch . . . . . 9             4, 6, 8, 9
Page width . . . . . 60                2-132 (10 CPI)
                                           2-198 (15 CPI)
Page length . . . . . 9                 2-127
Text . . . . . Name tags for spring flower show

F3=Exit  F12=Previous
```

Figure 48. Create Form Description Display

Specify the following on the Create Form Description display:

- *Form description.* Type NAMETAG for the name of the form description.

If you typed the name of a form description on the Work with Form Description display, APF places the name you specified in this prompt.

- *Characters per inch.* Type 15 for the character-per-inch setting.
- *Lines per inch.* Type 9 for the line-per-inch setting.
- *Page width.* Type 60 for number of print positions on the page.
- *Page length.* Type 9 for the page length.

Note: If symbols or special features (such as bar codes) are more than one line tall, use nine lines per inch or a horizontal gap will appear at the end of each.

- *Text.* Type text describing the form description.

When you finish typing this information, press Enter. APF presents the Design Form Description display.

Typing the Constant Data

On the name tags, we want the picture of the flower and the words FLOWER SHOW to appear on every form. This is considered constant data and can be added to the form description. The names change from one form to the next, and these changes in data come from the spooled data.

The Design Form Description display shown in Figure 49 on page 76 shows how to add constant data.

Note: The symbol ID must be capitalized because symbols are defined using capital letters. For example, FLOWER, flower, and Flower, would refer to three different symbols in APF. Notice also that the letters are triple-spaced because they come from a symbol set containing triple-sized letters.

```

                                Design Form Description
Form . . . . . : DEMOFORM      Length . . . . . : 33      Width . . . . . : 100
Control . . . . : _____
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001 FLOWER          F L O W E R   S H O W
002
003
004
005
006
007
008
009
_____ +
                                Features for Line 1
Type options for top line currently being displayed, press Enter.
1=Symbol set   2=Bar code   3=CPI
4=Highlight    5=Underline  6=Chart
Opt   Column   Width   Parm 1   Parm 2   Parm 3
_     _        _      _          _          _
F3=Exit   F9=Define box characters   F12=Previous

```

Figure 49. Design Form Description Display with Sample Constant Data

Specifying the Features

After the constant data is typed in the form description, you can specify which features to use on the form and where to apply those features.

Specifying the Position of the Logo

Specify that the picture of the flower is to be retrieved from a symbol set, as indicated on the Design Form Description display shown in Figure 50 on page 77.

```

                                Design Form Description
Form . . . . . : DEMOFORM      Length . . . . : 33      Width . . . . : 100
Control . . . . : _____
* . . . . 1 . . . . 2 . . . . 3 . . . . 4 . . . . 5 . . . . 6 . . . . 7 . . . . +
001 FLOWER          F L O W E R   S H O W
002
003
004
005
006
007
008
009
_____ +
                                Features for Line 1
Type options for top line currently being displayed, press Enter.
  1=Symbol set   2=Bar code   3=CPI
  4=Highlight    5=Underline  6=Chart
Opt  Column      Width      Parm 1      Parm 2      Parm 3
  1      1        15        LOGOS      MYSYMBOLS  MYLIB
F3=Exit  F9=Define box characters  F12=Previous

```

Figure 50. Design Form Description Display Retrieving the Flower Symbol

Select the following options from the Design Form Description display:

- *Opt.* Type a 1 to select option 1 (Symbol set).
- *Column.* Type 1.
- *Width.* Type 15.
- *Parm 1.* Type the symbol set name, LOGOS.
- *Parm 2.* Type the symbol set file name, MYSYMBOLS.
- *Parm 3.* Type the library name, MYLIB.

Specifying the Position of a Symbol Set

To specify the position of a Symbol Set on the Design Form Description display, you must indicate that the words FLOWER SHOW are printed using 3 by 3 letters, as shown in the Design Form Description display in Figure 51 on page 78.

```

                                Design Form Description
Form . . . . . : DEMOFORM      Length . . . . : 33      Width . . . . : 100
Control . . . .
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
001 FLOWER          F L O W E R   S H O W
002
003
004
005
006
007
008
009
+-----+
                                Features for Line 1
Type options for top line currently being displayed, press Enter.
  1=Symbol set      2=Bar code      3=CPI
  4=Highlight       5=Underline     6=Chart
Opt   Column        Width      Parm 1      Parm 2      Parm 3
  1       1          15        LOGOS      MYSYMBOLS  MYLIB
  1      18          40        SET3X3     MYSYMBOLS  MYLIB
F3=Exit   F9=Define box characters  F12=Previous

```

Figure 51. Design Form Description Display Specifying the Position of the Flower Symbol

Specify the following on the Design Form Description display:

- *Opt.* Type 1.
- *Column.* Type 18.
- *Width.* Type 40.
- *Parm 1.* Type the symbol set name, SET3X3
- *Parm 2.* Type the symbol set file name, MYSYMBOLS
- *Parm 3.* Type the library name, MYLIB.

Now indicate that the variable data from the spooled file should also be printed using a symbol set. In this case, the names that are to appear on the name tags are the variable data. Use the *Control* prompt to position the form on line 5. Type 5 in the *Control* prompt on the Design Form Description display.

Press Enter. APF presents line 5 at the top of the display, as shown in the Design Form Description display in Figure 52 on page 79.

```

                                Design Form Description
Form . . . . . : DEMOFORM      Length . . . . . : 33      Width . . . . . : 100
Control . . . . : _____
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+
005
006
007
008
009
010
011
012
013
_____ +
                                Features for Line 5
Type options for top line currently being displayed, press Enter.
 1=Symbol set   2=Bar code   3=CPI
 4=Highlight    5=Underline  6=Chart
Opt  Column    Width      Parm 1      Parm 2      Parm 3
 1      18      43      SET3X3     MYSYMBOLS  MYLIB
F3=Exit  F9=Define box characters  F12=Previous

```

Figure 52. Design Form Description Display with Line Five Selected for Printing

Testing the Form Description

To make sure everything is properly lined up on the name tag, press F3 (Exit) to return to the Advanced Printer Function display. On this display, select option 3 (Print form descriptions). The name tag is blank, which means that it does not contain any information from a spooled file but only constant data.

Press Enter. APF presents the Print Blank Form display as shown in Figure 53.

```

                                Print Blank Form
Type choices, press Enter.
File . . . . . MYFORMS      Name
Library . . . . . MYLIB      *LIBL, *CURLIB, name
Form Description . . . . . NAMETAG      Name, F4 for list

F3=Exit  F4=List  F12=Previous

```

Figure 53. Print Blank Form Display

On the Print Blank Form display, information appears that is needed to print the form. Press Enter. APF presents the Print Options (Page 1 of 2) display as shown in Figure 54 on page 80.

Print Options		Page 1 of 2
Type choices, press Enter.		
Form description	NAMETAG	Name
File	MYFORMS	Name
Library	MYLIB	Name
Printer	*FILE	*FILE, name
Number of copies	1	1-255
F3=Exit F12=Previous		More...

Figure 54. Print Options (Page 1 of 2) Display

Press Page Down on the Print Options (Page 1 of 2) display. APF presents the Print Options (Page 2 of 2) display, as shown in Figure 55, with additional information needed to print the form description.

Print Options		Page 2 of 2
Type choices, press Enter.		
Spool the data	*YES	*YES, *NO
Output queue	MYQ	*FILE, *DEV, name
Library	MYLIB	*LIBL, *CURLIB, name
Form type	*FILE	*FILE, name
Spooled file	*FRMD	*FRMD, name
Schedule	*FILEEND	*FILE, *FILEEND, *JOBEND, *IMMED
Job description	QBATCH	QBATCH, *NONE, name
Library	_____	*LIBL, *CURLIB, name
F3=Exit F12=Previous		Bottom

Figure 55. Print Options (Page 2 of 2) Display

The name tag prints on a 5225 dot matrix printer as shown in Figure 56 on page 81. No name appears on the name tag until the spooled file is merged with the form description as shown in Figure 61 on page 85.



FLOWER SHOW

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Figure 56. Example Name Tag

The form description is spooled to the output queue MYQ.A to a 5224 dot matrix or 5225 dot matrix printer. Use the Start Print Writer (STRPRTWTR) command to start the writer and get the printed results as shown in Figure 61 on page 85.

Creating the Spooled File

When data is spooled, it is placed on an output queue. To ensure your data is spooled, you can specify SPOOL(*YES) on the Change Print File (CHGPRTF) or Override Print File (OVRPRTF) commands.

The form description is created and the symbol sets are ready to use. Now you need to create a spooled data file and merge the spooled file with the form description.

You must decide how to create the spooled file. You can create the spooled file with an application program or an AS/400 utility. All that matters is that the spooled data is positioned correctly on the page. You can use data description specifications to ensure that the data is correctly positioned, but this is not a requirement.

Figure 57 shows how spooled data appears prior to using APF when merging data with the form description. The data prints on line 5, starts in column 18, and is triple-spaced.

```

1
2
3
4
5 J B C a s e y
6
7
8
9
1
2
3
4
5 K C H a n s o n
6
7
8
9
1
2
3
4
5 R O F e s s
6
7
8
9
1
2
3
4
5 J W B o n a l u m
6
7
8
9
1
2
3
4
5 L K S n o w
6
7
8
9
1
2
3
4
5 J R R i p s t r a
6
7
8
9
1
2
3
4
5 A A A d a m s o n
6
7
8
9

```

page 1

page 2

page 3

page 4

page 5

page 6

page 7

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Figure 57. Example of Spooled File

Merging the Spooled Data with the Form Description

When you finish spooling your data, keep track of the file name, job name, and spool number so that you can identify which spooled file APF is to use.

Select option 4 (Merge spooled data with a form description) from the Advanced Printer Function Display.

Press Enter. APF presents the Merge Form Description display as shown in Figure 58 on page 83.

```

Merge Form Description

Type choices, press Enter.

File . . . . . MYFORMS      Name
Library . . . . . MYLIB      *LIBL, *CURLIB, name
Form description . . . . . NAMETAG      Name, F4 for list

F3=Exit  F4=List  F12=Previous

```

Figure 58. Merge Form Description Display

On the Merge Form Description display, information appears that is needed to merge the form. Press Enter. APF presents the Print Options (Page 1 of 2) display as shown in Figure 59.

```

Print Options                                     Page 1 of 2

Type choices, press Enter.

Form description . . . . . NAMETAG      Name
File . . . . . MYFORMS      Name
Library . . . . . MYLIB      *LIBL, *CURLIB, name
Spooled file . . . . . QSYSPRT      *NONE, NAME
Job name . . . . . *      Name
User . . . . . _____      Name
Number . . . . . _____      000000-999999
Spooled file number . . . . . *LAST      *LAST, *ONLY
                                           number
Printer . . . . . *FILE      *FILE, name
Number of copies . . . . . _1      1-255

F3=Exit  F12=Previous                                     More...

```








Figure 59. Print Options (Page 1 of 2) Display

If you press Page Down on the Print Options (Page 1 of 2) display, APF presents the Print Options (Page 2 of 2) display as shown in Figure 60 on page 84. This display contains additional information needed to print the form description.

Print Options		Page 2 of 2
Type choices, press Enter.		
Spool the data	*YES	*YES, *NO
Output queue	*FILE	*FILE, *DEV, name
Library	_____	*LIBL, *CURLIB, name
Form type	*FILE	*FILE, name
Spool output file	*FRMD	*FRMD, name
Schedule	*FILEEND	*FILE, *FILEEND, *JOBEND, *IMMED
Job description	QBATCH	QBATCH, *NONE, name
Library	_____	*LIBL, *CURLIB, name
F3=Exit F12=Previous		Bottom

Figure 60. Print Options (Page 2 of 2) Display

Figure 61 on page 85 is a copy of the first few pages of the printed file that results when you merge the form description with the spooled file.

	FLOWER SHOW JBCasey
	FLOWER SHOW KCHanson
	FLOWER SHOW ROFess
	FLOWER SHOW JWBonaLumi
	FLOWER SHOW LKSnow
	FLOWER SHOW JRRipstra
	FLOWER SHOW AAAdamson

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Figure 61. Printed Output from the Merged Form Description and Spool File on a 5225 Dot Matrix Printer

Appendix F. Example Scale and Layout Grids for Form Design

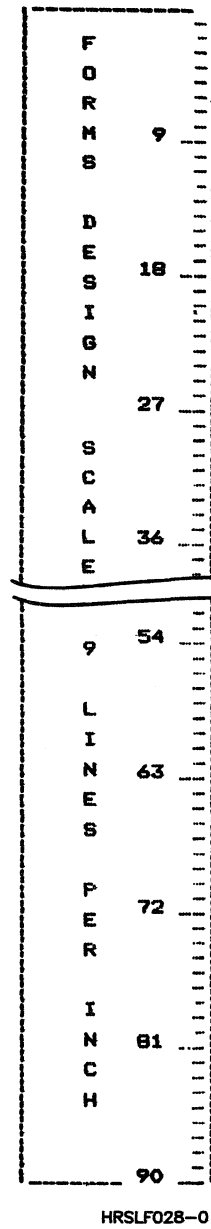
This appendix contains example grids for you to use when laying out logos or alternative characters. There are layout grids for:

- 4 by 4 characters
- 9 by 9 characters
- 15 by 15 logos.

The box above each layout grid illustrates the actual character or logo size when the character is printed. You can remove the grids from the book and make copies of them to help you when designing.

Forms Design Cutout Scale

Figure 62 shows an example of a forms design scale cutout.



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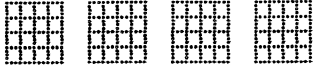
Figure 62. Forms Cutout

4-by-4 Layout Grid

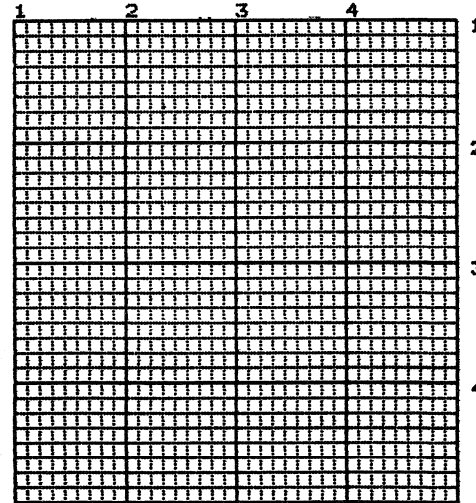
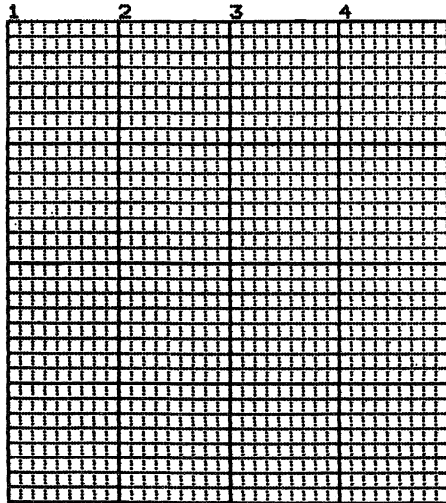
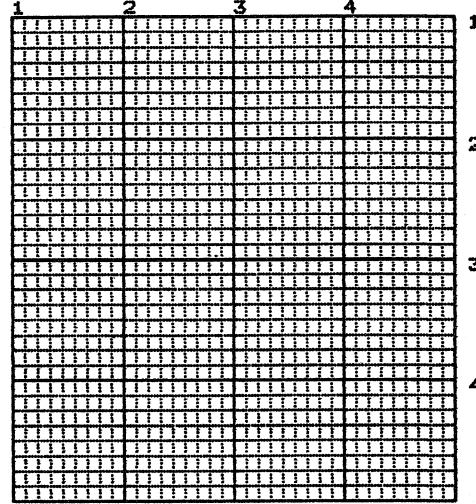
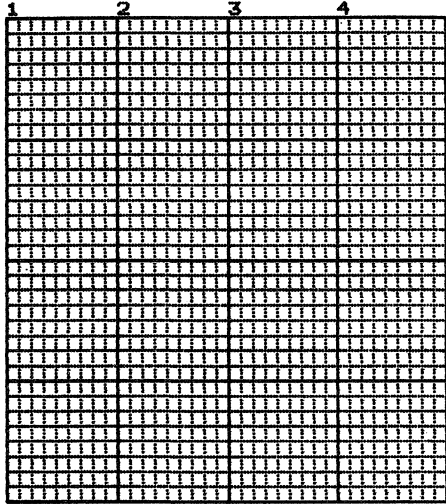
Figure 63 shows an example of a 4-by-4 layout grid.

ACS Layout: 4x4

Characters available : ABCDEFGHIJKLMNOPQRSTUVWXYZ [!@#\$%^&*()_+!:"'>?<.
abcdefghijklmnopqrstuvwxyz `1234567890—[\, ' < / < ,



actual size :



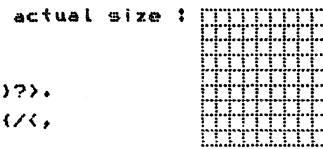
HRSLF030-0

Figure 63. Alternative Character Set Layout 4 by 4

9-by-9 Layout Grid

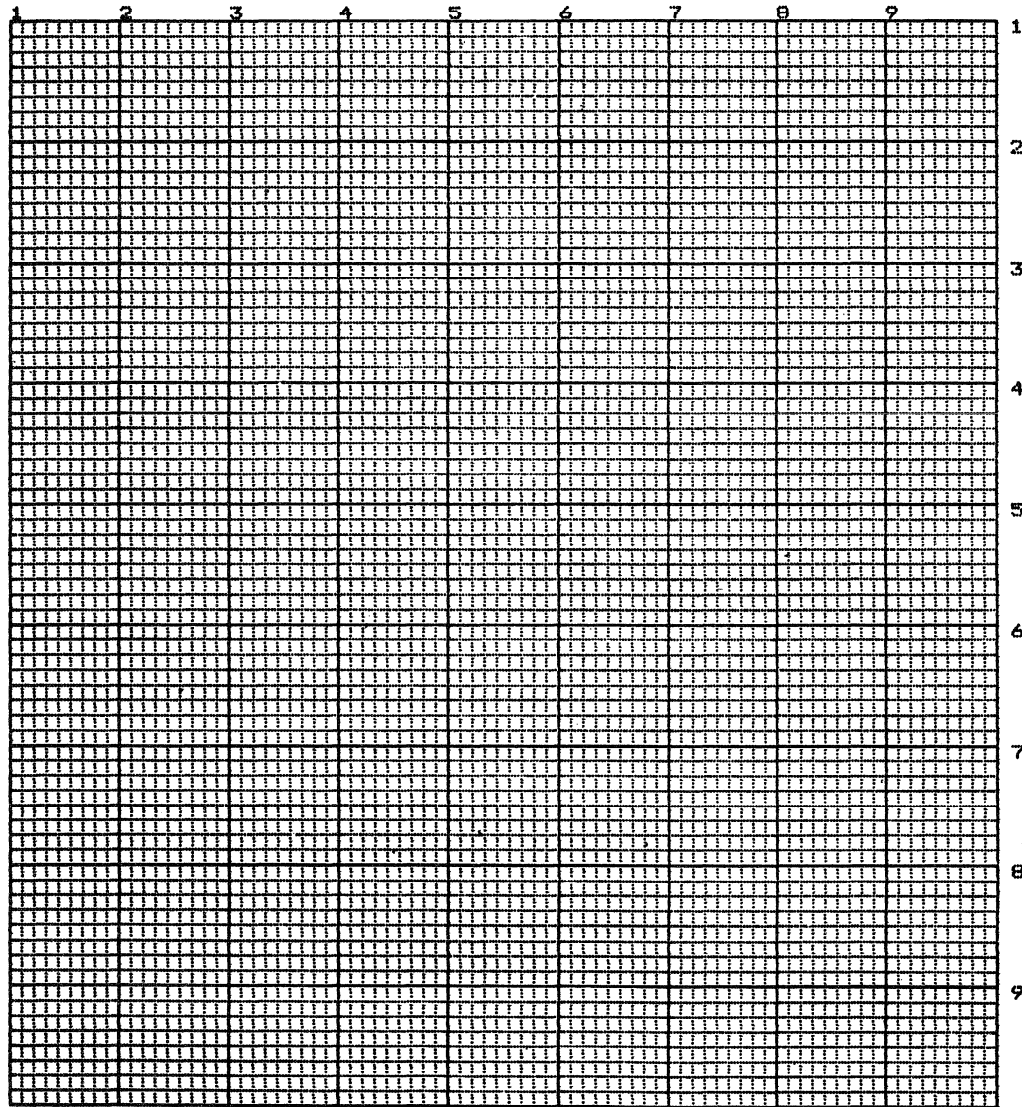
Figure 64 shows an example of a 9-by-9 layout grid.

ACS Layout: 9x9



Characters available :

ABCDEFGHIJKLMNOPQRSTUVWXYZ`|@#\$%^&*()_+!:"'>?.
abcdefghijklmnopqrstuvwxyz`1234567890—[\ , ' / < ,



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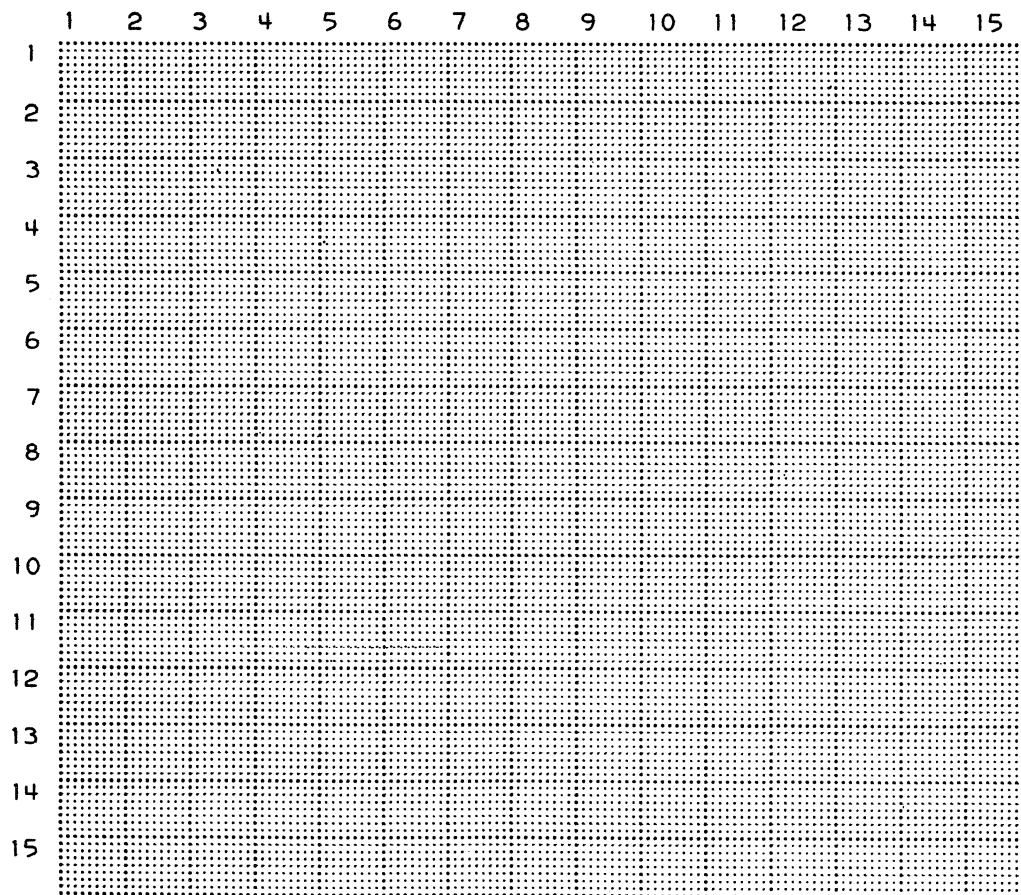
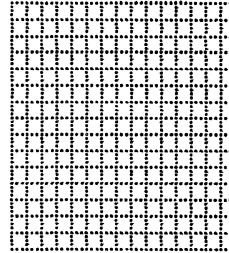
Figure 64. Alternative Character Set Layout 9 by 9

15-by-15 Logo Layout Grid

Figure 65 shows an example of a 15-by-15 layout grid.

Logo Layout: 15x15

actual size :



HRSLF031-0

Figure 65. Logo Layout: 15 by 15

Appendix G. Differences between APF on AS/400 System and System/36

This appendix describes the differences between APF on the AS/400 system and System/36. This appendix defines these differences as:

- Functional
- Command.

Functional Differences

Following is an explanation of the functional differences when using APF on the AS/400 system.

Logos

On System/36, logos are supported differently than alternate character sets. On the AS/400 system, logos and alternate character sets are both supported as symbol sets.

Alternate Character Sets

On System/36, alternate character or symbol definitions allow 48 or 96 characters in a character set. On the AS/400 system, for 1-byte codes, the maximum number of symbols in a symbol set is limited to the number of different characters you can type on your keyboard. With 2-byte codes, the number is greatly increased.

On System/36, symbol definitions may contain standard characters. (For additional information, see the *System/36 Advanced Printer Function Guide*.) This function is not supported on AS/400 APF. When System/36 symbol definitions containing standard characters are migrated to the AS/400 system using the migration aid, any standard characters in these symbol definitions is dropped. On the AS/400 system, you must change your form description or application data generates the spooled print data to include the standard characters that were a part of the System/36 symbol definition.

On System/36, an alternate character set file contains only one alternate character set. On the AS/400 system, each alternate character set is a member of a file. Because files on the AS/400 system may contain multiple members, a symbol set file may contain multiple symbol set (members). Each symbol set can contain multiple character definitions.

Forms Control Files

On System/36, up to two alternate character sets are allowed for a forms description. Only the positions (row and column) of the alternate character sets are specified in the forms control file. The names of the alternate character sets used by the forms control file is not specified until the merge form and data step is done.

On the AS/400 system, up to 20 symbol sets may be used for a forms description. The names(s) of the alternate character sets used by the forms description must be specified when the form description is created. When System/36 forms control files containing alternate character sets are migrated to the AS/400 system using the migration aid, a default character set name of CHARSET1 or CHARSET2 is generated for the first and second alternate character sets used in the forms control file.

On the AS/400 system, you must change your form description to specify the correct symbol set file (replace CHARSET1 or CHARSET2 with (PARM1), file (PARM2), and library (PARM3) of symbol set). When converting System/36 APF files, the migration utility creates a file with the same name as existed on System/36. The member name will be the same as the file name. The library name should be the library name specified when using the System/36 migration aid to migrate the APF files.

On System/36, up to four logos are allowed for a forms description. Only the position (row and column) of the logos are specified in the forms control file. The name(s) of the logos used by the forms control file is not specified until the merge form and data step is done.

On the AS/400 system, up to 20 symbol sets (logos or alternate character sets) may be used by the forms description. The name(s) of the logos used by the forms description must be specified when the form description is created. When System/36 forms control files containing logos are migrated to the AS/400 system using the migration aid, a default logo name of LOGO1, LOGO2, LOGO3 or LOGO4 is generated for the logos used in the forms control file.

On the AS/400 system, you must change your form description to specify the correct logos (for example, replace LOGO1 with member (PARM1), file (PARM2), and library (PARM3) of logo). When converting System/36 APF files, the migration utility creates a file with the same name as existed on System/36. The member name will be the same as the file name. The library name should be the library name when using the System/36 migration aid to migrate the APF files.

Command Differences

The following lists System/36 procedures and equivalent AS/400 commands used by APF:

System/36 Procedures	AS/400 Commands
APF	STRAPF
APFA	STRAPF
APFF	STRAPF
APFL	STRAPF
APFM	MRGFORMD

Bibliography

The manuals below are listed with their full title and base order number, and with the shortened version of the title. When these manuals are referred to in the text, the shortened version of the title is used.

For more information, refer to the following System/36 publications:

- *IBM 5224 Printer Models 1 and 2 Operator's Guide*, GA34-0092, describes how to use the 5224 Printer.
Short Title: *Operator's Guide for the 5224 Printer.*
- *IBM 5225 Printer Models 1, 2, 3 and 4 Operator's Guide*, GA34-0054, describes how to use the 5225 Printer.
Short Title: *Operator's Guide for the 5225 Printer.*

For more information, refer to the following IBM AS/400 publications:

- *Publications Guide*, GC41-9678, lists all AS/400 publications.
Short Title: *Publications Guide*
- *Programming: Control Language Reference*, SC41-0030, describes commands and parameters that you use for various OS/400 functions.
Short Title: *CL Reference*
- *Data Description Specifications Reference*, SC41-9620, explains how to use data description specifications.
Short Title: *DDS Reference*
- *System Operator's Guide*, SC41-8082, explains the operation of individual devices, and system operation.
Short Title: *Operator's Guide*

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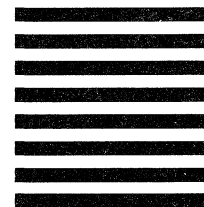
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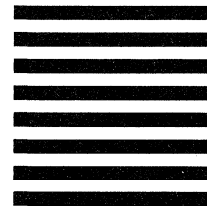
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